VOLUME 60, NUMBER 4

PERSPECTIVES on Science and Christian Faith

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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VOLUME 60, NUMBER 4

(US ISSN 0892-2675)

DECEMBER 2008

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Editor

ARIE LEEGWATER (Calvin College) 1726 Knollcrest Cir. SE, Grand Rapids, MI 49546 leeg@calvin.edu

Managing Editor

LYN BERG (American Scientific Affiliation) PO Box 668, Ipswich, MA 01938-0668 lyn@asa3.org

Book Review Editors

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JAMES C. PETERSON (McMaster University Divinity College and Faculty of Health Sciences) 1280 Main St. West, Hamilton, ON L8S 4K1 Canada peterso@mcmaster.ca

ARIE LEEGWATER (Calvin College) 1726 Knollcrest Cir. SE, Grand Rapids, MI 49546 leeg@calvin.edu

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Perspectives on Science and Christian Faith (ISSN 0892-2675) is published quarterly for \$40 per year by the American Scientific Affiliation, 55 Market Street, Ipswich, MA 01938-0668. Phone: 978-356-5656; Fax: 978-356-4375; asa@asa3.org; www.asa3.org

Periodicals 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, PO Box 668, Ipswich, MA 01938-0668.

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- Submit all manuscripts to: Arie Leegwater, Editor, Calvin College, De Vries Hall, 1726 Knollcrest Circle SE, Grand Rapids, MI 49546-4403.
 E-mail: leeg@calvin.edu. Submissions are typically acknowledged within 10 days of their receipt.
- 2. Authors must submit an electronic copy of the manuscript formatted in Word as an email attachment. Typically 2–3 anonymous reviewers critique each manuscript submitted for publication.
- 3. Use endnotes for all references. Each note must have a unique number. Follow *The Chicago Manual of Style* (14th ed., sections 15.1 to 15.426).
- 4. While figures and diagrams may be embedded within the Word text file of the manuscript, authors are required to also send them as individual electronic files (JPEG or TIFF format). Figure captions should be provided as a list at the end of the manuscript text. Authors are encouraged also to submit a sample of graphic art that can be used to illustrate their manuscript.

ARTICLES are major treatments of a particular subject relating science to a Christian position. Such papers should be at least 2,000 words but **not more than 6,000 words in length**, excluding endnotes. An abstract of 50–150 words is required. Publication for such papers normally takes 9–12 months from the time of acceptance.

COMMUNICATIONS are brief treatments of a wide range of subjects of interest to *PSCF* readers. Communications **must not be longer than 2700 words**, excluding endnotes. Communications are normally published 6–9 months from the time of acceptance.

NEWS & VIEWS are short commentaries on current scientific discoveries or events, or opinion pieces on science and faith issues. Lengths range **from 200 to 1,500 words**. Submissions are typically published 3–6 months from the time of acceptance.

BOOK REVIEWS serve to alert the readership to new books that appear significant or useful and engage these books in critical interaction. Guidelines for book reviewers can be obtained from the incoming book review editors. Note respective subject areas:

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- James C. Peterson (peterso@mcmaster.ca): apologetics, biblical studies, bioethics, ethics, genetics, medical education, philosophy, and theology.
- Arie Leegwater (leeg@calvin.edu): cosmology, engineering, history of science, mathematics, non-bio technologies, and physical sciences.

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Editorial

The Challenge of Interpretation

traditions which condition the acquisition of scientific knowledge. Every interpretation happens within an interpretive tradition. Even in sites where one can expect a similar interpretive tradition to hold, say in Calvinist centers such as Amsterdam, Belfast, Edinburgh, and Princeton, Darwin's theory of "descent with modification" was read differently. In short, the world is seen as a text marked by a multiplicity of meanings. Not only is the way we read Scripture bound up with all kinds of subjective factors, but also our reading of the "book of nature": the practice of science itself. Frequently, two differing, but parallel, modes of describing the natural world are compared: one is that of "discovery" or "reading"; the other is that of "construction" or "invention." The language of discovery assumes that the "laws of nature" are written in the book of nature. Ours is the task of faithfully transcribing what is written in this book. The language of discovery further suggests that objects are given directly to the mind with little mediating experience.

In contrast to the language of discovery is one of "construction" or "invention." It suggests that scientists generate different vocabularies, different ways of speaking, that are more or less useful in predicting and controlling what happens. Our sense, say, of the order or disorder in the universe is a function of our differing descriptions or interpretations and is not an inherent element in the world itself. Experimental systems, for example, create spaces of representation for things that otherwise cannot be grasped as scientific objects. Our laboratory language speaks of models and model reactions. Models of what? models of what is going on "out there in nature." Thus, nature itself only becomes real in scientific and technical perspective as a model. There seems to be no final point of reference for anything that becomes involved in the practice of scientific representation. The necessity of representation and experimental intervention

Arie Leegwater

ne of the descriptors of ASA is its "commitment to integrity in the practice of science." I surmise that for many of us integrity circles about the idea of faithfulness to the facts: speaking the truth about what has been discovered, presenting things fairly, documenting items carefully, and hewing close to the line by not overextending arguments or extrapolations. The picture is one of presenting "objective" facts. Donald MacKay once expressed it in these words: "The Christian case for objectivity as an ideal in science is so obvious as to hardly need stating ... [O]ur goal is objective value-free knowledge" (JASA 36 [1984]: 235). He went on to suggest that any proposal to dismiss the ideal of value-free knowledge as a "myth" would be irrational and irreligious.

With this in mind, science is often considered to be the prime example of objective knowledge. It is an international affair; scientific ideas are not limited to or compromised by national borders and political boundaries. A certain scientific theory may well have been accepted in one locality before another, but nowhere do we find examples of correct or accurate thought patterns being restricted to a specific geographic location. Science and its laws are universal. Science travels well.

This narrative is embodied in our scientific ethos and is ingrained in many of the textbooks we use to introduce a new generation to science. Science's history is inherently progressive, tending toward a codification of ideas or concepts. This history depicts the human mind actively reading "the book of nature" and entraining its discoveries in a factually detailed narrative that led up, seemingly inevitably, to the science of today.

Recent social and historical studies of science challenge this comforting narrative and its assumption of value-free knowledge. They call attention to "subjective" factors: local contexts and interpretive



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implies that any possibility of immediate evidence is foreclosed. There is no immediate experience. Every experience of the "outside" world is mediated by instruments and subject to differing interpretations.

Fifteen years ago Robert Crease in The Play of Nature (Bloomington, IN: Indiana University Press, 1993) gave voice to the tension created by this seeming chasm between objective and subjective interpretations of scientific practice. Using an analogy from the theater (the distinction between production and performance) he described the antinomic character of scientific experimental performances as being simultaneously ontological, or concerned with the real presence and disclosure of invariants in the world, and praxical, or shaped by human cultural and historical forces. This antinomic character of science gives rise to the temptation to overemphasize one of two different aspects, namely, its objectivity (its invariant structure) on the one hand, and its subjectivity, its social construction, on the other. But on closer examination neither discovery nor construction, by itself, seems to be an adequate metaphor for the production of scientific knowledge. Crease's theatrical analogy makes clear that scientific phenomena take place amid a complex interaction of both internal and external interpretive horizons.

The issue of transcendence, that is, the recognition of a need for a fusion of horizons – the internal and external-needs to be addressed. If, in the play of nature, we are forced to choose between a subjective (or constructive) view of science and an objective (or discovery) view of science, I think we will continue to remain uncomfortable with the incessant, almost dialectical, movement between the two. But does even a co-working of internal and external horizons represent a genuine solution to the impasse or chasm I highlighted earlier on? I am inclined to think not, as long as this co-working negates the transcendental or vertical dimension: that is, an ordering principle, a point of coherence, in which and through which all the various creational factors-both our subjective interpretations and the structural givens-derive their meaning. Efforts at integration or an acknowledgment of the co-working of several factors do not stand on their own, but are nourished by a deeper unity-an order which comes to us as revelation from God's good hand.

We do not need to be fearful of interpretation. As my colleague James Smith in The Fall of Interpretation: Philosophical Foundations for a Creational Hermeneutic (Downers Grove, IL: InterVarsity Press, 2000) has argued: "To be human is to interpret - to negotiate understanding between two or more finite entities" (pp. 149-50). Interpretation is not due to our fallen-ness, but reflects our finitude as creatures and reflects the goodness of creation. Experimental scientists do not read the book of nature or depict it as much as interpret it. But neither do they construct the world in any way they wish. Rather, we are faced with structural creational givens that invite interpretation-interpretation which is normed by that very structure. Creational revelation holds simultaneously both for the scientific investigator and that which is investigated. A modest answer is to insist on a robust Christian view of creation, creation as a revelation that invites interpretation, daily surrounds us, and speaks to the believing heart in all its trustworthiness and faithfulness.

Arie Leegwater, Editor leeg@calvin.edu



This last 2008 issue begins with an "In Memoriam" written by Robert Herrmann for Sir John Templeton, who has supported ASA in a variety of ways. Flanked by an article by George Murphy on cosmology and atonement and an essay review by J. W. (Jack) Haas of two books dealing with Catholic and evangelical understandings of science is a series of articles written by David Snoke, Douglas Groothuis, and Walter Thorson, and a book review by William Dembski. In turn, these articles consider the detection of undesign in a designed universe, the viability of design arguments, and the analysis of God's use of chance in David Bartholomew's recent book.

Readers will notice a call for papers for a special issue of *PSCF* devoted to "psychology, neuroscience, and issues of faith" on page 224. Nineteen book reviews and two book notices complete the issue.

In Memoriam



Sir John Templeton November 29, 1912–July 8, 2008

n July 8, 2008, the world of finance marked the passing of one of its great leaders, Sir John Marks Templeton. He was 95, a welldeserved age for someone who had lived his life in moderation and discipline, yet became one of the most successful practitioners of Wall Street. Indeed, when he retired in 1992, he sold his various management funds to Franklin Resources of San Mateo, California, for \$22 billion.

At that time, Sir John turned all his energies to the discovery and development of spiritual wealth. He argued that he had spent most of his career enriching people financially; now it was time to make them wealthy spiritually. He had already inaugurated the Templeton Prize for Progress in Religion, beginning in 1972 with Mother Theresa as first recipient of a cash gift exceeding the Nobel Prize. Perhaps of most interest to ASA members, many of the recipients have been scientists with a keen interest in the interplay between science and religion. They include Nobel laureate physicist Charles Townes, co-inventor of the laser, who is a member of our Advisory Board, and biologist Sir Alister Hardy, knighted for his extensive study of North Sea whales and director of an

Sir John Templeton: Member and Patron of ASA

Robert L. Herrmann

Oxford research center on religious experience. Also receiving the Prize was physical biochemist and theologian the Rev. Canon Arthur Peacocke, who did early work on the physical chemistry of DNA. He studied theology at the University of Birmingham and was ordained as a worker-priest. In 1986, he founded the Society of Ordained Scientists to further the science-theology dialogue. In the 1990s, he ably directed the European section of the Science-Religion Course Program which I administered for the John Templeton Foundation.

The eight other outstanding scientists who received the Prize were physicistcosmologist Paul Davies; physicists Freeman Dyson, Ian Barbour, George

Robert L. Herrmann is a retired biochemist who formerly served as the executive director of the American Scientific Affiliation. A graduate of Purdue University, he earned a PhD in biochemistry at Michigan State University and was a Damon Runyon Fellow at the Massachusetts Institute of Technology before joining the faculty of the Boston University School of Medicine. He also has been professor and chair of biochemistry at Oral Roberts University Schools of Medicine and Dentistry.

Bob is the author of over 100 articles and chapters and five books, many of which address questions at the interface between science and faith. He is co-author with John Marks Templeton of The God Who Would be Known (1989) and Is God the Only Reality? (1994), and the author of Sir John Templeton: From Wall Street to Humility Theology (1998). He recently edited Expanding Humanity's Vision of God: New Thoughts on Science and Religion.



Robert L. Herrmann

[After Sir John] sold his various management funds ..., [he] turned all his energies to the discovery and development of spiritual wealth.

In Memoriam

Sir John Templeton: Member and Patron of ASA

Ellis, Sir John Polkinghorne, and Carl Fredrich von Weizsäcker; biologist Charles Birch; and mathematician John Barrow. Of these, Sir John Polkinghorne is arguably the most prominent, having established a worldwide reputation in quantum physics as Chair of Mathematical Physics at the University of Cambridge. Then, after resigning to take Holy Orders in the Anglican Church and serving as a parish priest for seven years, he was welcomed back to Cambridge as President of Queens' College. He is also a Fellow of the Royal Society.

John Templeton's fascination with science as an entree to theological truth began at an early age. Back in Winchester, Tennessee, as a young boy, he and his older brother Harvey were introduced to the world of ideas by their mother, Vella, who had been blessed with advanced study in mathematics, Greek, and Latin at Winchester Normal College. She shared her love of learning by arranging two trips to Florida during winter vacations and two camping-out motor trips, one to the Northeast and the other to California. In each case, Vella arranged extensive visits to museums and libraries, allowing scarcely a minute to be wasted.

At home the boys got two old cars and combined parts to make one that would run. Years later his brother Harvey became a racer with a Ford Formula 4 and made a good friend of actor and fellow-racer Paul Newman. John also collected butterflies, a hobby which has continued throughout his life. The halls and offices at his headquarters at Lyford Cay in Nassau, Bahamas, are beautifully decorated with some of his trophies.

Still at home, John decided to try to go to Yale. Although he was at the top of his class at Central High School in Winchester, the idea was very challenging; no one had ever gotten into Yale University from Winchester. Perhaps part of the reason was the requirements of the College Entrance Examination Board. Entrance requirements included a minimum of four years of Latin, four years of English, and four years of mathematics. John's high school offered only three years of math, so the principal agreed to offer solid geometry and trigonometry as a fourth-year class, provided John would teach the class and recruit eight friends so that the class would meet state requirements. The principal set the examinations and graded them, and all John's students passed.

John's years at Yale were equally successful, and he went on from there to England as a Rhodes scholar, taking a degree in Law at Oxford. There was no business program at Oxford, which John would have preferred, but years later as a very successful investor, he funded a business school in the University which was named Templeton College in honor of his parents, Harvey and Vella Templeton.

John's mother was also a strong influence in his spiritual education. She was active in the local Presbyterian church, and during a period of spiritual growth, he took on the role of Sunday School Superintendent. Vella was also enamored with the fledgling Unity School of Christianity, which emphasized "thought control," the ability to discipline yourself and to focus your mind on things that are positive and productive and in tune with the great divine principles of the universe. This led to freedom for John to make virtually all his own decisions, and he thrived in this climate of trust.

As he moved through the study of economics and law, he continued to build principles of thrift and discipline which enabled him to succeed in spite of the unfavorable economic times that he encountered in the 1930s. He had married a girl from Tennessee, Judith Dudley Folk, and together they began a pattern of saving in which they pledged half of their income to the church and to investment. This led to a pattern of bargain hunting, budget control, and careful investment that became the foundation for his wealth. Sadly, Judith was killed in a traffic accident during a trip to Bermuda, and John had the burden of grief and the full care of their three children at an early time in his career.

Ultimate fame and success came when he moved his investment funds to Nassau, in the Bahamas, and built a powerful and gifted group of co-workers who could function, as he said, away from the influences of Wall Street, and where decisions could be made more thoughtfully and less impulsively.

Many of our readers may be unaware of the various ways that Sir John has supported our organization over the years. When I became Executive Director in 1981, we faced a debt of \$60,000, largely because of a failed advertising campaign to recruit new subscribers for our journal. At the time, I went to some of our wealthy members for help; John Templeton was sympathetic but not interested in investing in what looked like another nonprofit organization with a chronic negative balance. As it turned out, the rank and file rose to the challenge, and we were soon out of debt.

In the interim, John Templeton expressed interest in working with us on a new campaign for the journal. Eventually, after several proposals from us, during which time I recognized his keen insights into financial management, we were granted a budget for a new program which helped to support the journal and, with a 15% overhead, the ASA as well. Thus began a relationship between ourselves and John Templeton of an extensive lecture program in universities, seminaries, and churches all over North America and Europe. Dozens of our members presented on science-religion themes. This program continued throughout the tenure of Executive Director Don Munro. Today, with Randy Isaac at the helm, the ASA continues to receive support for various programs from the Templeton Foundation.

In conclusion, I will miss Sir John Templeton for so many reasons beyond his generosity to those of us who have worked with him over the years. We have seen his testimony to the love of God as expressed in his own gentle and humble spirit. We applaud his desire that all of humanity would be involved in the discovery of more spiritual realities. We will miss him!

We extend condolences to his family for which he has for so many years been shepherd and counselor.

Note from the Editor

I am pleased to present a graphical "annual" report to readers of *PSCF*. This report covers activities from September 1, 2007 through July 31, 2008.

Articles and Communications	Total Submitted	Accepted	Pending	Rejected	Submitted by ASA members	Accepted from ASA members
Apologetics	1 (1.8%)			1	0	0
Biotechnology	5 (9.1%)			5	3	0
Computers/AI	1 (1.8%)	1			1	1
Design/ID	7 (12.7%)		4	3	3	0
Environment	2 (3.6%)	2			2	2
Evolution	5 (9.1%)	1		4	1	0
Mathematics	1 (1.8%)			1	1	0
Medicine	2 (3.6%)			2	0	0
Sci/Rel/HOS	8 (14.5%)	2		6	4	1
Social Sciences	2 (3.6%)		1	1	0	0
Technology/Engr	2 (3.6%)	2			1	1
Theology	1 (1.8%)	1			1	1
Scripture/Science	9 (16.4%)	2	1	6	4	2
YEC/Flood	3 (5.5%)	1	1	1	2	1
Author Exchange	2 (3.6%)	2			2	2
Early Career	2 (3.6%)	2			2	2
Essay Review	1 (1.8%)	1			1	1
Interview	1 (1.8%)	1			1	1
Totals	55	18 (32.7%)	7 (12.7%)	30 (54.5%)	29 (52.7%)	15 (27.3%)

Statistics: September 1, 2007–July 31, 2008

Looking forward to 2008–2009, **Arie Leegwater**, *Editor*

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George L. Murphy

An understanding of atonement that is plausible in a scientific context is a necessity if the gospel is to be proclaimed convincingly in a scientific world.

Article

Chiasmic Cosmology and Atonement

George L. Murphy

Traditional views of atonement have come under attack recently. Not only have specific theories been criticized, but some writers reject the very idea of atonement. Since some arguments to this effect have been based on scientific knowledge of the world, it is important to develop an understanding of atonement that makes contact with the modern science-theology dialogue. In this article,¹ that is done as part of the chiasmic cosmology program in which the universe is seen in the context of a theology of the cross.

Sin is described here as a threat to creation, and a view of atonement stressing the idea of "new creation" is presented. This involves a reorientation toward God's intended goal of the evolutionary development of humanity and the world, which sin had thrown off course. The work of Christ is then seen as the descent of the Creator in order to re-create, the cross-resurrection event paralleling God's initial creatio ex nihilo. The effects of this work on humanity are the death of the human as sinner and the new life of the believer reconciled to God. This article concludes with brief discussions of the Christ-Adam relationship, the new creation theme in other models of the atonement, and the cosmic scope of atonement.

B elief in the atoning work of Christ has come under attack recently. There is nothing new about criticisms of specific "theories of the atonement," but today a number of writers who want to retain some semblance of Christianity reject the very idea of atonement. There are a number of reasons for such criticisms, such as the belief that divine requirement of atonement implies a legalistic and vindictive picture of God.

George L. Murphy holds a BS from Ohio University and a PhD from Johns Hopkins in physics and an MDiv from Wartburg Seminary. He is a retired ELCA pastor who has served Lutheran and Episcopal congregations and is adjunct faculty at Trinity Lutheran Seminary in Columbus, Ohio. In addition to research papers in physics, he has published numerous articles and five books on faith-science issues. His most recent books are The Cosmos in the Light of the Cross (2003) and Pulpit Science Fiction (2005), a collection of science fiction story sermons and essays on science fiction and religion. He has also contributed numerous print and internet resources for preachers. Murphy writes the "Handiwork" column for Lutheran Partners to help church leaders deal with science and technology in ministry, and he speaks to clergy and lay groups on these issues.

The Need to Relate Salvation and Science

There are also, however, arguments based on the modern scientific understanding of the world. Two centuries ago and more, some writers saw the heliocentric model of the planetary system and the possibility of a plurality of worlds as incompatible with Christian ideas of salvation. In 1832, for example, Ralph Waldo Emerson said, "I regard it as the irresistible effect of the Copernican astronomy to have made the theological scheme of Redemption absolutely incredible."² More recently, the difficulty of reconciling the traditional Christian "Fall" scenario with what is known of evolution has been claimed to render the concept of atonement pointless. John Spong argues this way:

As post Darwinians, we no longer believe we were created perfect. We were created as single cells of life and evolved into our present complex, conscious and self-conscious forms. Since we were never perfect, we could not fall into sin. Since we could not fall into sin, we could not be rescued. How can one be rescued from a fall that never happened or be restored to a status we never possessed?³

Such claims are not new. They have long been used by nonbelievers in attacks on traditional Christianity *and* by Christians who reject the idea of human evolution. In an earlier article in this journal, I explained why such arguments are inept and sketched a way of understanding original sin in an evolutionary context.⁴ Nevertheless, an understanding of atonement that is plausible in a scientific context is a necessity if the gospel is to be proclaimed convincingly in a scientific world.

In recent decades, an extensive dialogue between Christian theology and science has focused on issues related to the doctrine of creation but has shown relatively little interest in questions of how God saves humanity and the world in Christ.⁵ The need to make the message of salvation in Christ convincing to scientifically literate people means that the scope of religion-science discussions must be extended to include salvation in a more central way.

This is also necessary for the coherence of Christian thought, which holds that the God who saves us is the God who has created us. As Athanasius said in a phrase so basic that it might be called "Athanasius' Axiom," "The renewal of creation has been the work of the selfsame Word that made it at the beginning."⁶ Theology must take science seriously in its treatment of sin and salvation, as well as in its reflections on creation.

Christians over the centuries have developed a number of "theories of the atonement," such as Christus Victor, Vicarious Atonement, and Moral Influence.⁷ These all have some biblical support and can be helpful in preaching and in Christian education. My point here is not that they should be abandoned entirely but that there is another way of understanding atonement that is better able to deal with issues raised by the modern scientific picture of the world. The model I will sketch sees atonement in terms of the biblical concept of "new creation," an idea implicit in Athanasius' Axiom. More precisely, and with evolution in view, we will speak of a *reorientation* of creation through the life, death, and resurrection of Jesus Christ. Other theories have not neglected the new creation theme, but they have not given this concept a prominent place.

"The renewal of creation has been the work of the selfsame Word that made it at the beginning." —Athanasius' Axiom

The word "atonement" is often understood in a limited sense, as if it had to do only with sacrificial concepts. It is important to remember the more fundamental meaning of the word. Here popular etymology is correct, for the word is literally at-one-ment. It was used by Tyndale to translate *katallag*ēs in 2 Cor. 5:18, where most modern versions use "reconciliation."⁸

While the model of atonement suggested here has broader interest, the purpose of presenting it in this setting is to relate atonement to scientific understandings of the world, and especially to issues raised by evolution. We will not consider the work of Christ in itself as a scientific theory. Scientific issues are more important for understanding the context of salvation (and, in particular, what we are saved *from*) than for the process of salvation itself. So if science seems to have a peripheral role in some of the following discussion, readers should remind themselves of the whole picture of divine activity in the world, activity of which the atoning work of Christ is a part.

Previously I have dealt with issues of science and technology in terms of a theology of the cross, as part of what I have called "chiasmic cosmology."⁹ Luther developed that theology to deal with issues of sin and salvation, the central concerns of the Reformation.¹⁰ In addressing scientific issues related to creation, I have used it in a different way, and now reconnect with the matters that Luther had in view. The connection between the cross-resurrection event and creation will not be a surprise if we remember Athanasius' Axiom. The Creator is also the God of new creation, who in spite of sin and everything that threatens the world brings creation to its intended goal.

The Threat to Creation

Ephesians 1:10 tells of God's "plan for the fullness of time, to gather up all things in [Christ], things in heaven and things on earth." Creation is for the sake of Christ. But something has gone wrong with that plan. Atonement is needed because creation is alienated from God, an alienation revealed by human sin. In Romans 1, Paul emphasizes that refusal to acknowledge the true God *as Creator* is the basic human problem.

Sin threatens creation. The basic sin has often been seen as pride, the desire of the creature to usurp the place of the Creator. We want to be more than what God has created us to be. Feminist theologians, however, have emphasized that, in their experience, resistance to God's will is often expressed in the opposite way, as a failure to be what God intended them to be in the fullest sense. We may indeed be tempted to usurp God's place, but we may also be tempted to be unengaged nonentities, refusing our calling to represent God in ruling and serving the world.¹¹ Our failure may be the deadly sin of pride but it can also be the deadly sin of sloth. And it may be falsehood, a willful denial of the truth about God and the world.12 Sin in all these forms is an attempt to thwart God's will for creation.

The common biblical terms for sin (Hebrew *chata'* and Greek *hamartan*ō) have the sense of missing a mark. The same idea of failing to achieve a goal can be discerned in the Old Testament's common word for "repent," *shubh*, which means to turn back or return. If God intended creation to move toward the goal described in Eph. 1:10, creation is under threat if part of it moves away from that goal.

Seeing sin in this way helps us to deal with the challenge to Christian concepts of sin and salvation, the challenge that arises from evolution. The rest of this section summarizes an earlier article in this journal, which should be consulted for further detail.¹³

God has created humanity through an evolutionary process in which natural selection was a major factor. Our prehuman ancestors were the members of their species who were most successful in competition with others for various survival needs. They were not "sinful" because they killed, deceived, were sexually promiscuous, and did other things that would be sinful for their human descendants. But when the first humans, hominids who somehow were made aware of God and God's will for them, came into being, they would have had strong propensities for the same types of behavior which would have been difficult to avoid. They would have been strongly tempted by the basic sin, that of putting other things ahead of God.

Sin threatens creation. ... Our failure may be the deadly sin of pride but it can also be the deadly sin of sloth. And it may be falsehood ... Sin in all these forms is an attempt to thwart God's will for creation.

Studies of our closest primate relatives show that they do behave in ways that natural selection leads us to expect of the first humans.¹⁴ There is cooperative behavior among other primates, as there presumably was among our ancestors. But our knowledge of evolution in general and primate behavior in particular makes it quite unlikely that the first humans lived in a sinless "state of integrity" for any period of time.

Consider then those first hominids (without deciding how large that group may have been, or where or when they lived) who had evolved to the point of self-awareness and linguistic ability. They have developed abilities to reason and to communicate and, in some way, can receive and faintly understand God's Word. They have intimations of God's will for them, though we do not know how those intimations may have come to them. These first humans are at the beginning of a road along which God wants to lead them and their descendants to mature humanity and to complete fellow-ship with him.

In principle they can follow that road, but it will not be easy. They have inherited traits that enabled their ancestors to survive and pass on their genes, traits that predisposes them toward selfish behavior and away from the kind of relationships that God intends for them. Sin is not "hardwired" into them, but tendencies toward it are strong. They can refuse to trust God and can disobey God's will for them. History shows that humanity from the beginning has not worshipped and served the God of Israel and has been involved in continual conflict. That historical reality corresponds to the theological picture of humanity's gradual departure from God in Genesis 1–11. The first humans took a wrong road, one leading away from the goal that God intended. They and their descendants soon had lost their way.

This image of "taking the wrong road," like that of "the Fall," is a metaphor for the human condition, not a historical narrative. It is important to emphasize that it is not the condition of being on a journey that is sinful. The problem of sin is not that we are on a metaphorical evolutionary road, but that we are on a *wrong* road. Failure to make this distinction may result in the work of Christ being seen simply as one phase of the creative process, rather than as a correction of something that had gone wrong with it.¹⁵

Humanity is a "symbiosis" of genes and culture.¹⁶ Both help to transmit to each person the essence of humanity but both can also contribute to deviation from God's intention for humanity. Our genetic makeup, conditioned by natural selection, inclines us toward selfish behavior. The cultures in which we are conceived, born, and live exacerbate those tendencies. We are born as members of a tribe lost in the woods.

To say that there is a genetic component of original sin does not mean that there is a "gene for sin." Whether or not an action is sinful generally depends on the context in which it takes place as well as the action itself. Genes may give us tendencies for certain behaviors, but they do not force us to do those things.

To say that there is a cultural component of original sin means that sin is in part a result of our environment, an effect of "nurture" as well as "nature." The effects of our environment can be far more pervasive than mere examples, as the analogy of fetal alcohol syndrome due to a uterine environment suggests. They are not things that we freely choose to accept or reject, but influences that we take in "with our mother's milk."

There is solidarity in sin,¹⁷ so that people make up a "corrupt mass" (*massa perditionis*) in a classic phrase. More modern language speaks of "structures of sin" such as racism in human societies. A person born into a racist society is not predestined to be a racist, but it will be very "natural" to become one. Because of both genes and culture, we all start our lives on that wrong road, far from God, and thus are "missing the mark" from our beginning. Our sin of origin truly is sin. As Tillich put it, "Before sin is an act, it is a state."¹⁸

Neither strict Augustinians nor determined Pelagians will be satisfied with this model. Unregenerate people are not compelled to sin, but all people are sinners and would need grace even if they could theoretically avoid "actual sins." This approach does preserve the essence of what the western church has insisted upon, without theories about human history and the transmission of sin which are now seen to be untenable.

The Reorientation of Creation

With humanity separated from God and threatened with "not dying merely, but abiding ever in the corruption of death,"¹⁹ what was God to do? Scripture is clear about what God did do. With Abraham, God began to turn the course of history in a direction that would result in "all nations" being blessed. The prophets call people to "return to the LORD, your God" (Joel 2:13). Finally, the Creator appears on the scene in person, Jesus Christ.

"Why Did God Become Human?" That was the question posed by Anselm in his book *Cur Deus Homo*.²⁰ All the "theories" or "models" of the atonement have tried to answer that question. We need to bear in mind Forde's reminder that theories themselves do not save us or reconcile us to God.²¹ Theories and models are, however, helpful in communicating the gospel clearly.

The answer to Anselm's question for which I argue here starts from two texts from St. Paul: "If anyone is in Christ there is a new creation: everything old has passed away; see, everything has become new!" (2 Cor. 5:17) and "Neither circumcision nor uncircumcision is anything; but a new creation is everything!" (Gal. 6:16).

The explicit phrase "new creation" is found only in those two verses but the idea is much more common. We might think, for example, of the psalmist's prayer of repentance that asks, "Create in me a clean heart, O God, and put a new and right spirit within me" (Ps. 51:10). The use of the verb *br*' which expresses the divine prerogative of creation, as in Gen. 1:1, is significant. The cross and resurrection of Jesus Christ echo God's initial *creatio ex nihilo*. As Bonhoeffer puts it,

[T]he God of creation, of the utter beginning, is the God of the resurrection. The world exists from the beginning in the sign of the resurrection of Christ from the dead. Indeed it is because we know the resurrection that we know of God's creation in the beginning, of God's creating out of nothing. The dead Jesus Christ of Good Friday and the resurrected $\kappa\nu\rho\iotao\varsigma$ of Easter Sunday—that is creation out of nothing, creation from the beginning.²²

Themes related to new creation have been discussed, with greater or lesser emphases, throughout the course of Christian thought. With Athanasius' Axiom in mind, it is natural to look first to that theologian's early treatise On the Incarnation. The basic human problem here is that, after humans had been created and given the chance for participation in the life of God, their choice of sin set them on the way back to nonbeing.23 Athanasius argues that humanity was safe from dissolution and non-existence only through participation in the Logos, and thus could be saved only by virtue of the re-creative work of the Logos. "For being Word of the Father, and above all, he alone of natural fitness was both able to recreate everything, and worthy to suffer on behalf of all and to be ambassador for all with the Father."24

Over a century before Athanasius, Irenaeus, in his defense of the Christian tradition against the Gnostics, emphasized the unity of Creator and Redeemer and presented a distinctive view of the work of Christ as *recapitulation*. He saw Jesus going through the whole course of an individual human life to save humanity at all stages.²⁵ This does not mean that humanity is simply to be restored to its original condition. As Wingren explains Irenaeus' view,

[S]ince man was a growing being before he became enslaved, and since he is not restored until he has begun again to progress towards his destiny, man's restoration in itself is more than a mere reversion to his original position. The word *recapitulatio* also contains the idea of perfection or consummation, for recapitulation means that man's growth is resumed and renewed. That man grows, however, is merely a different aspect of the fact that God creates.²⁶

To recapitulate all of human life Christ also had to come to the end of life: "Then, at last," Irenaeus says, "He came on to death itself, that He might be 'the first-born from the dead, that in all things He might have the pre-eminence,' the Prince of life, existing before all, and going before all."²⁷ But as Irenaeus also insisted, the cross was not simply one element in a formal scheme.

Atonement comes about because God in Christ actually *does* something to change the status of people who "were dead through the trespasses and sins" (Eph. 2:1). To be effective, the work of Christ must overcome the nothingness toward which sinful humanity is headed, a nothingness which through its terror of death, guilt, and meaninglessness, it already experiences. If humanity and (as we shall note later) the rest of creation with it, is on the way to nothingness, God must re-create from nothing. Atonement parallels in a precise way the divine *creatio ex nihilo*. If that is the case, then we can begin to understand the necessity of the cross in two related ways.

The Descent of the Creator

Calvary is the way in which God enters into death – even into the lowest and most humiliating end, "the utterly vile death of the cross."²⁸ It is not just that he dies, but that he suffers what was considered the worst kind of death, one designed to be humiliating by Roman oppressors and considered cursed by the Jewish tradition.

"My God, my God, why have you forsaken me?" It was a death in separation from the source of life, in the darkness in which God cannot find God. And that is not only a human cry, for it is the person of the Son of God who speaks. By taking on human dying, God goes into the Deep, the nothingness that threatens creation.

This is not mere metaphor or symbolism. The Apostles' Creed is quite explicit: "crucified, dead, and buried." It continues with a phrase that was probably the last to be added to the creed and which has inspired a good deal of discussion: *descendit ad inferna*. Even the translation of this phrase is debated. The traditional rendering is "He descended into hell," while the version of the International Consultation on English texts is "He descended to the dead."²⁹

The traditional translation is richer but the modern one is not a mere banality. The redundancy, if indeed it is that, of saying "crucified, dead, and buried. He descended to the dead" means "He really did die. It is no figure of speech." Furthermore, we should not be misled by speculations about the afterlife that envision the souls of the departed as being immediately in heaven. There is, of course, that kind of picture in some places in the New Testament, but there is a sterner view in the Hebrew tradition. "In Sheol who can give you praise?" (Ps. 6:5; cf. also Ps. 88:5).

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However, the traditional English translation is "he descended into hell," and the typical Orthodox icon of the resurrection shows the "Harrowing of Hell," with the risen Christ breaking down the gates of hell, trampling down Satan, and releasing the saints of the Old Testament from prison. A similar idea was endorsed by Luther and the Lutheran tradition at the time of the Reformation.³⁰ The descent, in other words, is seen as the first act of the risen Christ.

The Reformed tradition, on the other hand, has understood Christ's descent into hell as his suffering the torments of the damned, including forsakenness by God, before his death. Mark 15:34 points in this direction. The descent into hell is then seen as the depth of Christ's passion.³¹ Barth developed this idea at some length in the *Church Dogmatics*. The Roman Catholic von Balthasar, on the other hand, in his theology of Holy Saturday, emphasized Christ's descent or his "going to the dead" as following his physical death but still, in a sense, as part of this passion. A recent study deals with the approaches of both of those theologians, with extensive citations.³²

Those two views, the descent into hell as the nadir of the passion and as the first act of the resurrection, are not mutually exclusive. Popular American television can illustrate that. The series *Prison Break*, in its later seasons, has moved on to other plot elements, but its original idea was intriguing. A man has been wrongly sentenced for murder, and to free him, his brother deliberately gets convicted of a crime so that he can get into the same prison and break his brother out. That illustration can be used to speak of Christ's descent into hell only with care, but within limits it is useful. God "made him to be sin who knew no sin, so that in him we might become the righteousness of God" (2 Cor. 5:21).

"Dead to Sin and Alive to God"

As Rom. 6:11 indicates, this work of re-creation is not something that God does for God's own self. It is the work of atonement, the restoration of creation to its divinely intended course of development which culminates in the goal sketched in Eph. 1:10.

Since the idolatry of which Paul speaks in Romans 1 separates humanity from God, that false faith must be destroyed before true faith in the true God is possible. In the passion and death of Christ, false faith comes to its inevitable consequence, the destruction of humanity. Jesus Christ is what humanity was always intended to be, and humanity that has turned away from God, humanity that does not want to be what God intended, kills him.

Which is to say, *we* kill him. Of course the cross did not come upon God unawares: it happened "according to the definite plan and foreknowledge of God" (Acts 2:23). But it was not God who cried, "Crucify him"; it was not God who demanded his death. It was our representatives in the Jerusalem crowd. Jesus died "for us" because we had to get rid of him in order to preserve our systems and our projects that were challenged by the message he proclaimed.³³

God allows us as sinful people to kill our one hope, the union of God with humanity in Christ, as the end of our self-chosen road. This is God's "alien work" which is foreign to God's character as love. But it is work that must be done if true faith is to be possible. Because if we are brought to realize what has happened—that our idolatry has destroyed the basis for our life and the hope for our future—then our false faith is shattered, and we are brought to see that we cannot put our ultimate trust in ourselves or in any creature. And when we have been reduced to nothing, the fact that Christ crucified is risen can bring about real faith in the real God, the one who "justifies the ungodly ... gives life to the dead and calls into existence the things that do not exist" (Rom. 4:5, 17). Trust in the true God comes about when the crossresurrection event becomes a reality for people. "Faith comes from what is heard, and what is heard comes from the word of Christ" (Rom. 10:17).

Against these claims for a new creative act of God in the death and resurrection of Christ, a skeptic may point out that there was no radical change in the world or the human race around AD 30. But no one who reflects on God's initial creative work should be surprised by this. God did not make a fully formed world instantaneously. His creative Word called into being a world that was capable of development; the universe was ten billion years old before life came into being on our planet. Over the past fourteen billion years, God has been working in and through created things as instruments, cooperating with the natural processes which science describes.³⁴ Similarly, the claim that the historical development of our world was turned back toward its proper goal by God's re-creative act in the crossresurrection event is compatible with the belief that it may take a long time before God's activity in creation through the means of grace has made significant progress toward that goal.

New creation takes place for the individual, but it is not just an individual matter. It is the creation of a new humanity (Eph. 2:15).³⁵ Paul speaks of this as the Body of Christ, the corporate reality of which Christ is the head. Teilhard de Chardin suggested that the Body of Christ should be seen as the future of the evolutionary process.³⁶ As single cells united a billion years ago to form multicellular organisms, so single persons are united in Christ in a true human community. Individual differences are not crushed out but, as Paul emphasizes in 2 Corinthians 12, they are brought out by being united. As Teilhard put it, "union ... creates ... *differentiates* ... [and] *personalizes.*"³⁷

Christ and Adam

A question that will naturally be asked about this discussion of sin and atonement has to do with passages in which Paul connects Christ and Adam – Rom. 5:12–21; 1 Cor. 15:21–22, 45–49. How can the

work of Christ reverse the effects of the sin of Adam if there was no historical Adam? The background of these Pauline texts and their interpretation are complex and cannot be explored in detail here, but some aspects of an answer to that question are in order.

To begin we should note that the model of original sin developed in an earlier article and summarized here does *not* require that there was no historical Adam. Genetic data make it hard to see how all present humans could have descended from a single couple living at any time that might fit a historical Adam and Eve, but the proposed model would not have to be changed if that turned out to be possible. My arguments do not depend on the size of the original human population.

We should also not overemphasize the importance of the Christ-Adam connection in Romans. In the first three chapters, Paul sets out the basic problem of universal sinfulness and God's solution to the problem in Christ without mentioning Adam. He sees sin extending far back in history but there is no mention of Adam or a unique "Fall" event. It is not until Chapter 5 that Paul appeals to the Christ-Adam pattern. This does not mean that the latter chapter should be ignored, but it would be wrong to infer from it that Paul believed the atoning work of Christ to be dependent upon a fall of an individual Adam.

In fact, that Christ-Adam relationship is expounded for the sake of Christ, not of Adam. Paul's purpose in these passages was not to teach us about Adam but rather to tell us the significance of Christ. It is "the man of heaven," not "the man of dust" (1 Cor. 15:48–49) who shows us what God intends humanity to be and who, in fact, accomplishes that goal for creation.

It is certainly likely that Paul, as a first-century Jew, believed Adam to have been a historical figure. The situation may be similar to what we find in Genesis 1, which uses ideas about the physical world such as the "dome" of the sky and the waters above it (Gen. 1:6–8). These are instances of the Holy Spirit's "accommodation" of inspiration to the views of a biblical writer and that writer's cultural context in matters that are not essential to the theological point being made.³⁸ The theological point for Paul is the significance of Christ, not the historicity of Adam, and one way of speaking about the significance of Christ may make use of a nonhistorical figure. Dunn's brief discussion of this point is help-ful.³⁹ In particular, "[T]he effect of the comparison between the two epochal figures, Adam and Christ, is not so much to historicize the individual Adam as to bring out the more than individual significance of the historic Christ."⁴⁰

The Theme of New Creation in Other Theories of the Atonement

All three major "theories of the atonement" have connections with the theme of new creation, though they do not give it a central role. In the "Latin theory," Christ makes satisfaction for the offense to God's honor by human sin. God's "honor" was not simply an abstract concept for Anselm but had to do with God's plan for a predestined number of souls to enter the heavenly city. That had to include humans because of the fall of some of the angels.⁴¹ Thus atonement repairs the damage done to creation by sin so that God's purpose for creation can be fulfilled.

In the Christus Victor model, Christ defeats the powers of evil that stand against humanity and that hold us in bondage. Although Christians have not always been aware of it, this theme is connected with the ancient image found in some Old Testament texts (Job 26:12–13; Ps. 74:12–17; Ps. 89:8–13; Isa. 51:9–10) of the *Chaoskampf*, the battle with chaos through which God created the world. The Gospel stories of Jesus walking on the sea make the point that the same God is present in Christ, and suggest that his work parallels that of those ancient mythic images of creation.⁴²

The Christus Victor theory could thus be seen as a model of re-creation clothed in dramatic images and metaphors. The approach taken here does not have the emotive impact of a combat with demonic powers, but it is correspondingly free of the problems that are raised by giving a central role to Satan in our understanding of atonement.⁴³

In "moral influence" theories, the crucified Christ brings about a change in those who behold him. The focus of most versions of such theories has been our response of love to the love shown by God, but we should emphasize first the creation of *faith* faith which indeed is active in love (Gal. 5:6). In spite of the way in which such theories are often described, the change that takes place need not be purely "subjective." At their best, they can be understood as descriptions of an act of new divine creation that God brings about. With John 12:32 in mind, Knutson spoke of these theories as giving a "Magnet Picture" of the atonement.⁴⁴ We can think of the way a magnet makes pieces of iron into little magnets even as it draws them to itself.

The Cosmic Scope of New Creation

To this point, the focus has been on our own species, but there are biblical texts that suggest that all creation, not just terrestrial humanity, is in need of atonement. Paul's statements in Rom. 8:18–25 about the subjection of creation to "futility" and its longing for liberation; the hope for new heavens and earth in Isaiah, 2 Peter, and Revelation; and especially the promise of the reconciliation of "all things" to God through the cross in Col. 1:20 point in this direction. We need to remain aware of these statements about the wider creation, but we should not allow the cosmic sweep of atonement to tempt us into excessive speculation about how it might be effected.

While the first human sin did not cause an abrupt change in the natural world, sinful human attitudes and behaviors have had a negative impact on the terrestrial environment. In recent years, we have become aware of how exploitation of nature has led to the destruction of habitats and extinction of species. The reconciliation of humanity to God would include fulfilling our responsibility to represent God in caring for the earth; as a result, the "nonhuman" parts of our planet would become more fully what God intends for them.

What we have said about the inevitability of sin for an intelligent species created through evolution applies to any putative extraterrestrials as well as to humans. If there are intelligent extraterrestrials, we can be sure that they are in need of atonement. The fact that at present we know nothing more about such creatures, either from Scripture or from science, means that anything else we say about the matter must be guesswork. Nevertheless, it seems likely that an understanding of atonement centered on the idea of new creation will be better equipped to deal with this issue than will models which were developed before the church took the possibility of extraterrestrials seriously.

We have, at best, hints about how the work of Christ might affect creation beyond the earth. Ephesians 3:10 says that the church is to make known the wisdom of God "to the rulers and authorities in the heavenly places." That originally meant proclamation to angelic powers, but we may see it today as a call to a cosmic mission.45 Robert John Russell argues that the resurrection of Christ is the first instance of a new law of nature, and that might be connected with the possibility of causal influence of God's ultimate future on the past.⁴⁶ It is worth pursuing such ideas as we attempt to understand more fully the atoning work of Christ in a universe that we understand through scientific study. But we must also bear in mind Paul's reminder that "now we see in a mirror, dimly" (1 Cor. 13:12a). *

Notes

- ¹This is a revision of a paper presented at the joint meeting of Christians in Science and the American Scientific Affiliation, Edinburgh, UK, 3 August 2007. I would like to thank the Rev. Sandra Selby for conversations and suggestions about the present version. I also appreciate the comments of reviewers of an earlier draft. Unless otherwise noted, biblical citations are from the New Revised Standard Version.
- ²Quoted in Michael J. Crowe, *The Extraterrestrial Life Debate*, 1750–1900 (Mineola, NY: Dover, 1999), 236. For other examples of this and other views on the issue, see the Subject Index entries under "redemption and incarnation, Christian doctrines of" on p. 678.

³John Spong in his email newsletter of August 15, 2007.

- ⁴George L. Murphy, "Roads to Paradise and Perdition: Christ, Evolution, and Original Sin," *Perspectives on Science and Christian Faith* 58 (2006): 109.
- ⁵See, however, the discussion initiated by Celia Deane-Drummond, "Shadow Sophia in Christological Perspective: The Evolution of Sin and the Redemption of Nature," in *Theology and Science* 6, no. 1 (2008): 13, with other contributions by James W. Haag, Nathan J. Hallanger, William O'Neill, SJ, and Robert John Russell.
- ⁶Athanasius, "On the Incarnation of the Word," in A Select Library of Nicene and Post-Nicene Fathers of the Christian Church IV, 2d ser. (1891; reprint, Grand Rapids, MI: Wm. B. Eerdmans, 1978), 36.
- ⁷See the classic discussion in Gustaf Aulén, *Christus Victor: An Historical Study of the Three Main Types of the Idea of the Atonement* (New York: Macmillan, 1961). A recent presentation of four views is found in James Beilby and Paul R. Eddy, eds., *The Nature of the Atonement* (Downers Grove, IL: InterVarsity Press, 2006).

⁸*The Oxford English Dictionary*, s.v. "atone" and "atonement." For Tyndale's text (with the spelling "attonement") see Luther A. Weigle, ed., *The New Testament Octapla* (New York: Thomas Nelson and Sons, n.d.).

^oGeorge L. Murphy, *The Cosmos in the Light of the Cross* (Harrisburg, PA: Trinity Press International, 2003).

¹⁰Martin Luther, "Heidelberg Disputation," in *Luther's Works* 31 (Philadelphia: Fortress, 1957), 35–70. Gerhard O. Forde, *On Being a Theologian of the Cross* (Grand Rapids, MI: Wm. B. Eerdmans, 1997), discusses the implications of the theology of the cross for issues of sin and salvation.

¹¹Valerie Saiving, "The Human Situation: A Feminine View," in Carol P. Christ and Judith Plaskow, eds., *Womanspirit Rising: A Feminist Reader in Religion* (San Francisco: Harper & Row, 1979), 25–42. This essay was first published in 1960.

¹²For these three "forms" of sin see Karl Barth, *Church Dogmatics* IV, no. 1 (Edinburgh, UK: T & T Clark, 1956), 142–3. ¹³Murphy, "Roads to Paradise and Perdition."

- ¹⁴E.g., Richard Leakey and Roger Lewin, *Origins Reconsidered* (New York: Doubleday, 1992), chap. 16.
- ¹⁵Several essays in Pierre Teilhard de Chardin, *Christianity and Evolution* (New York: Harcourt Brace Jovanovich, 1971) illustrate this.
- ¹⁶Philip Hefner, *The Human Factor: Evolution, Culture and Religion* (Minneapolis: Fortress, 1993), especially pp. 28–31. He attributes the idea to Ralph Wendell Burhoe.
- ¹⁷Stephanus Trooster, *Evolution and the Doctrine of Original Sin* (New York: Newman Press, 1968).
- ¹⁸Paul Tillich, "You Are Accepted," in *The Shaking of the Foundations* (New York: Charles Scribner's Sons, 1948), 155.
 ¹⁹Athanasius, "On the Incarnation of the Word," 38.
- ²⁰Saint Anselm, *Cur Deus Homo* (1903; reprint, Forth Worth, TX: RDMc Publishing, 2005).
- ²¹Gerhard O. Forde, "The Work of Christ," in Carl E. Braaten and Robert W. Jenson, eds., *Christian Dogmatics* 2 (Philadelphia: Fortress, 1984).
- ²²Dietrich Bonhoeffer, *Creation and Fall* in *Dietrich Bonhoeffer Works* 3 (Minneapolis, MN: Fortress, 1998), 34–5.
- ²³Athanasius, "On the Incarnation of the Word," 38.
- ²⁴Ibid., 40.
- ²⁵Irenaeus, "Against Heresies" II, xxii, 4 in *The Ante-Nicene Fathers* 1 (1884; reprint, Grand Rapids, MI: Wm. B. Eerdmans, 1979), 391.
- ²⁶Gustaf Wingren, *Man and the Incarnation* (London: Oliver and Boyd, 1959), 173–4.
- ²⁷Irenaeus, "Against Heresies," 391.
- ²⁸This Latin phrase was the original title of Hengel, *Crucifixion*. For the citation of Origen and discussion, see p. xi.
- ²⁹For the history, see J. N. D. Kelly, *Early Christian Creeds*, 2d ed. (New York: David McKay, 1960), 378–83. A brief presentation of the rationale of the *International Consultation on English Texts* for its rendering of the phrase is its *Prayers We Have in Common*, 2d rev. ed. (Philadelphia: Fortress, 1975), 4–5.
- ³⁰Article IX of the "Thorough Declaration of the Formula of Concord," in *Concordia Triglotta* (St. Louis: Concordia, 1921), 1051.
- ³¹Heinrich Heppe, *Reformed Dogmatics: Set Out and Illustrated from the Sources* (Grand Rapids, MI: Baker, 1978), 490–4.
- ³²David Lauber, Barth on the Descent into Hell: God, Atonement and the Christian Life (Aldershot, UK: Ashgate, 2004).
- ³³The discussion here owes a good deal to Forde, "The Work of Christ," especially section 4.

³⁴Murphy, *The Cosmos in the Light of the Cross*, chapters 6 through 8.

³⁵On this topic see George L. Murphy, "The Church in Evolution," *Seminary Ridge Review* 5, no. 1 (2002): 38.

³⁶Pierre Teilhard de Chardin, *The Phenomenon of Man* (New York: Harper and Brothers, 1959), 254–72; *Activation of Energy* (New York: Harcourt Brace Jovanovich, 1970), 99–127, 148–51, and 271–80; *Christianity and Evolution* (New York: Harcourt Brace Jovanovich, 1971), 15–17, 66–74, and 165–8.

³⁷Teilhard de Chardin, Activation of Energy, 115–6.

³⁸Paul H. Seely, "The Date of the Tower of Babel and Some Theological Implications," Westminster Theological Journal 63 (2001): 15, especially section VIII. George L. Murphy, "Couldn't God Get It Right?" in Covalence (March 2006): www.elca.org/faithandscience/covalence/story/default. asp?Copyright=06-03-15&Author=murphy&Pages=1).

³⁹James D. G. Dunn, *Word Biblical Commentary* 38: *Romans* 1–8 (Dallas, TX: Word Books, 1988), 289–90.

⁴⁰Ibid., 290.

⁴¹Anselm of Canterbury, "Why God Became Man," in Eugene R. Fairweather, *A Scholastic Miscellany: Anselm to Ockham* (New York: Macmillan, 1970), Book I, chapters 16–9.

⁴²Hermann Gunkel, Schöpfung und Chaos in Urzeit und Endzeit (Göttingen: Vandenhoeck und Ruprecht, 1895); John Day, God's Conflict with the Dragon and the Sea (New York: Cambridge, 1985); Bernhard W. Anderson, Creation versus Chaos (Philadelphia: Fortress, 1987); George L. Murphy, "The Sea of Chaos and Creation," presented at the 2000 meeting of the American Scientific Affiliation.

⁴³These problems appear vividly in Gregory A. Boyd, *Satan* and the Power of Evil (Downers Grove, IL: InterVarsity Press, 2001) and God at War (Downers Grove, IL: InterVarsity Press, 1997). Quite different is the "Narrative Christus Victor" approach of J. Denny Weaver, *The Nonviolent Atone*ment (Grand Rapids, MI: Wm. B. Eerdmans, 2001).

⁴⁴Kent S. Knutson, *His Only Son Our Lord* (Minneapolis, MN: Augsburg, 1966), 72–5.

⁴⁵One suggestion in this regard is given in the story sermon "The Signal" in George L. Murphy, *Pulpit Science Fiction* (Lima, OH: CSS Publishing, 2005).

⁴⁶Robert John Russell, Cosmology, Evolution and Resurrection Hope (Kitchener, ON: Pandora Press, 2006); Ted Peters, Anticipating Omega (Göttingen: Vandenhoeck und Ruprecht, 2007); Murphy, The Cosmos in the Light of the Cross, chap. 12.



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Defining Undesign in a Designed Universe

David Snoke

The argument from design, recast today in the Intelligent Design movement, relies critically on the contrast of designed things with undesigned things. This poses a problem for Christians, however, because they affirm that God designed the whole universe. How then can we call anything undesigned? I argue that this problem is equivalent to the problem of free will, or the problem of moral evil, and as such can be addressed by the same philosophical frameworks developed in the past for addressing those issues, in particular the notions of different levels of description and Augustine's different levels of giftedness.

he argument from design, associated with William Paley1 but with roots in antiquity,² has long seemed persuasive to many people at a gut level—if something looks designed, then it is reasonable to conclude that it is designed. In Paley's famous analogy, if we are walking in the woods and find a watch, even without knowing the history of the watch at all, we conclude that there was a watchmaker. Or in a similar example, if we walk into a room and find a table with one hundred six-sided dice all with the number 1 facing up, we "know" that some person arranged them to be that way. We do not know how or when – perhaps the other person tediously turned them all that way by hand, or perhaps some other person manufactured them with weights on one side and then threw them-but either way, the pattern of the dice has attributes that seem to demand of our intuition that intelligence and planning were involved somewhere along the way.

Modern intelligent design (ID) proponents, such as Dembski³ and Behe,⁴ have essentially followed this same argument, but have tried to tighten up the definition of the attributes we look for when we say something looks designed. Humans seem to have a built-in sense of design just as we have built-in senses of other things, such as hot and cold temperatures and loud and soft sounds, or more subtle things such as beauty and guilt. These built-in senses make it easy to know it when you see it, but they can be a hindrance to conveying to others exactly what you mean—one person can say "that looks designed to me" while another says it does not, just as one person might say a painting is beautiful and another says it is not.

Yet modern science gives us hope that many things originally thought to be subjective impressions can be defined more rigorously. For example, a few hundred years ago, hot and cold were merely subjective impressions: one person might say a room was cold, and

David Snoke (email: snoke@pitt.edu) is a professor of physics in the Department of Physics and Astronomy of the University of Pittsburgh, and a Fellow of the American Physical Society and of the American Scientific Affiliation. His research centers on quantum effects in the optics of semiconductors; he has authored or coauthored over one hundred journal publications and three scientific books, including two with Cambridge University Press and the recently published Solid State Physics: Essential Concepts, a textbook for Addison-Wesley. His activities in science-faith issues include a physics curriculum for home schoolers which integrates faith issues, publication in 2006 of A Biblical Case for an Old Earth with Baker Books, and recently, helping to organize small meetings to bring together scientists on both sides of the intelligent design debate. He is an ordained elder and licensed preacher in the Presbyterian Church in America. He and his wife Sandra have four children.

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another person could disagree, saying it felt hot. With the advent of thermometers and the kinetic theory of heat, we can now talk much more rigorously about these previously only subjective impressions. In the same way, we can now quantify the loudness of sounds using decibel meters instead of just saying, "It sounds loud to me." It is therefore reasonable to hope that our sense of design need not remain forever in the category of the subjective and undefinable.

An intrinsic problem for Christians ... is that we affirm that God designed the entire universe.

... if we say that only some things are designed and not others, then we seem to accuse God of not doing some things well.

Intrinsic to this increase of rigor is the need to make distinctions. In both examples used above, the watch in the woods and the dice on the table, we identify the designed thing in contrast to other things which do not look designed. The watch stands out as designed precisely because it is not like a rock or other object which we would expect to find on a path in the woods. The dice stand out as having a pattern produced by a person because they do not look like the result of a random throw. Our intuition identifies designed things partly by detecting contrast with other things that are undesigned. ID proponents argue the same way. Some things, e.g., the mechanisms of living cells, are identified as designed in contrast to the products of random forces.

An intrinsic problem for Christians, however, is that we affirm that God designed the entire universe. If we say that some things look designed, and other things do not look designed, are we rejecting the idea that God is glorified by everything that exists? This problem seems to underlie many Christians' discomfort with the ID movement – do ID proponents see God's hand only in the unusual or the miraculous, and not in the daily workings of the universe?

There seems to be a dilemma. On one hand, if we say that all things look designed, then the force of the design argument goes away. We are essentially just saying that all things look alike in some way, and we cannot say anything about what they would look like if they were not designed. On the other hand, if we say that only some things are designed and not others, then we seem to accuse God of not doing some things well.

The Inductive Conclusion of Design

To put the problem into focus, let me restate the argument from design in a more rigorous manner. This argument is intrinsically an inductive argument, as follows:

1. In our experience, some things are known to be designed by intelligent agents, namely us, or animals with some degree of intelligence.

2. In our experience, some other things are known to not be designed by intelligent agents.

3. In our experience, we find that all of the things which we know to be designed by intelligent agents have certain properties, and none of the things which we know are not designed have those properties.

4. Therefore, when presented with something of unknown history, if it has the properties of a designed thing, then we conclude inductively that it is designed by an intelligent agent.

As it stands, this is a perfectly legitimate inductive argument, used all the time in daily life as well as in science. For example, scientists argue inductively that since we observe that all hydrogen has the property of absorbing light with certain exact wavelengths, and no other atoms or molecules absorb light at those exact wavelengths, therefore, if something (e.g., an interstellar gas cloud) absorbs light at those wavelengths, then we can conclude that it contains hydrogen. "Telltale" signs of the existence of one thing by their close association with something else are used in our thinking all the time.

Two objections are often made to this argument. One objection is that, in step 4, "an intelligent agent" is poorly defined. Since the only intelligent agents with which we have regular experience are living beings that have flesh and blood, does the intelligent agent need to have flesh and blood? If the agent is not exactly like us, how do we know what it is like? Could it be a Great Spaghetti Monster? Are we warranted in identifying this designer with the God of the Bible?

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Clearly, this argument does not take us all the way to the God of the Bible. Designed things are evidence of only one attribute of the designer, namely, the ability to generate teleological forces; that is, the designer must have at a minimum the ability to set a goal (to visualize a state of things not as they are) and to act as a causative agent to bring about that goal. Any number of intelligent agents might possess this ability, including the God of the Bible, Zeus, Thor, or indeed, the Great Spaghetti Monster. To distinguish between these possibilities we must look to other arguments and evidences, such as evidence of communication and self-revelation from these beings.

Because of this limited nature of the design argument, some have accused ID proponents of deceptiveness-we all know they "really" believe in the God of the Bible (though this is, in fact, not true: Anthony Flew,⁵ Paul Davies,⁶ Michael Denton,⁷ and Frank Tipler⁸ have made strong intelligent design arguments but are all deists of one variety or another; the Jewish author Gerard Schroeder9 and Muslim writer Mustafa Akyol¹⁰ have also embraced ID arguments). Such accusations betray a misunderstanding of the nature of evidential argument. Evidence can often be used to narrow the field of possibilities without specifying exactly one possibility; for example, a prosecutor in a court might produce a black hair to show that the killer had black hair; this does not specify a single person but reduces the set of possibilities. Making a final decision on a specific candidate requires other information, or sometimes just a best guess.

The other objection, which is the topic of this article, has more weight. In step 2, how can we say that we have a set of things which we know not to be designed? Christians say that all the universe is designed by God.

Levels of Description

To approach this dilemma, we can start by understanding the concept of different levels of description. Many authors, e.g., Douglas Hofstadter¹¹ and Donald MacKay,¹² have pointed to the need for different levels of description in regard to the problem of reconciling apparently free will and consciousness with an underlying determinism. The same distinction between levels of description helps us to reconcile the existence of undesign in a world designed by God. I contend that the problem of defining undesign in a designed universe maps directly to the problem of defining free will in a universe controlled by God; they both involve the same problem of talking about things which God did not do. To some readers, this will not at all seem helpful—to make the argument from design we need to first solve one of the greatest philosophical problems of all time. Yet seeing the connection can help us by letting us draw on how the great minds of the past have delineated the problem.

In each problem, we have the concept of a "domain of control" in which we may say that a living being acts as the only relevant teleological agent. In the problem of free will, Christians affirm on the one hand that God is the first cause of all things, but they also affirm that there are some things which humans control and for which they are responsible, to such a degree that we can say that God did not do them. Indeed, it would be improper to say that God did all things, for that would make us pantheists – to say that God does everything is to say that when we see a creature doing anything, we should say we see God doing it. Christian theology insists that God is separate from his creation, and while we may say that God ultimately caused an action, it would be improper to say that God did the action. If a tree falls down, we properly say the tree fell, not that God fell. If a beaver builds a dam, we do not say that God built the dam-the beaver did. In the same way, if a person sins, we do not say that God sinned.13

In the problem of defining undesign, Christians can affirm that God is the designer of the universe in the same way that he is the first cause of the universe, although he made some things in the world of humans over which we have control and responsibility. Just as we can do things badly, without accusing God of badness, we can also leave things undone and undesigned, without accusing God of laziness. Within our sphere of control, the sphere of our consciousness, we have the freedom to do good or evil and also the freedom to design or to leave things undesigned.

In classical theology, this distinction between spheres or levels of control is discussed in terms of the distinction between "first" causes and "second" causes. First causes are actions directly attributable to God, such as the original creation and later miraculous interventions. Second causes are actions

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attributable to agents which exist in this world, which, of course, ultimately owe their existence to God's first causes, but which operate by themselves as causative agents. This is another way of talking of different levels of description. God is the first cause of the "lower" level, that is, the laws of physics and all the things which lead to our own existence. At the same time, we are causative agents in the "upper" level of our own experience. Although I am not the creator of the universe or the controller of it, I operate within a realm over which I have control. I can make my bed or not. I can design a birdhouse or not.

In the problem of defining undesign, Christians can affirm that God is the designer of the universe in the same way that he is the first cause of the universe, although he made some things in the world of humans over which we have control and responsibility.

Christians of all types accept this type of distinction; on the one hand, we agree that people can sin and can be held accountable for their sins, and on the other hand, we thank God for decisions of other people which are answers to our prayers. We are not saying that God bypassed the will of those people in answering our prayers, or that, in fact, it was God who did it instead of the people who thought they were making decisions; rather, we acknowledge that God arranged the "lower level" story to bring about the end result. I do not pray, "Thank you, God, for offering me the job"; I pray, "Thank you, God, for leading that employer to give me a job offer."

While we make such distinctions naturally, a difficulty arises in speaking coherently of the relationship between the lower level and the upper level. Within orthodox Christianity, two main schools of thought have debated how to reconcile the two levels of description.¹⁴ "Arminian" theologians affirm that God is the first cause of all things, including the existence of humans and other causative agents in the universe, but they also would say that humans have been given a unique ability to share in the first-cause power of God. In this view, once God has created humans, some of the things humans choose to do are outside the control of God.

"Calvinist" theologians would say that nothing is outside God's control, including all the decisions of people, but that this does not take away their freedom. In Calvinist thinking, God's causal power operates at the lower level, leading to the desires themselves upon which people act. As Jonathan Edwards argued,¹⁵ the statement "You always do what you want" is both a statement of freedom and a statement of predestination. Given what we want, we make teleological decisions about what we can do to bring it about, but what we want is something which precedes our decisions and controls them. In the upper level, we start with our desires as they are and act on them; in the lower level, God brings about all the various causes which lead to those desires, in the long chain of cause and effect of all the influences and physical feelings which go into who we are.

I will certainly not resolve the debate between Arminianism and Calvinism in this article. Instead, I simply argue that regardless of which school of thought one holds to, the distinction between levels of description is natural, and this distinction helps us to understand what we mean by calling some things undesigned. Consider the following example: a teenager who has control over the arrangement of things in his or her room. Walking in, we may see some things which the teenager has taken the time to design, such as a set of CDs organized alphabetically, and some things which the teenager has left to chance, such as clothes on the floor. We might, of course, say that the position of the clothes on the floor is not really random, that they all obeyed the designed laws of physics when cast down, and going further, we might even say that the exact way in which the teenager threw them was also not random, being ordained by God before all time for his inscrutable purposes. Yet at the level of the sphere of responsibility and control of the teenager, such considerations are irrelevant. While God may have ordained and designed all things, the teenager certainly did not, and we can therefore split the things in the room into two categories, those things into which the teenager put energy to arrange for a purpose, and those which were not so arranged. The question then becomes simply, can we find any observable properties which belong only to the things in the first category and not to those in the second? There is no a priori reason why we cannot expect to find such properties.

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Indeed, to reject the notion that we can say some things are undesigned is to reject the idea of randomness altogether. To insist that all things are created good by God, and therefore that we cannot say anything is undesigned, is to say that no examples of random and unplanned events existat any level – which could be contrasted to planned events. Yet the notion of randomness underlies the well-established scientific field of statistical mechanics. Even while assuming that all atoms in a gas follow deterministic laws, we can say that as far as we know, their behavior is random. The idea of "coarse graining" in thermodynamics¹⁶ is just another way of distinguishing between levels of description. At the microscopic level, atoms act deterministically, while at the macroscopic level, their behavior can be treated as random.

At the macroscopic level, treating the behavior of many things as random has led to successful mathematical laws with sometimes surprising implications, such as spontaneous pattern formation. The proposal of Prigogine¹⁷ and many others is that all macroscopic phenomena can be understood by means of such statistical laws. The proposal of ID is that only some phenomena can be explained by statistical laws, and that some other things are best explained by nonrandom events, namely, events either directly caused by God in miracles or events "rigged" by God by means of specially chosen initial conditions.

The ID inductive argument can therefore be restated as follows:

 Within our "domain of control," we see three types of things: (1) things of which we know the origin, which some intelligent person or animal has designed, (2) things of which we know the origin, which are the product of only random and undirected forces, i.e., undesigned, and (3) things of which we do not know the origin.

Note that saying we know the origin of a thing does not refer to the ultimate origin of all its parts, but only to the origins within our domain of control. This assumes that humans (and some animals) have creative power—that some things are indeed created new by us. For example, I may create a birdhouse. I did not create all its parts—I use wood, nails, glue but the entity which is a birdhouse did not exist before, and now it does. If I look down on the floor afterwards, I see other new entities which I also created, but without plan or purpose: piles of sawdust, leftovers from the building process. I did not design the arrangement of those piles – they formed randomly, as viewed in my macroscopic level of description. Thus here are some newly created entities of which I know the origin, within my domain of control.

Living things belong in category (3) above. Even though we may see a new living thing being born or spawned, properly viewed this is simply a new instance of an existing system, not a new creation, and we have no direct knowledge about the origin of life.

- 2. Within the subset of things in categories (1) and (2) of which we know the origin in our domain of control, we can identify property set A that applies to all things which we know a person designed, and that applies to no things which we know were randomly formed.
- 3. We inductively conclude that property set A is a telltale for designed things. We then apply this test to things in category (3) of which we do not know the origin.

Furthermore, we can try to generalize this test to things at other levels of description. Thus, for example, going to the microscopic level, I might want to decide whether the values of the constants of nature (the electron charge, the speed of light) can be described purely as the result of random events at an even lower level (quantum fields) or whether they have the attributes A which are associated with designed things in the domain in which I derived my rule.

More Than One Level

This last point leads to a possibility of hierarchies of design. So far, I have focused on only two levels of description, namely my own level in which I have a domain of control, and the microscopic level of things below mine, which I usually treat as random. It is possible to go further, however, and allow for many levels in each of which some things appear random and other things appear designed. In the same way, one can talk of a hierarchy of levels of causes (e.g., subatomic, atomic, cellular, organic, human, community, societal) instead of just the two categories of first causes and second causes of classical theology. Essentially, this approach breaks down the category of second causes (things not immediately caused by God) into several subcategories.

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Augustine of Hippo envisioned a similar hierarchy of levels of creation,¹⁸ and proposed that each level was gifted by God, with higher gifts for higher levels, but none having all the good attributes of God himself. This view of levels of giftedness is also seen in Jesus' words, "You are of more value than many sparrows" (Luke 12:7), at the same time that he said God cares for each and every sparrow. This concept of levels of giftedness can be adapted to allow us to speak of levels of design. At the lowest level, all things have design in the sense of obeying well-designed laws of nature. At a higher level, some things have even higher levels of design, in that they demonstrate patterns which cannot be derived solely from the lower levels of design. Thus one may argue that life is an additional designed pattern added onto the design of the lower microscopic level, and consciousness is yet another level of design added onto life. In so saying, one is not arguing that things with design only on the lower levels are badly done by God. One is merely arguing that they do not show as much design as other things when viewed at a higher level.

This was Augustine's approach to the problem of evil. He argued that every level has some degree of goodness, so that one can properly say that all of creation is good, but that not every level has the highest degree of goodness. Thus even unrepentant people are gifted with a certain level of goodness, in that they have the dignity to make moral choices, but they have not received the higher gift of being able to repent. Augustine would not say they were badly made, just that they had not received God's highest gifts. In the same way, an ID proponent who says that the clothes in a messy teen's room or the sawdust on a workshop floor are not designed is not saying that God is not glorified in this part of creation, just that these things lack a higher gift, the property of design on a higher level.

Some have also proposed even higher levels of description, of societies and nations. In the Bible, God often talks directly to nations as entities with their own character, even though from the national perspective, the actions of individual people may be treated as random.

One can also talk of differing degrees of design within the same level of the hierarchy of design. Some anti-ID arguments take the approach of noting less-than-optimal design as an indicator that God was not involved; for example, the Panda's thumb or the inverted human retina are supposedly examples of bad design. Yet in Augustine's approach, no created thing has been given every good gift, and some have been given more gifts than others. Finding something further down in degree of design does not imply that nothing has design. For example, finding a simple little ditty written by Mozart does not mean he was a poor composer; finding a Mercedes-Benz with hubcaps which are not as aerodynamic as we might like does not mean the car was made randomly. People make various things for various uses, and there is no reason why God could not do the same. This leads to the possibility of a quantitative scale of the degree of detected design in a system. For example, clothes hanging from a drawer in a teenager's room could be scored as having more design than clothes randomly strewn on the floor, though clothes neatly folded would score even higher.

The Missing Grand Metanarrative

ID has been criticized because it does not supply a "grand metanarrative," that is, a story of how everything came to be. In the above, I have argued that the ID community primarily deals with the local statements "This looks designed," and "That looks undesigned" (at the appropriate level of description). This frustrates some people¹⁹ because ID proponents do not typically supply a story of where the design came from.

This frustration arises from a conflict of paradigms about the nature of explanation itself. In the standard view of science, an explanation consists of a history, that is, a story which includes a causal chain of events leading to the present state. The ID revolution lies in its proposal that the best available explanation of the state of things is not necessarily a history at all.

This can be illustrated with the example of the hundred dice, mentioned above. If I come into a room and see one hundred six-sided dice all with the number 1 facing up, I know that a person was involved somehow. I could imagine any number of possible histories which would all lead to the same state: a person tediously placing them that way one by one, a person manufacturing them with weights on one side, a person taking them out of a storebought package in which they all were already

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aligned, etc. To the ID proponent, it would seem odd to reject the conclusion that a person was involved just because no further information is available to select between these different scenarios. In all cases, the relevant fact is that a person made sure that the dice were arranged and not randomly thrown. I might like to know more, but I must work with what information I have. Based on appearances, I can rule out a narrative which involves only random dice throws, without determining the truth of any of the alternative stories.

As mentioned above, the emergent phenomena approach of Prigogine and others says that all macroscopic phenomena can be explained in terms of statistical laws which treat all behavior of the underlying microscopic world as random. The ID view insists that some things cannot be explained this way, that some things evidence design which could not come about by random events. How, exactly, did God insert this design? There are various possible scenarios which have been suggested by different ID proponents. One scenario is that God used first causes, i.e., miracles, multiple times in the history of the universe. Another is that the initial state of the universe was "rigged" at the microscopic level with specially chosen initial conditions from the very beginning of creation, to eventually lead to the design we see.

Is this latter view any different from the Prigogine emergent view? In both the Prigogine view and the rigged-microscopic-level view, design at an upper level arises from the deterministic actions of things in a lower level. The difference is that in the rigged-microscopic view, the elements which lead to the appearance of design at the higher level are not random. As Michael Behe has put it, a pool player may use a chain of precisely chosen causes and effects to bring about a final effect.²⁰ We are impressed with this precisely because we cannot imagine the final event happening by means of lower-level events which we view as random.

In other words, in the rigged-microscopic view, one classes the lower-level events into two categories: those which are effectively random (from our point of view) and those which are not, having the initial state of their causal chain chosen carefully by an intelligence. The Prigogine view says that all macroscopic phenomena, including life, can be understood in terms of one class of lower-level phenomena, namely random events. The ID view rejects this and hypothesizes another class of causes in addition to random events. Whether this new class is first-cause miracles, as proposed by the many-miracle ID approach, or second-cause special initial conditions, as proposed by the rigged-microscopic ID approach, or some combination of both, is a secondary question.

The ID community is therefore unlikely to come up with a grand metanarrative about the history of the universe and is unlikely to care. In the ID view, the observation, "This looks designed," is entirely supportable as a local story based on our experience with things in the domain of our experience. This observation may fit into various grand metanarratives, such as young-earth creationism, oldearth interventionism, theistic evolution, Platonic deism, or even Spaghetti-Monster creation, but it is not dependent on them.

The scientific import of ID is a limiting principle, that random events at a lower level can do only so much and no more. In this sense it is a negative, not a positive principle, but negative principles are common in science: the uncertainty principle of quantum mechanics gives us a limit to how much we can know about a particle, the second law of thermodynamics tells us that entropy cannot decrease spontaneously, relativity tells us that things cannot go faster than the speed of light, and so forth. ID says that certain physical processes cannot lead to certain other physical outcomes; for example, random chemical processes cannot construct the machinery of life, and random mutation and selection cannot produce new organs. (Behe has recently proposed even tighter restrictions, that changes of even three or four elements of a gene are beyond the limit of random mutation and selection.²¹) In each case, a prediction is made which can be falsified – it would take only one example of a perpetual motion machine to overturn the second law of thermodynamics, and only one example of a new organ generated by random processes in the lab to overturn ID.

We might like to have more positive principles, but good science must deal with reality as it is. We have no more reason to expect ID to come up with predictions for new types of biology than we do to expect physics to come up with ways to defeat the second law of thermodynamics.

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The apologetic or theological import of ID is that it undermines a grand metanarrative used by many atheists, that all things came to be by undirected random events, and all that seems well designed and beautiful has emerged spontaneously and without direction. This view lends relative evidential support for theism, though it clearly does not take one all the way to the Christian God.

Conclusion

As discussed above, a main objection to ID, the problem of defining undesign in a world designed by God, maps directly to the problem of free will, and thus also to the problem of the existence of moral evil in a good world.

Despite the philosophical challenges, in each case we have an innate ability to conceptualize a domain of our control in which we can identify things not done by God, even though we affirm that, at the deepest level, God has done all things well. Within our domain of control, we can do good and evil, and we can create designed and undesigned things.

The ID proponent can thus affirm, with Augustine, that all things are good to some degree, but some are more gifted than others. In my domain of observation, there are some things, like rocks, which are well designed in one sense, in that they obey well-designed laws of nature, but there are other things, such as living systems, which have an additional level of design that cannot be derived from the lower-level design alone. It is therefore improper to say that the ID view sees God only in the miraculous and not in the commonplace.

There is no common agreement within the ID community of how the extra level of design came to be inserted into the world, and it is unlikely that such a story will be forthcoming. ID rules out certain histories, but it provides only statements about appearances, not complete histories. It fundamentally addresses only the simple question of how to make objective the apparently subjective impression that some things look designed and others do not.

Notes

¹William Paley, *Natural Theology*, ed. M. D. Eddy and D. Knight (New York: Oxford University Press, 2006).
²See, e.g., W. A. Dembski, "The Design Argument," in G. B. Ferngren, gen. ed., *The History of Science and Religion in* *the Western Tradition: An Encyclopedia* (New York: Garland, 2000), 65.

³W. A. Dembski, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (Lantham, MD: Rowman and Littlefield, 2006).

⁴M. J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996).

⁵A. Flew and G. Habermas, "My Pilgrimage from Atheism to Theism," *Philosophica Christi* (Winter 2005); A. Flew and R. A. Varghese, *There Is a God: How the World's Most Notorious Atheist Changed His Mind* (New York: HarperOne, 2007).
⁶Paul Davies, *Mind of God: The Scientific Basis for a Rational World* (New York: Simon and Schuster, 1993).

⁷Michael Denton, *Evolution: A Theory in Crisis* (Chevy Chase, MD: Adler and Adler, 1986).

⁸J. D. Barrow and F. Tipler, *The Anthropic Cosmological Principle* (New York: Oxford University Press, 1987).

^oG.L. Schroeder, *The Science of God* (New York: Broadway Books, 1997).

¹⁰See, e.g., "In the Beginning," The Economist (April 19, 2007).

¹¹D. Hofstadter, *Gödel*, *Escher*, *Bach: An Eternal Golden Braid* (New York: Basic Books, 1979).

¹²D. M. MacKay, *Brains, Machines, and Persons* (Grand Rapids, MI: Eerdmans, 1980).

¹³Some passages of Scripture seem to blur this distinction, such as Amos 3:6, "If evil comes to a city, has not the Lord done it?" (or, "made" it.) The lower-level causation by God of all things is often in view. Yet the Bible also clearly states that it is wrong to say that God does all things directly, e.g., Jer. 7:31, "They have built high places ... to burn their sons and daughters, which I did not command, nor did it enter my mind," and James 1:13–14 "When tempted, no one should say 'God is tempting me' ... but each person is tempted when he is lured and enticed by his own desire." The entire concept of judgment implies a distinction between the actions of the Creator and the creature at some level.

¹⁴Arminius and Calvin were Protestants, and Protestant movements have been named after them, but similar positions on this issue have been taken throughout church history, not only in Protestantism.

¹⁵J. Edwards, *Freedom of the Will* (New Haven, CT: Yale University Press, 1957).

¹⁶For a discussion of coarse graining, see G. E. Uhlenbeck, "Problems of Statistical Physics," in J. Mehra, ed., *The Physicist's Conception of Nature* (Dordrecht, Holland: D. Reidel, 1973), 501. As discussed by Peierls in comments at the end of this article, the coarse graining view is equivalent to excluding "crazy" initial microscopic states.

¹⁷I. Prigogine, *From Being to Becoming* (San Francisco, CA: W. H. Freeman, 1980).

¹⁸Augustine of Hippo, *Confessions*, trans. Rex Warner (New York: Signet Classics, 2001). Several chapters deal with this issue, since the problem of evil was a burning question for Augustine in his conversion.

¹⁹E.g., R. Pennock, "DNA by Design? Stephen Meyer and the Return of the God Hypothesis," in W. A. Dembski and M. Ruse, eds., *Debating Design: From Darwin to DNA* (New York: Cambridge University Press, 2004), 130.

²⁰M. J. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007).
 ²¹Ibid.

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The emerging discipline of Intelligent Design (ID) is a legitimate scientific research program and, therefore, should be taught as such at the state university. I argue that the design inference is a reliable means of detecting design in nature which relies on no uniquely religious assumptions. However, ID does grant some intellectual credibility to Christian theism since it directly challenges the monopoly of naturalism in science and thus opens the door to claims that the Christian God is the Designer of nature.

The emerging discipline of intelligent design (ID) is an academically justifiable subject for teaching and study at the state university, both in the hard sciences and in philosophy. If ID arguments are allowed to enter into academic debate at the university level, scientific categories will be rightly expanded and philosophical questions related to the rationality of Christianity will be rightly raised within the sphere of science in a new and significant way.

The thesis is that ID is legitimately scientific and lends epistemic support to Christian theism. As such, it gives science another tool for empirical discovery and serves as a key challenge to the monopoly of naturalistic explanation in the sciences. This monopoly issues from a perspective that disallows any distinctively theistic understanding of nature a priori because naturalism (either philosophical or methodological) excludes design as a fundamental category of scientific explanation. While ID is neither a religion nor based on uniquely religious principles, it lends credibility to Christian theism as an explanation for nature, since Christianity claims that evidence of God qua designer should be detectible in some way from nature (see Ps. 19:1–6; Rom. 1:18–21).¹ However, ID in and of itself does not argue for a fullfledged Christian theology, since it does not – and cannot – speak directly to distinctively Christian matters such as the Trinity or the Incarnation.

Christianity and Freedom of Thought at the State University

In a nation that enshrined freedom of religion and freedom of speech in the Constitution, it is ironic and tragic that the leading organ of higher learning in this nation—namely, the university—has separated Christian knowledge claims from its curriculum and its ethos. By "knowledge" I mean justified, true belief, which is the classical understanding, going back to Plato.² This situation,



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Douglas Groothuis, *PhD*, *is professor of philosophy at Denver Seminary* where he directs the Philosophy of Religion Masters Degree. He is the author of ten books including Truth Decay, On Jesus, and On Pascal, as well as many publications in academic journals such as Philosophia Christi, Religious Studies, Inquiry, and Journal of the Evangelical Theological Society and magazines such as Christianity Today and Books and Culture. *His comments have been published in many newspapers and magazines, such as* Time, The Wall Street Journal, The Washington Post, and The Denver Post. *He often speaks and writes on Intelligent Design in both academic and popular settings.*

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of course, was not always so, as George Marsden and others have amply documented.³ Many colleges that originally shared a Christian vision have become secularized, and secularization has resulted in a fact/value dichotomy in many areas of American life, including the university. Facts abide in the domain of knowledge; they are empirical and public in nature. Values repose somewhere in the realm of subjective opinion and are private in nature. Given this conceptual dichotomy, religious truth-claims-Christian or otherwise - are typically excluded from the sphere of the university with respect to their being candidates for genuine knowledge. Science speaks to facts; religion to values. While higher education should be an environment open to genuine pluralism, principled disputation, and academic freedom, Christian perspectives are largely ignored and not allowed into academic debate.4

Some scholars have attempted to break apart this dichotomy by arguing that secular claims are not value-neutral or epistemologically disinterested, and that even hard science is motivated by presupposed worldviews.⁵ This approach has its strengths and evens the playing field to some extent, as long as it does not devolve into postmodern nonrealism or hard perspectivism.⁶ However, I suggest another approach to science that can serve to make the university more open to and respectful toward Christian knowledge-claims. That approach is ID.

Detecting Design in Nature

ID is a fairly young movement made up of scientists, philosophers, and others who deny the sufficiency of Darwinism for explaining nature. What it disputes about Darwinism is not that natural selection occurs, but that undirected natural causes alone are sufficient to explain all of life. The Discovery Institute, the leading organ of ID research and activism, defines ID thusly:

The theory of intelligent design holds that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection.⁷

Unlike the older and less intellectually sophisticated creationism, ID does not argue for a young earth, young universe, or a global flood.⁸ Moreover, it is a big tent movement, with members holding to a variety of religious and nonreligious convictions.⁹

Thus it cannot be stereotyped as a fundamentalist revolt against science. While some of the arguments of ID may have religious implications hostile to naturalism and friendly toward theism, its methodology and presuppositions are scientific and not uniquely theological. ID does not appeal to *any* sacred texts for *any* evidential support of *any* of its theories.

William Dembski has done more than anyone to theoretically ground the ID movement in a bona fide scientific strategy. The details of Dembski's thinking-which often reach a high theoretical level-cannot be pursued at length here. Dembski lays out a method for detecting design in nature by means of an empirical strategy that makes use of rigorous criteria. This method of detecting intelligent causes is already accepted in several areas of science, such as archaeology, forensic science, intellectual property law, insurance claims investigation, cryptography, random number generation, and the search for extra terrestrial intelligence (SETI).¹⁰ ID simply employs these methods used for detecting or falsifying design and applies them to the natural sciences as well.

Design is detected through the use of an "explanatory filter" which checks for the marks of contingency, complexity, and specificity. An event or object may be reckoned the result of an intelligent cause—as opposed to a non-intelligent, material cause—if it exhibits all three of these factors. In other words, each factor by itself is a necessary, but insufficient, condition of design. However, if all three factors are combined, then this threefold cluster becomes a necessary and sufficient indicator of design.

An event or object is *contingent* if it is not explicable on the basis of automatic processes lacking in intelligence. An event is not contingent if it can be explained simply on the basis of natural law, such as a waterfall or a sunrise. To be more specific, Dembski notes that a salt crystal can be explained on the basis of chemical processes described by chemical laws. Thus, it is not contingent in the sense meant by Dembski. However, a complex setting of silverware is not explicable on the basis of automatically functioning natural laws. We infer from its properties that it was laid out by an intelligent agent. While natural laws act on contingent events (gravity affects the place setting), natural laws cannot exhaustively account for them.

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Complexity is a form of probability, and the greater the complexity, the less the probability that the event or object came about by chance – that is, without intelligent causation. But as Dembski notes,

Complexity by itself isn't enough to eliminate chance and indicate design. If I flip a coin 1,000 times, I will participate in a highly complex (or what amounts to the same thing, highly improbable) event. Indeed, the sequence I end up flipping will be one in a trillion trillion trillion ... where the ellipsis needs twenty-two more "trillions." This sequence of coin tosses won't, however, trigger a design inference. Though complex, this sequence won't exhibit a suitable pattern.¹¹

Thus far we have seen that contingency and complexity are necessary, but not sufficient, indicators of design.

The last indicator is specification. If an object or event is to pass successfully through the design filter, it must exhibit a pattern independent of its mere improbability. That is, the pattern of improbable and contingent factors must be specified ahead of time, not *fabricated* after the fact. If a player shakes up a box of Scrabble® tiles and throws them onto a table, the resulting arrangement of English letters will be improbable (since any number of arrangements are possible) and contingent (since the throwing of the tiles is not attributable to an automatic process). However, the pattern of letters will be largely gibberish, only pocked by an occasional short word such as "be" or "to." This will be the case even if the procedure is repeated many, many times. But what if we compare the results of the random throwing of tiles on the table with the results of a finished game of Scrabble®? The tiles arranged by players according to Scrabble® rules will show many words arranged intentionally. That is, the letters will be arranged according to a pattern independent of themselves-the rules of English spelling. This orderly arrangement of parts (the Scrabble® tiles), then, conforms to the specificity of words. When comparing the results of the random Scrabble® throw with that of the finished game, the marks of design are readily detectable.

Another example may help. If a farmer randomly throws a dart against the side of a barn from twenty feet away, where the dart lands will be improbable in the sense that it might have landed in any number of places. This is still the case when the farmer paints a bull's eye around the dart and then remarks on what an accurate dart thrower he or she is. This is what Dembski calls a *fabrication* instead of a *specification*. However, if a bull's eye is painted on the barn *before* the dart is thrown, and the farmer hits the bull's eye, the result is *specified*. This likely indicates skill instead of luck – especially if the results are repeated. However, chance and necessity can adequately explain the destination of the randomly hurled dart.¹² To claim otherwise – by painting on a target after the fact – is ad hoc and indicates a fabrication, which is not appropriate for detecting design.

The design filter is an attempt to locate instances of "specified complexity" in the natural world. This specified complexity is a mark of intelligence and cannot be reduced to the factors of chance and necessity. There are many candidates for a design inference in the natural world, but I will speak only of the bacterial flagellum, a motor on the back of bacteria in a cell.

Michael Behe and Molecular Machines

Biochemist Michael Behe claims that Darwinism cannot account for certain features of molecular biology, since its appeal to natural law and chance (its only explanatory resources) falls short. Behe's essential argument is that certain molecular machines could not have been brought about through gradualist, naturalistic Darwinian mechanisms that lack intelligent causation. This is because their component parts are all required to function at once and together in order to confer their vital function. Behe calls this phenomenon "irreducible complexity." Behe writes:

By *irreducibly complex* I mean a single system composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning. An irreducibly complex system cannot be produced directly (that is, by continuously improving the initial function, which continues to work by the same mechanism) by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by

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definition nonfunctional. An irreducibly complex biological system, if there is such a thing, would be a powerful challenge to Darwinian evolution.¹³

Irreducible complexity can be contrasted with "cumulative complexity." The latter describes a system in which complexity is built up piece by piece, as in the founding and growth of a city. Any number of buildings and roads could be removed without the city ceasing to be a city. But irreducible complexity is another animal altogether. As Behe notes,

An *irreducibly complex* system cannot be produced ... by slight, successive modifications or a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition nonfunctional ... Since natural selection can only choose systems that are already working, then if a biological system cannot be produced gradually it would have to arise as an integral unity, in one fell swoop, for natural selection to have anything to act on.¹⁴

Behe illustrates this concept through a mousetrap, in which every part of the device is needed for its function of catching mice.¹⁵

In Darwin's Black Box, Behe gives several examples of molecular machines he takes to be irreducibly complex, including the blood clotting cascade, the cilium, and (most famously) the bacterial flagellum. He claims that "examples of irreducible complexity can be found on virtually every page of a biochemistry textbook."16 We will briefly consider the flagellum: an extremely complicated outboard motor used by bacteria to swim. Behe notes that the available scientific literature on these systems all written by Darwinists-fails to even attempt to explain how the flagellum could be formed in a gradualist manner. It is just assumed.17 But he takes the assumption to be presumption and proposes an alternative. These systems were designed ahead of time (with the entire unit in mind) such that each part was intended to work with every other part to produce the end result. This notion of planning the relationship of parts to a whole to perform a function—so common in human experience—is utterly antithetical to Darwinism, which rejects any hint of antecedent intentionality by any intelligent cause. Behe summarizes the workings of the flagellum:

The flagellum is quite literally an outboard motor that some bacteria use to swim. It is

a rotary device that, like a motorboat, turns a propeller to push against liquid, moving the bacterium forward in the process. It consists of a number of parts, including a long tail that acts as a propeller, the hook region, which attaches the propeller to the drive shaft, the motor, which uses a flow of acid from the outside of the bacterium to the inside to power the turning, a stator, which keeps the structure stationary in the plane of the membrane while the propeller turns, and bushing material to allow the drive shaft to pike up through the bacterial membrane. In the absence of the hook, or the motor, or the propeller, or the drive shaft or most of the forty different types of protein that genetic studies have shown to be necessary for the activity or construction of the flagellum, one does not get a flagellum that spins half as fast as it used to, or a quarter as fast. Either the flagellum does not work, or it does not even get constructed at all. Like the mousetrap, the flagellum is irreducibly complex.¹⁸

The flagellum's irreducible complexity is an example of Dembski's concept of specified complexity. The flagellum is *contingent* – its constitution is not explicable on the basis of any natural law; it is amazingly complex; and it is specified in its functions. It is not merely improbable. The complexity fits a pattern that is independent of the actual living system. That is, the key functions of the flagellum are found elsewhere, as in outboard motors. The complex functionality of the flagellum is a case of specified complexity, which is sufficient evidence for design.¹⁹ Moreover, the genetic assembly instructions for the flagellum are a further indication of irreducible complexity, since they indicate contingency, complexity, and specification. ID theorists have made much of the "information argument" from the specified complexity of genetic information.²⁰

Objections to the Design Inference

Of course, various Darwinists have challenged Behe and have advanced naturalistic explanations for the flagellum. Behe has kept track of the objections and responded to them forcefully.²¹ The objection heard most often is that one must simply presuppose naturalistic explanations because of the very nature of science. This is called "methodological naturalism." The implicit or explicit definition of science, according to methodological naturalism, is this:

Science pursues material/unintelligent explanations for natural phenomena through empirical observation and rational theorizing.

This definition commits the fallacy of begging the question in favor of naturalistic explanations. It also insures that if there is any design evident in nature, science—so defined—is sure to miss it. Such a presuppositional veto is a *knowledge-stopper*, since if there is any knowledge of a designer available in nature, this understanding of science precludes it in principle. It unfairly excludes intelligence as having an empirically detectable causal primacy in any natural system.

I propose another general understanding of scientific investigation that does not suffer from this conceptual squint:

Science pursues the best explanation for natural phenomena through empirical observation and rational theorizing.

This may—or may not—include causes that are not entirely explicable on naturalistic grounds: that is, *intelligent* causes or intelligent design. We should, thus, follow the *empirical* evidence wherever it leads in the search for truth.

ID theorists do not insert intelligent causes at any and every place in the natural world such that natural laws would no longer hold. Rather, ID explains the origin or basic structure of certain natural phenomena by virtue of intelligent causes.

While the design inference is viewed by Richard Dawkins and others as a science-stopper because it is supposedly based on ignorance, it is nothing of the sort. ID does not appeal to *ignorance* of natural causes, but to the *inadequacy* of natural causes to explain the entity in question. Furthermore, the design inference is based on substantial increases in our knowledge of the natural world (from microbiology to astrophysics), a knowledge that has revealed specified complexity at many levels.²²

But some would exclude any nonmaterial causation from science. Consider this from well-known biologist Richard Lewontin:

We take the side of science *in spite* of the patent absurdity of some of its constructs, in spite of its failure to fulfill many of its extravagant promises of health and life, in spite of the tolerance of the scientific community for unsubstantiated just-so stories, because we have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our a priori adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is an absolute, for we cannot allow a Divine Foot in the door. The eminent Kant scholar Lewis Beck used to say that anyone who could believe in God could believe in anything. To appeal to an omnipotent deity is to allow that at any moment the regularities of nature may be ruptured, that miracles may happen.23

Lewontin's "divine foot in the door" worry commits the fallacy of the false dichotomy: either naturalistic science or a divine foot in the door that kicks the life out of science. By divine foot, Lewontin (and many others) means admitting a random element into science that would play havoc with science's desire to find meaningful patterns of explanation. After all, God (or any other supernatural agent) could supposedly do anything in nature, thus destroying orderly patterns. But this objection misses the mark because ID theorists do not insert intelligent causes at any and every place in the natural world such that natural laws would no longer hold. Rather, ID explains the origin or basic structure of certain natural phenomena by virtue of intelligent causes.²⁴ They appreciate microscopes and telescopes as much as anyone. (Moreover, the God of Christian Scripture does not intervene capriciously or irrationally.)25

One last objection, repeatedly given by Richard Dawkins, is that any appeal to a designer is pointless, since this designer must also be explained by a designer, *ad infinitum, ad nauseam*. But the design inference gives the best explanation for certain observable states of affairs. Since the designer is

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not observable, its specific nature is undetermined by the design inference. Of course, if the designer is the God of Christianity, he is self-existent and not subject to further explanation (see Acts 17:25). (Elsewhere I have argued that one personal agent is the best candidate for the designer.²⁶) Moreover, the specific character of the designer may be fleshed out by philosophical and theological arguments outside the ken of a design inference *simpliciter*.²⁷

Intelligent Design at the University

I have not given all the arguments for ID, nor have I responded to all the objections raised against it. For example, certain Christian theists, who are committed to Darwinism as an adequate theory of life and its development, argue that we cannot "catch God in the act"²⁸ of design and that methodological naturalism is the true vocation of science. They fear the old "God of gaps" problem and believe that ID falls into this fallacy. I cannot adequately respond to all of these concerns, but suffice to say that there are both good and bad gaps in empirical investigation of the natural world, as John Lennox has recently noted. A bad gap occurs when God is illicitly used to plug a hole in a theory (such as Newton's invocation of divine action to alter planetary motion from time to time). But there are good gaps that simply reveal the inadequacy of unintelligent natural causes to explain exhaustively some things in nature, such as the bacterial flagellum or the informational nature of DNA.²⁹ If we ban ID explanations from science (as both atheists and some Christians want), then we will eliminate an explanatory category from science. This, then, insures that a "matter of the gaps" explanation will trump all others in principle and no matter the evidence to the contrary.

I have tried to suggest that ID is authentically a scientific model for investigation. If successful, ID arguments lend rationality to one necessary component of Christian theism: namely, that God's designing intelligence is observable in nature. The fact that many Christians are advancing ID arguments in no sense disqualifies their arguments as being religious instead of scientific. One's motivations in this case are irrelevant; it is one's theories of explanation that count decisively.³⁰ Thinking otherwise commits the fallacy of poisoning the well. Moreover, the secular university should admit the possibility that Christianity can muster significant rational support for its worldview, even from science. If so, a genuine deliverance of science can have theological implications without violating the nature of either science or theology.³¹ This possibility of the rationality of Christian theism should not be shut down a priori by any de facto ban on the presentation of ideas that are friendly toward theism and particularly Christianity.

My practical recommendations are that ID be allowed – not required – to be taught in both science and philosophy classes at the university. Critics cannot rightly argue that teaching ID is a partisan or proselytizing activity barred by the First Amendment. No specific religion would be advocated and no religious texts are used for evidential purposes. Recent rulings against the teaching of ID in public high schools do not discredit my point because (1) the rulings are eminently disputable³² and (2) the legal situation for state colleges and universities is significantly different from that pertaining to compulsory education. Even my modest proposal, however, faces severe challenges from the Darwinian establishment (atheist and theistic), given how ID advocates have been treated at state universities. Nevertheless, if my arguments succeed, this proposal is warranted and would be beneficial for science itself, for students who should be exposed to rational alternatives to naturalism, and for the presentation of Christianity as a claim to *knowledge*. *

Notes

¹Some claim that these texts reveal, at most, some kind of general revelation, but that they are not sufficient to ground the claim that evidence for God as designer is discernible in nature through scientific observation. I grant that general revelation is necessary, but not sufficient, for scientific design detection in nature, but I will argue below that the scientific evidence is, in fact, available for detecting design in nature, given the strength of the ID arguments. It also seems strange theologically to grant that God has revealed himself in nature, but that an entire discipline (science) can say nothing in favor of this fact of divine design.

²This understanding has been challenged by the Gettier problem, but I cannot go into the details of that here.

³George Marsden, *The Soul of the American University: From Protestant Establishment to Established Nonbelief* (Oxford: Oxford University Press, 1996).

⁴For a discussion of indoctrination at the university, see David Horowitz, *Indoctrination* (New York: Encounter Books, 2006). Horowitz is not concerned with ID, but many of his insights relate to the ideological difficulties in challenging the received orthodoxies of the university.

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- ⁵See George Marsden, *The Outrageous Idea of Christian Scholarship* (Oxford: Oxford University Press, 1997); and John Sommerville, *The Decline of the Secular University* (Oxford: Oxford University Press, 2006).
- ⁶Against postmodernism, see Douglas Groothuis, *Truth Decay: Defending Christianity against the Challenge of Postmodernism* (Downers Grove, IL: InterVarsity Press, 2000); Millard Erickson, *Truth or Consequences* (Downers Grove, IL: InterVarsity Press, 2001).
- 7"Frequently Asked Questions" at: www.discovery.org/ csc/topQuestions.php.
- ⁸For more on the distinction between ID and creationism, see William Dembski, *The Design Revolution* (Downers Grove, IL: InterVarsity Press, 2004), 41–5; and Francis Beckwith, *Law, Darwinism, and Public Education* (Lanham, MD: Rowman and Littlefield Publishers, Inc., 2003), 118–21.
- ⁹For example, David Berlinski is an agnostic, secular Jew; William Dembski is an evangelical; Michael Behe is Catholic; Jonathan Wells belongs to the Unification Church; and Phillip Johnson is a Presbyterian.
- ¹⁰William Dembski, *The Design Inference* (New York: Cambridge University Press, 1998).
- ¹¹William Dembski, "Science and Design," *First Things* (October 1998); available at: www.firstthings.com/article. php3?id_article=3580.
- ¹²The fact that an intelligent agent hurled the dart is irrelevant here, since the agent did not apply any specific intention to the throw with respect to hitting a specified target on the wall; that is, the agent was not trying to hit a particular part of the barn wall. One could change the illustration by inserting a random, mechanical dart thrower.

¹³Michael Behe, *Darwin's Black Box*, 10th anniversary ed. (New York: Free Press, 2006), 39.

¹⁴Ibid.

¹⁵Ibid., 66.

- ¹⁶Behe, "Design in the Details," in *Darwinism, Design, and Public Education,* ed. John Angus Campbell and Stephen C. Meyer (East Lansing, MI: Michigan State University Press, 2003), 298.
- ¹⁷Ibid., 298-9.
- ¹⁸Michael Behe, "Evidence for Design at the Foundation of Life," in *Science and Evidence for Design in the Universe*, ed. Michael J. Behe, William A. Dembski, and Stephen C. Meyer (San Francisco, CA: Ignatius Press, 1999), 134–5. Behe gives a more in-depth description in *Darwin's Black Box*, 70–3. To get a better sense of the machines' integrated complexity, one should consult one of Behe's drawings or, better yet, watch the video presentation of the flagellum contained in *Unlocking the Mystery of Life*. This is available through Access Research Network (www.arn.org).
- ¹⁹See William Dembski's explanation in *Intelligent Design* (Downers Grove, IL: InterVarsity Press, 1999), 149.
- ²⁰See especially the work of Stephen Meyer. For example, "Word Games: DNA, Design, and Intelligence," in *Signs of Design: Understanding Intelligent Design*, ed. William A. Dembski and James M. Kushiner (Grand Rapids, MI: Brazos, 2001), 102–17.
- ²¹See Behe, "Afterward: Ten Years Later," in *Darwin's Black Box*, 255–72.

²²On astrophysics, see Guillermo Gonzales and Jay Wesley Richards, *The Privileged Planet: How Our Place in the Cosmos Is Designed for Discovery* (Washington, DC: Regnery, 2004).

- ²³Richard Lewontin, "Billions and Billions of Demons," *The New York Review* (January 9, 1997): 31.
- ²⁴The question of miracles occurring in history is another matter, one pertaining to philosophy and history, not to the matter of finding intelligent causes that explain the origin and basic structures of biological entities. On the relation of miracles to intelligent causes, see Dembski, *The Design Revolution*, 183–7.
- ²⁵On how Christianity encouraged the development of science in Europe (and why Islam did not in the countries in which it held sway), see Rodney Stark, *For the Glory of God: How Monotheism Led to Reformations, Science, Witch-Hunts, and the End of Slavery* (Princeton: Princeton University Press, 2003), 121–200.
- ²⁶See my review of Beckwith, *Law, Darwinism, and Public Education* in *Philosophia Christi* (series 2) 5, no. 1 (2003): 354–61.
- ²⁷The discipline of natural theology is essential here. See James Sennett and Douglas Groothuis, eds., *In Defense of Natural Theology* (Downers Grove, IL: InterVarsity Press, 2005).
- ²⁸This phrase was culled from a personal correspondence with Walter Thorson.
- ²⁹John Lennox, God's Undertaker: Has Science Buried God? (Oxford: Lion Hudson Publishing, 2007), 168–72.
- ³⁰See Dembski, *Design Revolution*, 50–7.
- ³¹I cannot explore this in more depth here, but see J. P. Moreland, *Christianity and Science* (Grand Rapids, MI: Baker Books, 1989).
- ³²On the recent Dover, New Jersey, decision, see David DeWolf, John West, Casey Luskin, and Jonathan Witt, *Traipsing into Evolution* (Seattle, WA: Center for Science and Culture, 2006).

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Essay Review

God's Use of Chance

William A. Dembski

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GOD, CHANCE AND PURPOSE: Can God Have It Both Ways? by David J. Bartholomew. Cambridge: Cambridge University Press, 2008. 272 pages. Paperback; \$19.99. ISBN: 9780521707084.

God, according to Bartholomew, creates a world in which chance operates and produces ineradicable uncertainty – not even God can accurately predict what chance will do.

n God, Chance and Purpose, statistician David Bartholomew chides Christians who cling to, in his words, a "naive orthodoxy." Such Christians view God as exhibiting a set of perfections (especially omniscience and omnipotence) and as satisfying a set of propositions (a creed). Such a view is, according to Bartholomew, unworthy of God. In place of a "naive orthodoxy," he therefore proposes a "critical orthodoxy." At the center of his "critical orthodoxy" is the skeptical claim that "all knowledge is uncertain, in varying degrees" (p. 232). Question: To what degree is that claim uncertain? Bartholomew's claim does not pass its own test.

As a statistician, Bartholomew is right to be concerned with uncertainty. Where he goes wrong is in elevating uncertainty to a feature of the world that even God cannot master. God, according to Bartholomew, creates a world in which chance operates and produces ineradicable uncertainty—not even God can accurately predict what chance will do. Although he never cites openness theology, Bartholomew embraces its truncated view of divine knowledge.

William A. Dembski holds doctorates in mathematics (University of Chicago) and in philosophy (University of Illinois at Chicago). He is Research Professor in Philosophy at Southwestern Seminary in Ft. Worth, Texas, and Senior Fellow with Discovery Institute's Center for Science and Culture. He has authored and edited more than a dozen books, including the first book on intelligent design to be published by a major university press, The Design Inference (Cambridge University Press, 1998). He lectures around the globe on intelligent design and has appeared on numerous radio and television programs, including ABC's Nightline and Jon Stewart's The Daily Show.

How does Bartholomew justify ascribing uncertainty to God? He offers two arguments, both of which fail. One argument is aesthetic: it seems to him more worthy for God to create a world in which God does not need to keep track of all details but instead delegates details to natural (and especially chance-driven) processes. Bartholomew rejects the picture of God as sovereign. This picture, to him, bespeaks a micromanager who obsessively controls all aspects of an organization. Working with an organizational picture of creation, Bartholomew prefers a laid-back manager who provides creation with general guidelines rather than tight controls.

Whatever the appeal of this organizational metaphor, the underlying argument is fallacious: it reduces to "my view of the God-world relation is just too beautiful to be false." If beauty (or worthiness or fittingness ...) is a criterion for theological truth, then special revelation is in trouble. The cross of Christ breaks all humanly constructed aesthetic criteria. Christ died on an instrument of torture—neither the Jews nor the Greeks who rejected Christ found any appeal in it. And yet the cross is the instrument of salvation—on it Christ gave himself for the life of the world.

Bartholomew's other argument to justify ascribing uncertainty to God focuses on a fundamental fact of statistics, namely, that chance events, when considered jointly, can exhibit order. Thus, even though the outcome of a

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single coin toss may be totally uncertain, multiple coin tosses can yield stable patterns. For instance, as a coin is tossed repeatedly, the proportion of heads will tend to ½. Bartholomew takes such patternedness arising from chance as the key to linking chance and purpose. God, he stresses repeatedly, uses chance to accomplish his purposes. Yes, individual chance events may indicate no purpose. But when aggregated, they can.

God's use of chance to realize purposes is the central idea in Bartholomew's book. By itself, this idea is unexceptional. Scripture contains plenty of instances where chance events (e.g., the casting of lots) are said to accomplish divine purposes. For instance, in Acts 1 the selection of Matthias to replace Judas as the twelfth apostle results from casting a lot. Proverbs 16:33 reads, "The lot is cast into the lap; but the whole disposing thereof is of the LORD." Such passages of Scripture, however, suggest that God sovereignly controls chance events or, as Bartholomew puts it, "furtively" manipulates them – an option Bartholomew rejects out of hand.

So why does Bartholomew's God-uses-chanceto-accomplish-purposes argument fail? Theologically it fails for the same reason that openness theology fails, namely, Christianity's clear teaching throughout the ages has been that God fully knows the future. Yes, this teaching is under dispute, and there is a growing literature disputing it. But the heterodoxy of openness theology becomes evident on reflection. In particular, strict uncertainty about the future means that God cannot guarantee his promises because the autonomy of the world can then always overrule God. Of course, to say that God can always step in when things get too out of hand defeats the whole point of openness theology.

Bartholomew's God-uses-chance-to-accomplishpurposes argument fails not only on theological grounds but also on its own terms. His analysis of chance is surprisingly shallow. He never tells his readers what chance is. He merely describes what it supposedly does, which is to produce events that are inherently unpredictable. But how does he know that they are inherently unpredictable?

Even if we accept that quantum mechanics, for instance, produces events that we humans cannot in principle predict, why should that mean that God cannot predict them? Are not God's ways higher than ours? Why, then, should not God be able to predict them? Does Bartholomew not engage in shameless anthropomorphism in requiring that God be subject to the same epistemic constraints that we are? What relevance does our inability to predict certain events have to God's knowledge of them? In any worthy conception of God, do not God's abilities radically transcend our own?

The underlying problem here, however, runs deeper. Bartholomew marvels at the ability of chance events, when viewed aggregately, to exhibit remarkable patterns. But the fact is that chance, as characterized statistically (and Bartholomew is a statistician), can and will violate all expected patterns. Flip a fair coin, and in the long run, the proportion of heads will tend to 1/2. True enough. But we do not live in the long run—our entire lives and even the life of the universe occurs in the short run. Flip a coin in the long run; then in the short run you will witness any finite sequence of coin tosses whatsoever. Thus, if you flip a coin long enough, you will see a sequence of coin tosses that, if interpreted as ASCII text (0 for tails, 1 for heads), will spell out the entire works of Shakespeare. There will also come an occasion when you witness a trillion trillion trillion heads in a row (would such a coin, in the short run, appear fair?).

So how do you know that with the chance events we are witnessing in this life, we are not coming in, as it were, on coin tosses that are completely uncharacteristic of their "normal" chance behavior? When we look at nature, how do we know we are not seeing a trillion trillion trillion heads in a row when chance would "ordinarily" present a roughly equal proportion of heads and tails? To say that an equal proportion is "expected" or will happen "normally" or is "likely on average" begs the question, for why should chance behave that way?

In my book *No Free Lunch*, I provide a nonquestion-begging approach to this problem. There I suggest that because God has given creation a determinate character, when God acts in creation, his actions have statistical side-effects. I employ the following analogy: the English language has a determinate character; thus when we write, we find that thirteen percent of the time the words we use employ the letter "e." Such percentages are, of course, statistical. But they are completely reliable.

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Any deviation from them constitutes an intentional act (as when Ernest Vincent Wright wrote the 50,000-word novel *Gadsby*, which completely omitted the letter "e"). I am not saying that this approach to chance as an epiphenomenon of design is necessarily correct. But it shows that chance is deeply mysterious. Thus, for Bartholomew to characterize chance solely in terms of unpredictability cannot be the whole story.

Bartholomew is an ardent Darwinist: "The combination of chance variation and natural selection has been a powerful creative force, fashioning the world as we know it" (p. 170). Consequently, he critiques intelligent design (ID) and my work in particular. His critique disappointed me because back in 1998 Bartholomew reviewed my book *The Design Inference* for the Templeton Foundation (it was an in-house review commissioned by Charles Harper at a time when ID still had some respectability with Templeton). Back in 1998, Bartholomew liked the book, though he indicated that portions went beyond his understanding. That lack of understanding has, unfortunately, persisted.

Bartholomew argues that my method of design detection as outlined in *The Design Inference* is fatally

flawed because it presupposes design to identify the rejection regions I use to eliminate chance and infer design. Thus my method of design detection is supposed to constitute circular reasoning. But Bartholomew never engages my key notion of specification, which extends and enriches the traditional statistical understanding of a rejection region (indeed, the word "specification" appears only in the footnote on page 113, and the concept itself remains unanalyzed throughout the book). Specifications, as I define them, do not presuppose design but are characterized independently in terms of an extension of Kolmogorov complexity. Bartholomew fails to acknowledge this crucial point, much less to engage it. Similar misunderstandings and misrepresentations pervade his other criticisms of ID.

Albert Einstein, in criticizing the apparent incompleteness of quantum mechanics, remarked, "God does not play dice with the universe." To this Niels Bohr replied, "Albert, stop telling God what to do." Bartholomew, by contrast, tells us that God *does* play dice with the universe. Bohr's reply applies equally to Bartholomew. *****

A Call for Book Reviewers

The readers of *PSCF* have long appreciated the many insightful reviews published within its covers. Reviews have been assigned to whoever requested a particular book first. Out of fairness to ASA members with different post delivery times and to assure the best fit between reviewer and book, *PSCF* is planning to initiate book reviews by invitation. If you would be open to being asked to contribute to this interesting and important service of writing a book review, please send a brief email to psfranklin@gmail.com that describes your areas of interest and expertise, preferred mailing address, and phone number. This information will be entered into a database that will bring you to the book review editors' attention when a book of interest to you and *PSCF* readers becomes available for review. Of course, when a book is offered to you by email or phone for review, you will still be able to accept or decline the mailing of the book at that time.

Book Review Editors

Rebecca Flietstra (Point Loma Nazarene University) 3900 Lomaland Drive, San Diego, CA 92106 rflietst@pointloma.edu

James C. Peterson (McMaster University Divinity College and Faculty of Health Sciences) 1280 Main Street West, Hamilton, ON L8S 4K1 Canada peterso@mcmaster.ca

Arie Leegwater (Calvin College) 1726 Knollcrest Circle SE, Grand Rapids, MI 49546-4403 leeg@calvin.edu
Interactions with Science

J. W. Haas, Jr.

CATHOLICISM AND SCIENCE by Peter M. J. Hess and Paul L. Allen. Westport, CT: Greenwood Publishing Group, 2008. 242 + xxvi pages, series foreword, preface, primary sources, glossary, bibliography, index. Hardcover; \$65.00. ISBN: 9780313331909.

Evangelical and Catholic

EVANGELICALS AND SCIENCE by Michael Roberts. Westport, CT: Greenwood Publishing Group, 2008. 304 + xvi pages, series foreword, introduction, primary sources, references, index. Hardcover; \$65.00. ISBN: 9780313331138.

hese latest additions to the Greenwood Guides to Science and Religion reflect the recent outpouring of scholarly interest in the field. The series seeks

... to explore the vast domain of mutually supportive and/or transformative interactions between scientific institutions, practices, and knowledge and religious institutions, practices, and beliefs. A second goal is to offer the opportunity to make comparisons across space, time, and cultural configuration (p. xii, *Catholicism and Science*).

Recent historical studies of science and religion have demonstrated the importance of time and place and the difficulty of drawing broad generalizations. These studies of Catholic and evangelical engagement with science are the latest reminders. One might expect that common interests in the authority of Scripture, the importance of theology, and parallel moral concerns would translate into similar stances by the twenty-first century. Well, yes and no. It is interesting that the Greenwood series lumps Catholics into one book, but Protestants need evangelical and liberal versions.

Catholicism and Science

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Catholicism and Science (C&S) offers a sweeping 2000-year survey of the Catholic experience—sometimes chronological, at other points topical. The authors seek to avoid a partisan approach to their account:

Instead, we retain a descriptive approach in which we endeavor to remain attentive to the theological dimensions of various questions and historical episodes (p. xviii).

They also avoid the negative emphasis of Don O'Leary's pioneering study *Roman Catholicism and Modern Science* (2006) which chronicles the magisterium's general reluctance to come to grips with new science even though many Catholic scholars and the laity have accepted it.

Today, one still finds frustration on the part of some American Catholics for what they see as an Anglo-Protestant

John W. (Jack) Haas, Jr. served as professor of chemistry at Gordon College from 1961–1995. Following ten years as editor of PSCF, he became an editor of the ASA website. A physical chemist with research interests in electrochemistry and carbohydrate reaction mechanisms, he was inspired to work on historical aspects of science and Christianity at a 1987 seminar led by Ronald Numbers and David Lindberg. His publications in this area include studies of the response to science of British Methodists from John Wesley to those of the early twentieth century. He is an elder, organist, web page editor, and Sunday school teacher at First Presbyterian Church, Ipswich MA.



of Catholic and evangelical engagement with science are the latest reminders [of the importance of time and place and the difficulty of drawing broad generalizations].

These studies

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interpretation of history shot through with anti-Catholic assumptions and prejudices. These include the Catholic-dominated dark and barbarous Middle Ages, Protestants freeing the Western mind from bondage, and the building of the modern world by the Protestant work ethic. This interpretation includes the charge of anti-science based on the Galileo incident and a historiography that emphasizes the role of Protestant (Puritan) Christianity in the early flowering of modern science.¹

Evangelicals reading this work need to recognize the hold that a hierarchical system of authority and a clergy-dominated educational system has had on the thinking of the Catholic laity—but times are changing. *C&S* is written for use in college classrooms and parish discussion groups, and for the personal enrichment of Catholics and non-Catholics.

Peter M. J. Hess serves as Faith Project Director with the National Center for Science Education, and as adjunct professor at Saint Mary's College, Moraga, California. Paul L. Allen is assistant professor in theological studies at Concordia University, Montreal, Quebec.

Early Contacts

C&S begins with a broad picture of Christians and science from the time of Jesus Christ to the fifteenth century.² Emphasis is placed on intellectual foundations supplied by Hellenistic philosophy, particularly that of Plato and Aristotle: Aristotle's doctrine of the soul as the organizing principle of the body and ultimately all of life, the importance of firsthand observation, and the idea of final cause being key to later Christian thought.

Some church fathers were active naturalists who made careful observation of the world around them. Augustine felt that familiarity with science was important for Christian leaders but warned against recklessly and incompetently expounding on Scripture and being caught out by those not bound by the authority of Scripture. Of note is Augustine's attempt to fit together the literal creation expression "the waters above the firmament" in Gen. 1:6–7 and the Aristotelian physics and cosmology of his day.

Toward a Synthesis of Faith and Learning Universities were founded starting with Bologna (1158) and followed by Paris and Oxford. Their approach to learning–Scholasticism–was a synthesis of ideas expressed in classical Roman and Greek writings, Christian Scripture, the writings of the patristic fathers, and other Christian authors maintained by the ideal of *the unity of knowledge*.

Dominican philosopher-theologian Thomas Aquinas (1225–1274) provided the best known and enduring synthesis of the scholastic system in his *Summa Theologiae* and *Summa Contra Gentiles* which became canonical texts after the Council of Trent (1545–1563). Aquinas was careful to define the provisional nature of science and the different principles by which philosophers and faithful Christians should consider a natural object.

Traditional scholars reacted against the importance attached to Aristotle's thought, finding it heretical because of his views of the eternal nature of the world and the division of the soul into divine and human parts. As a result, the Bishop of Paris (1277) condemned 219 propositions drawn from a number of sources—including Aquinas, excommunicating him three years after his death. In an amazing turn, the actions were nullified, and Aquinas was canonized by John XXII in 1323.

A Time of Revolution

The Council of Trent (1545) and the publication of Copernicus's De revolutionibus orbium coelestium (1543) profoundly affected the relationship between Catholicism and early science. The first signaled a response to the Protestant Reformation while the second involved a variety of factors and influences that differentiate "the hypothetico-deductive enterprise we know as empirical science ... and the predominantly non-empirical natural philosophy of the West prior to 1550" (pp. 25-6). The Council of Trent was significant too in (1) placing the interpretation of Scripture with the magisterium, (2) centralizing the Inquisition and the establishment of the Index of Prohibited Books, and (3) establishing the Jesuit order which evangelized (and spread science) to the world, built academic institutions, and engaged in science.

The Copernican recycling of the heliocentric hypothesis overturned the scholastic synthesis of Ptolemaic astronomy and Aristotelian physics and theology, and offered a new way of viewing the world and its neighbors – one that took a long time to catch on. Ironically, the Catholic Church nurtured the very institutions and ways of thinking that would help to break apart scholastic natural philosophy—including the establishment of the Vatican Observatory. Cherished ways of thinking would be severely tested by the "Galileo affair" which continues to symbolize diverse causes.

Galileo is properly treated by the authors who discuss multiple points of contention rather than the stereotype of science vs. church. These include conflicting worldviews, differing views on the role of sensory experience and mathematics, politics, biblical interpretation, academic turf wars, and a lack of humility. Hess and Allen agree that Catholic contributions to science significantly diminished after the Galileo trials. Catholics could not engage in chemistry or chemical medicine because of their association with magic and the darker arts. Advocates of atomism and Descartes' matter theory were likewise suspect. Yet, a qualified and gradual accommodation of these disciplines to theology took place—however reluctantly.

Time and Nature

The eighteenth and nineteenth centuries focused on the role of time in the changing structure of the earth and biological diversity. Catholics and Protestants alike needed to deal with

the discovery of the deep history of time and the supplanting of a miraculous with a naturalistic explanation for the diversity of life on earth. Not only science, but philosophy, theology, and every other discipline would be irrevocably altered (p. 62).

Biblical chronology was challenged by the discovery of fossils, but longstanding views of Pliny and the obsession with an emblematic view of living things remained until the late seventeenth century. The English "physico-theology" movement emerged; it was exemplified by John Ray's (1627-1705) The Wisdom of God Manifested in the Works of Creation (1691), which was followed by similar Wisdom works that furthered the design argument with the smallest of natural details. This restatement of the scholastic argument-proof from a final cause-had been part of St. Aquinas's theological system. In spite of critiques by Hume and others, the movement endured into the nineteenth century (and to the present) to include William Paley's Natural Theology (1802). Catholic convert priest-geologist Nicholas Steno studied fossils and Tuscany's geology in great detail from 1667 to

1670. He drew together his observations in a fashion that spelled out most of the principles of modern geology in a broader biblical framework that included Noah's flood.

The eighteenth century saw natural history become part of university culture and morph into today's discipline of biology. A secular science would become the norm as teleology, physicotheology, emblematic distinctions, vitalism, and the Bible were set aside for a mechanistic interpretation of life. In Les époques de la nature (1778), Comte de Buffon suggested that the earth originated much earlier than the 4004 BC date of Ussher. Based on the cooling rate of iron, he calculated that the age of the earth was 75,000 years. For this, he was condemned by the Catholic Church in France and his books were burned. The process of accommodation to the scientific consensus of an earth of immense age and an evolutionary picture of biological change was painfully slow.

Convert Cardinal John Henry Newman's *The Idea* of the University (1858) offered a resounding affirmation of the ultimate unity of truth, suggesting that theology and science "are incommunicable, incapable of collision, and needing at most to be connected, never to be reconciled" (quoted on p. 72). He would endorse his friend biologist St. George Mivart's evolutionary ideas.

"Until recently the great majority of naturalists believed that species were immutable productions, and had been separately created." -Charles Darwin

Catholic reaction to Darwin's *Origin of Species* (1859) was initially cautious. Two councils and Pope Pius IX warned against holding scientific views contrary to church doctrine and Scripture in a battle to protect the church against modernism. On the one hand, the sciences were valued, even used in detecting attacks on the Sacred Books, but on the other hand, Pope Leo XIII (1893) declared that the magisterium had the "right and responsibility to enforce an interpretation of scientific evidence consonant with

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Scripture" (p. 75). Resistance to evolution was based more on a resurgent Neo-Scholasticism than on biblical literalism.

English anatomist St. George Jackson Mivart's *On the Genesis of Species* (1871) found it possible to reconcile Catholic teaching with an evolutionary stance framed by a Christian worldview. Fr. John Augustine Zahm, professor of chemistry and biology at Notre Dame University (1875–1892) is also cited as an important Catholic apologist for the harmonization of theology with evolution. Each would pay a price for his ideas.

In America, the discussion over evolution was allowed to continue. [Here (and later on) the authors make much of the distinction between discussion and prohibition. They forget that actions surrounding the discussion (perhaps threats and warnings) would place a damper on Catholic involvement in science and the treatment of the origin of humans in Catholic educational institutions.] St. Louis Seminary science professor Martin Brennan's *The Science of the Bible* (1898) concluded that Darwin's theory was wrong based on science and Scripture. However, Peoria, IL, Bishop John L. Spalding noted that

... one may admit the general prevalence of the law of evolution without ceasing to believe in God, in the soul, and in freedom (quoted on p. 86).

On the continent, biologists usually carried the torch for evolution. German exegete Joseph Knabenbauer (1877) was confident that "the article of faith contained in Genesis remains firm and intact even if one explains the manner in which the different species originated according to the principle of the theory of evolution" (quoted on p. 79). In general, Catholics found it difficult to assimilate evolution and related fields, such as paleontology, into their theological system.

Gregor Mendel unwittingly contributed to the development of evolutionary theory. Teaching physics at the Augustinian Order of St. Abby in Brno, he took up the question of genetic variation in plants—cultivating and investigating a remarkable 29,000 pea plants. His controversial paper was published in 1866, but it was rediscovered long after his death and became a major factor in the neo-Darwinian synthesis.

The Twentieth Century

The twentieth century would be characterized by the quickening pace in science, an increasing secularism in society, a wide acceptance of biblical criticism, serious efforts to replace Thomism with other philosophical systems, and a struggle to demonstrate that the Catholic Church could change with the times. Yet, it would seem that a gulf between the hierarchy and scientists would increase as time passed.

Pope Pius XII was an enigmatic figure in the changing attitudes of the hierarchy toward science. He engaged the scientific culture in ways that opened the gates, however cautiously, for Catholics to engage in scientific work that was antithetical to traditional Thomism and biblical interpretation. Mathematician-priest Georges Lemaître's 1927 proposal of an expanding universe met with the disapproval of many physicists (including Einstein) until the 1965 discovery of the cosmic energy left behind by the Big Bang. Pius XII used Lemaître's ideas in an address to the Academy to support the argument for the existence of God:

... [Science] has indicated [the cosmos] beginning in time at a period about five billion years ago, confirming with the existence of proofs the contingency of the universe and the wellfounded deduction that about that time the cosmos issued from the hand of the Creator (quoted on p. 105).

Lamaître was publicly disturbed with the Pope for this simplistic endorsement.

Pierre Teilhard de Chardin's studies convinced him of the validity of evolution as basic to understanding the meaning of human existence. Taking evolution as his key idea, he saw the whole universe as an evolutionary process – which he called cosmogenesis. Everything in the universe, including humankind, was bound together in complete organic integration. His superiors in the Society of Jesus believed him to be overly optimistic about the problem of evil, heterodox in his interpretation of the Fall of humanity, and having pantheistic tendencies. Barred from teaching in France, his major writings were not published until his death. The authors consider Teilhard's doctrine difficult to reconcile with either an orthodox Christian teaching or a scientific theory of evolution. Yet it has influenced scholars from Charles Raven, John Haught, and ecological

thinker and theologian Thomas Berry to a cluster of New Age advocates.

American Catholic concern for a mid-twentiethcentury lack of Catholic participation in science research by individual Catholics or Catholic institutions of higher learning led to the establishment of the Albertus Magnus Guild.³

Vatican II

Vatican II (1962–1965) marked a move to new traditions that included celebration of the Mass in the local language, a reaching out to the world characterized by papal visits to many non-Catholic venues, and a loosening of the monarchical image. Yet the authors note that "the ongoing series of interpretations of the Second Vatican Council reveal a great deal of flux and tension amongst church leaders over the theology of the Church" (p. 118). Vatican II maintained the doctrine of sin entering the world through Adam and Eve but was silent on the question of polygenism which is crucial to an evolutionary model.

Pope John Paul II seems not to have opened up the dialog with science to any great extent. The 1992 investigation of the Galileo affair would stress the absence of specific proof for heliocentrism and ignore the central role of Pope Urban III in his condemnation. Yet Pope John Paul II deemed the outcome "a hasty and unhappy decision." His positions on ethics and morality often conflicted with those of secular scientists and philosophers. His emphasis on Thomism and natural theology marks a return to traditional thinking. The sometimes obscure papal comments create controversies among interpreters and ambiguity about the Church's views toward science where it touches theology. Today, there exists a broad diversity of views of science and Christianity over the face of the Catholic communities. Benedict XVI, in his first extended reflections on evolution published as pope, noted that Darwin's theory cannot be finally proven and that science has unnecessarily narrowed humanity's view of creation, but he stopped short of endorsing intelligent design (2007).

A number of short essays on current prominent figures in the science-faith discussion follow: these include theologian Hans Küng, priest-astronomer William Stoeger, biologist Kenneth Miller, priestphysicist-historian Ernan McMullin, and theologian John Haught. Clearly, the greater freedom for Catholic thought has resulted in a new interest in the range of issues involving science. Catholics now join with Protestants in faith/science dialog, usually in the context of liberal theology. It would be interesting to see if Protestant young-earth creationists or ID proponents have found common ground with their conservative Catholic counterparts.

Science and Ethics in the Catholic Church

Vatican II turned Catholic discussion away from theological and doctrinal issues to questions related to the lives of people and society in general—a turn that evangelicals were also taking. Popes traveled the world, making headlines with calls for peace and justice for the disadvantaged, visiting national leaders, and taking very visible stances on moral and ethical issues.

The issue of birth control has been center stage during this period. In 1588, Pope Sixtus V's bull *Effraenatum* imposed excommunication on those who used any form of contraception or abortion. The question of artificial conception was discussed by a study group of clergy and the laity in 1967. However, Pope Paul VI refused to accept their recommendations for change. His encyclical *Humanae Vitae* argued that the unitive and procreative meanings of marriage are inseparable. Many Catholic theologians and 90% of the laity today disagree in spite of Pope John Paul II's 1987 ban on further discussion of the subject.

Catholic thought distinguishes between science and nature in terms of *practice* and *reality*. Natural law is framed in a Thomistic philosophy that guides the church in making moral judgments. The idea of natural law embodied in *Rerum Novarum* (1891) assumes that there is a universal law to which people of all races, classes, cultures, and religions have access by their natural reason. Natural law thus serves as a bridge, between church and world, for ethical and social questions.

Beyond the issues associated with reproduction are those related to ecology, human life (beyond the embryo), cloning, stem cell research, euthanasia, sociobiology (human love), neuroscience (soul, death, human unity), and genetic science (eugenics, genetic therapies, original sin). John Paul II's *Centesimus Annus* (1991) was a key component of earlier and more recent papal and bishops' state-

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ments on environmental issues. The authors offer the work of Celia Deane-Drummond as one who brings basic aspects of Catholic moral theology to the challenges of genetics. She emphasizes the four classical virtues that guide decisions in individual cases – prudence, justice, fortitude, and temperance.

Current debates on unusual procreation strategies, cloning, and stem cell research challenge people of faith in public life. They must make decisions on questions that deeply divide Americans. Currently, five US Supreme Court justices are Catholics. In the previous two hundred years, only seven Catholics had served.

Concluding Remarks on C&S

C&S mainly describes the Catholic hierarchy and cleric-scientists. It is a good introduction to the development of Catholic thought, but leaves the reader without any sense of the place of Catholic nonclerics in the scientific enterprise or the ways that the faithful view science today. How much of this discussion passes down to the laity through the Catholic press? Are Catholic youth encouraged to enter science? How are sensitive topics presented in Catholic schools? Are Catholics represented in science in proportion to their number?

Clearly, the bulk of academic discussion has been carried out by philosophers, theologians, biblical scholars, sociologists, and ethicists who have interests, education, and experience in science. Catholic scientists look to their church for guidance and support as they teach and carry out research that has implications for human welfare, and as they investigate topics that have faith dimensions. Defense of the faith is only part of a larger discussion.

C&S has broken new ground in offering students and the laity a good resource for reflecting on the interaction of their Catholic faith and science. The book is an admixture of fact and opinion, pessimism and optimism.

Evangelicals and Science

Opportunists from H. L. Mencken to Richard Dawkins have managed to distort the public impression of evangelicals as " ... a subset of Protestants, who adopt biblical literalism, are anti-intellectual, and reject all science" (p. 7). The well-worn Draper-White conflict thesis offering "historical" evidence of religion's perpetual opposition to science still heads bibliographies and blogs of the twenty-first century despite countering evidence.

Author Michael Roberts has served as pastor and field geologist, and has maintained a long interest in science and Christianity discussions, especially in earth history. His work seeks "to put evangelicals and science *today* into historical and contemporary context" and is written for students and anyone interested in the history of science (p. 2).

Defining the Evangelicals

Evangelicals are the "people of the Bible." They are trinitarian, emphasize the need for personal conversion, recognize the atoning work of Christ, are active in their faith, and committed to biblical authority. These beliefs have played out in different ways in time and place. Evangelicals, perhaps 400 million in number and of great variety, move across national boundaries, denominations, and time. Although this work focuses on the US and the UK, the roots of evangelicalism are found in the churches of the Reformation, and for Americans, in the immigrants who came to America seeking freedom of worship as well as economic opportunity.

About the only constant is that they are rarely Catholics. At times individualistic, divisive, un-Christian in behavior toward those considered liberal, they form many types of parachurch fellowships to further the Gospel and to do good works. They may belong to churches of hierarchical structure, but stoutly maintain their freedom to think as they feel led of God. They include barefoot fundamentalists in a backwoods Kentucky log chapel and some who dine at high table at an Oxford college. Often seeking to serve rather than consort with the powerful, they, with Catholics, have often been viewed with disdain or ignored by the cultural elite.

The Beginnings

While framed by the spirit of the Protestant Reformation, the evangelical movement emerged in the 1730s from orthodox Christians of British and American Protestantism who looked for a revitalized church. The heroes of the early revival of orthodoxy are John and Charles Wesley, Jonathan Edwards, George Whitfield, John Newton, and their precursors, Cotton Mather, Isaac Watts, William Law, and the German pietists.

The movement grew slowly until about 1790 when it began a rapid expansion in the British

Empire and less rapidly in America to become dominant from 1850 to about 1900 when liberalism became prominent. For the next fifty years, "Evangelicalism declined and retreated into the fortress of Fundamentalism, and it was regarded as a spent force" (p. 12).

The gilded age saw an increasingly prosperous middle class move toward mainline churches with impressive architecture, large organs, and a more ritualistic style of service. At the same time, the effects of German biblical criticism were being felt in the seminaries and in the churches served by their graduates. The British churches especially saw a massive decline in influence as modernism became dominant.

Evangelicals met in reaction to the modernist threat in the 1890s at Niagara Falls, NY, but with little effect. One product of their work was *The Fundamentals*, a collection of twelve books published in 1910. Notably, James Orr's (Glasgow, Scotland) article, "Science and Christian Faith," accepted evolution with the exception of humans.

New denominations appeared as religious conservatives split from the mainline churches into "Bible-believing" derivatives. Independent churches and chapels were formed by those tired of hierarchical authority. Despite the fact that old-line theological liberalism was in disarray and decline after World War I, it retained its hold on American institutions of higher learning by effectively shutting conservative views out of higher education. Somewhere along the way, the term *fundamentalist* entered the mix—notably in the famous Harry Emerson Fosdick (1922) sermon "Shall the fundamentalists win?"

The labels—conservative, evangelical, fundamentalist—are hard to pin down in the religious turmoil of early twentieth-century America. Fundamentalism moved from defending the faith to a more negative position—involving a rigidity of understanding, negativity toward higher education, hardline defense of positions, disdain of fellow Christians over secondary matters, and guilt by association. Christians, having abandoned the institutions of higher learning, established many Bible schools and Bible colleges. By and large, academic scholarship was abandoned for an authoritarian approach to higher education. Dispensationalism, developed by Plymouth Brethren J. N. Darby, was embodied in C. I. Schofield's extensive notes in his widely used Schofield Reference Bible (1909). Dispensational premillennialism became the norm in non-Reformed churches well into the twentieth century through a network of Bible schools and summer conferences throughout the US.

Evangelicalism in the Twentieth Century

By the 1920s the fundamentalists had largely replaced the American evangelical movement. New denominations, independent churches, seminaries, and Christian colleges served those who had been the losers in the battles over control of denominations and educational institutions. The 1925 Scopes trial in Dayton, TN, highlighted the fundamentalists' opposition to evolution – a defining moment for the warfare thesis.

As early as 1910, evangelical students at Cambridge University had broken away from the Student Christian Movement because of their promotion of modernist theology. A number of Christian Unions were founded at various British universities—curiously unmentioned by Roberts. In 1928 a number of these groups joined together as the InterVarsity Fellowship, later imported by Canada and the US.

The realignment of Protestant Churches in this period resulted in a gradual reduction in the membership in the mainline churches while the majority of American Christians were found in new associations. There were those in the US and UK who hung on in the old church seeking renewal from within. The Post-WWII revival of American evangelicalism saw gains in number, education, political influence, social responsibility, and theological sophistication that continue into the twenty-first century. The UK has seen similar, but more muted changes.

Evangelicals, the Bible, and Science

Roberts views evangelicals at a popular level today as desiring to reconcile science with the Bible using a *literalistic* approach rather than one which requires *interpretation*. This approach emphasizes the Fall of Adam which brought suffering and death into the world and the need for a Savior who conquered death and forgives sin—views that fit into popular evangelistic strategies and young earth creationism. Scholarly studies find interpretative value in the

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past in considering current issues. Yet the ghosts of the past may hamper attempts to break new ground.

Pre-Evangelical Views on the Nature and Interpretation of Scripture

Roberts reaches back to the early church fathers to locate the roots of the evangelical attitude toward Scripture. Evangelicals differ from liberals in viewing the Bible as a communication from God, not just as a record of human experiences with God. The Reformation distinction of *Sola scriptura* emphasizes its *final* authority in matters of faith and doctrine, not as the *only* source for gaining knowledge. He notes particularly the valuing of nonbiblical knowledge by early church fathers such as St. Augustine and later by Calvin and Luther.

The Reformers' interpretation of Scripture derived from the ways that humanists such as Erasmus studied divine texts. They sought the *literal* sense over against the *allegorical*. *Literal* here is the record of events that actually transpired, not a "blow-byblow" detailed chronological account. Another principle of interpretation used by Augustine and later by Calvin was that of *accommodation* which involves the process of adapting, fitting, and adjusting language to the needs and capacities of the hearers.

Evangelical Views on the Nature and Interpretation of Scripture, 1730–1950

Early evangelicals, some highly educated, accepted the Bible as "the ultimate authority" and "Newtonian science" as augmenting God's Word. As the movement spread and deepened, new theologies developed and maturing science brought new ideas about nature to fit into a biblical framework consistent with the "unified knowledge" tradition stemming from the Renaissance. The large number of evangelicals with sparse education had little cause to question a literal interpretation of Genesis. By 1770 geologists such as Cuvier and Hutton had begun to demonstrate the enormous age of the earth. Most evangelicals were content to place the geologist's age into the time of chaos after Gen. 1:1.

Amateur geologist Hugh Miller's posthumous *The Testimony of the Rocks* (1857) led a move to a dayage interpretation by J. W. Dawson and a chaosrestitution interpretation by others. These interpretations went out of fashion until recycled by George Pember as the gap theory and included in the Schofield Reference Bible. It remained popular with fundamentalists until replaced by an extreme literalistic interpretation of Scripture promoted by the US Creation Science movement of Whitcomb and Morris in the 1960s.

Evangelical Biblical Interpretation, Post-1950

The post-WWII educational explosion and revival of evangelicalism led to a deepening of scholarship as doctorates in theology blossomed. Inevitably there has been a shift to more liberal views, but there remain many with traditional fundamentalist views. A lack of Old Testament (OT) scholars has hindered the development of faith-science scholarship. Problems with the OT text concerning historicity and textual inerrancy make it difficult to hew the line in some conservative seminaries and colleges. The roles played by extra-biblical creation accounts, paleontology, and archeology pose additional problems.

Roberts notes the lack of an evangelical scholarly consensus on the early chapters of Genesis: Douglas Kelly, John Carl McMurray, and, more popularly, John Whitcomb represent literalistic six-solar-day worldwide flood readings. Meredith Kline's framework approach avoids the need for a chronological account; Hugh Ross (Reasons to Believe) and Glen Morton are representative of those who hold the day-age view. Various concordistic strategies continue to be discussed as evidenced in the pages of *PSCF*. Americans are far more disposed to employ this strategy than their British cousins. Advocates of evolution tend to favor a framework position or feel that the Bible does not deal with scientific questions.

The Question of Inerrancy

The elephant in the room of any evangelical discussion continues to be inerrancy—the view that the Bible is absolute truth and does not err in its statements. Scholarly studies of the biblical text and science cast doubt on a doctrine framed from Scripture that has been held with varying degrees of nuance. Roberts argues that John Calvin and most of the reformers as well as mid-nineteenth-century stalwarts such as Charles Hodge and B. B. Warfield held nonliteral views on some matters in early Genesis.

Post-WWII evangelical scholarship saw a return to a *limited inerrancy* and the battle lines were drawn. The late 1970s saw various public statements by councils of noted scholars as well as innumerable books. Roberts does an excellent job of outlining what is essentially an American problem while "most evangelicals in Britain reject or avoid inerrancy" (p. 53).

The Early Evangelicals and Science

"What comparison can there be between saving a soul and analyzing a salt?" (From Henry Venn's 1780 letter to Francis Wollaston, a future professor of chemistry at Cambridge, warning him not to let chemistry take over from his Christian ministry, quoted on p. 68).

Mid- to late-eighteenth-century evangelical clergy generally approached science in a fashion similar to other clerical counterparts. Roberts offers brief treatments of Jonathan Edwards, Thomas Prince, John Wesley, and William Williams. None were in the class of the earlier William Derham and John Ray. Roberts locates the roots of today's evangelical attitudes in the total acceptance of Copernican and Newtonian astronomy and physical science in general, but ambivalence toward the historical sciences like geology and the history of life.

He suggests that eighteenth-century science raised no *evangelical* theological questions. However, Irish Priest John Needham's 1748 experiments on spontaneous generation of living organisms and Comte de Buffon's speculations in his *Natural History* that living creatures evolve according to natural laws, that humans and apes are related, and that all life has descended from a single ancestor, raised the ire of Wesley and others.

The Age of Revolution: 1789–1850

This was the period of great interest in nature by clerics, gentlemen of science, academics, and a few "professional" scientists. Evangelicals interested in science were found at all levels of society.

The design argument reached a peak with William Paley's *Natural Theology* (1802). Taught in the universities for many decades, it would be criticized by some because it focused on God rather than the Redeemer. Yet popular apologists would appeal to proofs from nature for God as preparatory to the Gospel.

Geology raised questions about the role of Noah's flood, the age of the earth, pre-Adamic humans, and whether there was animal death before Adam's fall. In August 1831, Adam Sedgwick provided recent Cambridge graduate Charles Darwin with a crash course in geological practice as the two traveled through the Vale of Clyde to Bangor in North Wales. Early in his career, Sedgwick (and most other geologists) held a catastrophist view that the earth's surface was shaped by sudden, short-lived, violent events that were sometimes worldwide in scopeamong them Noah's flood. By 1850, most geologists had moved to a uniformitarian view that geologic change occurs slowly over long periods of time punctuated by occasional natural catastrophic events that have affected Earth and its inhabitantsthe Flood had disappeared from geological sight. A mind-numbing collection of clerical, amateur, and professorial geologists on both sides of the Atlantic and their harmonies of Genesis and geology or antigeologies are portrayed.

Roberts argues that Sedgwick became more cautious of attributing geological features to God's direct intervention in the normal path of nature. As an early critic of Thomas Chamber's Vestiges of the Natural History Creation (1844) for its mistakes in using fossils to support evolution, Sedgwick also criticized Darwin's Origin of Species (1859) for its lack of rigor in rejecting "'the true method of induction' and coming out with speculations as 'wild I think as Bishop Wilkin's locomotive that was to sail with us to the Moon'" (quoted on p. 93). More serious were moral and theological concerns he raised in a friendly letter to Darwin: "Tis the crown & glory of organic science that it does thro' final cause, link material to moral; ... You have ignored this ... " (quoted on p. 93).

The Post-Darwinian Evangelicals

We now enter ground whose scientific and religious dimensions have been explored in various ways by James Moore, John Brooke, Peter Bowler, and Geoffrey Cantor, among many others. By 1900 more of the educated evangelicals accepted evolution – excluding humans – but there was no consensus about the scientific details. Darwinism had been replaced by a guided evolution in which direction or orthogenesis operated.

Robert's conclusion that the "advances in physics, chemistry, or even astronomy … caused no controversy for any Christian, whether evangelical or not" (p. 136) in the last half of the nineteenth century may stem more from a myopic interest in geology. His conclusions are: (1) most evangelicals had no objection to geology, and thus did not insist on a six-day

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creation; (2) many were concerned at the possibility of evolution and an existence of humanity for more than Usher's 6,000 years; and (3) "there was a gap between the clergy and the educated layman with many rank and file Christians, who regarded science with suspicion" (p. 137). These conclusions have the feel of validity, but do not take time and place into account.

Lurking in the wings were two small American religious communities who held ideas that would later profoundly influence evangelical ways of viewing science and Christianity. Carl Ferdinand Wilhelm Walter was one of a number of mid-western Lutheran church leaders who actively promoted a young earth, flood geology, and a geocentric cosmology. Seventh-day Adventists emerged in the 1860s out of an earlier millenarian tradition. They worshiped on Saturday based on the fourth commandment and strongly held a literal six-day creation based on that commandment.

The Twentieth Century

Roberts moves into this period by reminding the reader of a fading US evangelical movement troubled by liberalism in mainline churches, and in the UK, by a loss of general interest in the church. Americans tended to form new churches and denominations while the British would stay in the established church as a "beleaguered rump."

Accounts of the 1925 Scopes trial have been long used to perpetuate a "warfare between science and religion" and as a case history of gross historical misinterpretation. Roberts sets things straight and comments that the 1925 issue was the teaching of evolution, while today both evolution and geology stand in the dock. He notes that William Jennings Bryan and evangelist Billy Sunday denounced the popular eugenics movement of the day as inspired by evolution.

The Anti-Evolution/Anti-Geology Fundamentalist "Scientists" Pundits

Seventh-day Adventists, their colleges, and medical schools had opposed evolution and old-earth geology since the mid-nineteenth century. A son of that movement, George McCready Price, wrote a number of anti-evolution flood geology works culminating with *The New Geology* (1923), a work of 736 pages that had the look of a science text of the day. Price

gained significant influence in conservative evangelical circles in the US, but not in the UK. Roberts is right in viewing the influence of Price and later Presbyterian minister Harry Rimmer, *The Harmony of Science and Scripture* (1936), a nonscientist critic of geology and evolution, as selective. Yet Price managed to gain the attention of AAAS journal *Science* editor James M. Cattell who published an article by an academic geologist which roundly panned Price's ideas and lack of qualifications.

American anti-evolutionists formed a number of short-lived Bible and science organizations which inevitably failed because of disagreements among their founders. However, the faithful would hear of their ideas in summer Bible conferences and other venues and would provide fertile ground for the creationist explosion of the 1960s.

British evangelicals went into a decline after 1900. Most accepted evolution except when it came to the human soul or when it served as a basis for discarding the Fall. Articles critical of evolution appeared in the pages of the *Journal of the Transactions of the Victoria Institute* and the *Evangelical Quarterly*. Ambrose Fleming, Douglas Dewar (*Difficulties of Evolution*) and L. Merson Davis (*The Bible and Modern Science*) were scientists involved with the Evolution Protest Movement which became the Creation Science Movement in 1980.

A New Engagement with Science

The need represented by earlier abortive Biblescience groups still remained in fundamentalist circles. In 1941, the American Scientific Affiliation (ASA) emerged from dispensational/Bible institute roots and daunting circumstances to form an enduring base for evangelical thought and action. The founding fathers and the first ASA Council initiated an organization that would be the scientific component of the American evangelical post-war renaissance-uncertain at times, feisty, maligned, underfunded, and often ignored by those it sought to serve. Stoner, Kulp, Ramm, Hearn, Hartzler, Bube, and Morris are but a few of the early participants in an enduring discussion. While the ASA seems obsessed with origins questions, it has been at the front of emerging scientific issues ranging from the environment to stem cell research and worldview questions broadly involving Christianity and science. Roberts suggests that the first two decades of the ASA led to a new openness by evangelicals to all science and unwittingly to a new and vigorous form of young earth creationism (p. 160).

Our British cousins also have an organizational history-beginning with the Victoria Institute (founded 1865), created in part to counter The Origin of Species. In 1944, InterVarsity leader Oliver Barclay began a series of annual conferences on science and religion which became the Research Scientists Christian Fellowship and in 1988, Christians in Science (CiS). Barclay, R. E. D. Clarke, Reijer Hooykaas, Donald MacKay, Robert Boyd, and Malcolm Jeeves provided early leadership. CiS joined with the Victoria Institute in publishing the journal Science and Christian Belief. Conservative statements of faith by both organizations would exclude from membership some who would become important in later science-faith discussion. The ASA and CiS have strong ties and hold regular joint meetings.

The Rise of Creationism: Young Earth Creationism and Intelligent Design, 1961–2007

Roberts⁴ is clear about the importance of young earth creationism (YEC) in the English-speaking world. Answers in Genesis (1991) and the Institute for Creation Research (1970) are the most important of many US organizations along with innumerable internet clones and blogs. The UK has seen the growth of creationism in mainline Anglican and Methodist churches due to the growing numbers of evangelicals in those bodies. YEC has made major inroads in New Zealand, Australia, and Canada. Roberts finds the growing Third World church very susceptible to YEC interpretations—the dominant understanding of Christians in Latin America, Africa, and Asia.

As creationism gained in power among the evangelical right, moves were made to include creationism and (later) intelligent design in science courses in the public schools. Arguments about "equal time," "critical thinking," and "teaching the controversy" were argued in post-Scopes trials using scientists, historians, and philosophers as expert witnesses. Opponents of anti-evolutionists include Talk.Origins, the Panda's Thumb blog site, and innumerable atheistic websites and blogs. *PSCF* readers are familiar with the religious and scientific strategies used to further the YEC cause. An earlier variety of choices has now been reduced to either atheistic evolution or seven-day creation. The 1980s saw the introduction of Intelligent Design (ID) to the anti-naturalism arena. Roberts provides a nuanced account of this new twist on the teleological argument for the existence of God, modified to avoid the nature or identity of the designer. The well-funded ID movement has had significant influence in the English-speaking world and beyond. Curiously, the YEC community opposes ID because its promoters are indifferent about the earth's age and accepting of some levels of evolution.

Environment and Bioethics

The discussion of views on origins and design has been joined in recent decades by equally contentious environmental and bioethical questions. The response by evangelicals to overpopulation, abortion, genetic engineering, stem cell research, and global warming is complex – often heavily politicized. The ASA and CiS have regularly offered discussions of the issues in their journals and meetings.

Evangelicals, such as Loren Wilkinson, Cal DeWitt, and Richard Wright on the American side and Sam Berry, John Houghton, and Ghillean Prance among many in the UK, have worked professionally to advance green themes. Opposition has been sharp on the right by browns, such as nonscientist Calvin Beisner who has offered a theological basis for his "Cornucopia hypothesis" of unlimited growth. While TV evangelists, "health and wealth" advocates, and "other worldly" Christians are often naysayers, many (especially younger) evangelicals have joined the environmental cause. Evangelical leaders including Francis Schaeffer and Richard Cizik have been strong supporters.

The issues raised by advances in biotechnology have been spelled out by evangelicals Elving Anderson, Nigel Cameron, Gareth Jones, and Oliver O'Donovan, among many others. William Hurlbut contributed to a US Presidential commission on sources of embryonic stem cells (1997). The rightto-life movement in the US has provided the political muscle to mediate research activity.

Roberts closes with a section on medical missions. As on the battlefield, missionary medicine often takes place in non-ideal settings with little protection for the physician. Serving in parts of the world, little touched by mainstream medical research, they have sometimes been the first to note new problems and unconventional treatments.

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The Big Picture

Roberts paints a comprehensive picture of evangelicals and science from the American epicenter to the uttermost parts of the earth. In a changing admixture of worldviews, one must choose from a buffet of choices which inevitably have unanswered questions. In the center, the ASA and CiS have long-term roots in their respective spheres of influence. Hugh Ross's Reasons to Believe has a large American influence. On the left, the Institute on Religion in an Age of Science and the Science and Religion Forum provide fellowship and discussion for those of like mind. On the right, Answers in Genesis, the Creation Research Society, and the British Biblical Creation Society serve large communities of believers.

Innumerable organizations, websites, blogs, and other internet media spread their messages in a bewildering maze of conflicting views. Does the average Christian pastor, working scientist, engineer, or layperson really care about the issues unless they strike them personally?

The concluding chapter aptly summarizes today's state of the relationship between evangelicals and science. As with C&S, there needs to be more discussion of current evangelicals in science. While centrist evangelicals continue fine-grained forms of accommodation, those pushing the envelope to the left in various forms of open theology and panentheism or in quantum mechanical fluctuations are unmentioned.

Even though evangelicals have received much scholarly attention in recent years, Roberts has provided a unique contribution that offers the novice and active participant much fuel for thought.

Catholics and Evangelicals in Science: Diversity, Complexity, Parallels, and Distinctives— An American View

Today these Christian communities hold much in common ranging from worship styles to how they view science and faith. Immigrant distinctives have worn off in the melting pot and ipod culture. Enduring beliefs and practices still divide the two communities but clergy and laity find common purpose in good works and questions of public morality. I suspect that local churches hold generally positive views on science and environmental concerns. Creationist concerns are far more widely found in evangelical communities.

Scholarly communities exhibit a wider diversity. Catholics range from conservative to strongly liberal while evangelicals find few who stray too far from conservative theology and a high view of Scripture – the conservative constituency that funds the institution acts as its own magisterium. Catholic education generally teaches evolution with traditional reservations about human origins, yet polls show the laity to be on the conservative side. Evangelicals are more inclined to support creationist agendas. Each offers ways of interpreting nature and science distinct from conventional ethics and morality.

Each work engages the conflict (warfare) thesis. Clearly, fundamental and some irresolvable differences between scientific and religious worldviews have and will continue. Questions of authority, the desire to protect the faithful from heresy, and the wish by biblical scholars and scientists alike to freely pursue their work have provoked incidents that seem unnecessary when viewed from a distance, yet appropriate at the time.

C & S primarily displays the detachment of scholars while E & S reflects a mixture of detachment and the passionate interest of one deeply involved with the issues. The authors have taken on a daunting task. Paperback versions belong on your bookshelf.

*

Notes

¹See I. Bernard Cohen, *Puritanism and the Rise of Modern Science* (New Brunswick, NJ: Rutgers University Press, 1990); and R. Hooykaas, *Religion and the Rise of Modern Science* (Grand Rapids, MI: Wm. B. Eerdmans Publishing Co., 1972).

²The authors follow the line of David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, 600 B.C. to A.D. 1450* (Chicago: University of Chicago Press, 1992) for this period.

³Ronald A. Brinzley, "American Catholicism's Science Crisis and the Albertus Magnus Guild, 1953–1969," *Isis* 98 (2007): 695–723.

⁴Roberts closely follows the groundbreaking work of Ronald L. Numbers, *The Creationists: From Scientific Creationism to Intelligent Design* (Berkeley, CA: University of California Press, 1993; expanded ed.; Cambridge, MA: Harvard University Press, 2006).

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Walter R. Thorson

I think his [Groothuis'] proposal to teach "intelligent design" (ID) in the secular university is a bad idea ... [M]ost arguments for ID are not concerned with science. They offer a superficial "answer" to people who do not know much ... about the subject.

Article

A Response to Douglas Groothuis

Walter R. Thorson

Douglas Groothuis' proposal to make "intelligent design" (ID) the focus of a Christian apologetic in the university community is a bad idea. It would publicly associate Christianity with debatable claims that design arguments are scientific, and also with hostile attitudes to scientific tradition. Dismissing "naturalism" as a presupposition of science is a particularly questionable move. In this response to Groothuis' article, I argue, first, that the continuing controversy over ID has some disturbing parallels with earlier controversies over recent-earth creationism; second, that while there are a few legitimate arguments for ID, most are superficial, both scientifically and philosophically. The ambivalence or hostility of most ID arguments toward any kind of biological evolution is also significant. I argue that while ID is legitimate as natural theology, it is certainly not an agenda for scientific enterprise; in a brief account of the ID movement, I survey various arguments for ID. Finally, I discuss why attacking "naturalism" is misguided; in the long run, it damages the credibility of those arguments (such as Michael Behe's) that have some scientific merit.

The *PSCF* editor asked me to review an earlier version of the article by Douglas Groothuis. I entirely disagree with Groothuis' thesis, but did not think it right to reject the article. I proposed instead to give a critical response to any revision making the same arguments. I also explained to the author why I think his proposal to teach "intelligent design" (ID) in the secular university is a bad idea – and suggested some further reading about the issues.

The article published here shows little evidence that issues raised have been considered. A brief comment in the section "Intelligent Design at the University" dismisses one aspect of my critique in a single hand-waving sentence. I also object to the *misrepresentation* of my own views presented there: I am implicitly described as a Christian theist "*committed to Darwinism as an adequate theory of life and its development*" (p. 238). Had Groothuis read any of my articles on the subject—or even comments made in my review—he would have realized that this statement is false. He seems to have been so convinced of his own views that he just did not bother to examine my remarks further.

In this response, I first discuss the tradition of the ASA in relation to the legitimacy and methodology of science. Brief comments on biological evolution and the scientific context for the ID controversy follow; then I give a short account of the ID movement and remark on the naive dismissal of "naturalism" in science by ID advocates.

Walter R. Thorson was professor of theoretical chemistry at the University of Alberta (1968-1994), and adjunct professor of the Philosophy of Science at Regent College, Vancouver, BC, for 25 years. He is a (retired) Fellow of the American Physical Society and of the American Scientific Affiliation. Since retiring in 1994 he has written extensively on issues in science and theology and the philosophy of science, in articles published in PSCF and elsewhere. In the continuing debate over "intelligent design," he has been particularly concerned to defend the theological legitimacy of "naturalism" as a presupposition of science. Walter and his wife Mary reside in Calgary, Alberta, Canada, close to their two children and their families.

Walter R. Thorson

After some years, I have concluded that most arguments for ID are not concerned with *science*. They offer a superficial "answer" to people who do not know much (and do not care much) about the subject. That is why it would be a disaster to make ID a standard-bearer for Christian thought in the university.

I have spent much of my life in a serious personal commitment to the legitimacy of science, and know something about its practice, authentic tradition, and philosophical presuppositions. As a Christian who takes science seriously and knows something about it, I am embarrassed by other educated Christians who, having little or no experience of the scientific enterprise, nevertheless feel fully qualified on purely philosophical or theological grounds to offer authoritative opinions on the subject in *PSCF* and elsewhere.

The Tradition Established by the ASA

As Ronald Numbers has shown in his excellent and carefully written book *The Creationists*,¹ the history of the American Scientific Affiliation before ~1950 was troubled by a long controversy over recentearth creationism; many ASA members at the time were committed to a literal reading of the biblical creation accounts. Eventually, ASA's leadership (and a majority of its members) affirmed their commitment to a scientific understanding of the physical world, and publicly declared that they did not consider recent-earth creationism to be scientifically valid. Those who disagreed with this position severed their connection with ASA and formed several organizations (associated with the names "creation science" or "creation research") dedicated to promoting recent-earth creationism. In retrospect, this was a watershed for the ASA-especially its clear affirmation that scientific inquiry and methods (including the implicit acceptance of "naturalism" as a presupposition of *physical* science) can lead to truth about creation. ASA's positive influence on generations of Christians working in the sciences stems at least in part from the courage of its leadership in establishing this commitment to the legitimacy of science.

Specific issues in the 1950s' controversy in ASA over recent-earth creationism have little to do with most arguments regarding ID. Neither Groothuis, nor any of the ID proponents with whom I am acquainted, actually rejects the evidence of physical science for a universe about 15 billion years old and an earth approximately 4.7 billion years old – though arguments some ID proponents have made against the philosophical legitimacy of "naturalism" in science *might* be so interpreted. Nevertheless, controversy over ID within ASA and in *PSCF* presents deeply disturbing parallels to the earlier controversy over recent-earth creationism.

A commonly stated view of many scientists is that ID is "just another form of creationism." An unhappy aspect of Groothuis' approach is his willingness to draw up battle lines with science on that basis. But making ID a public issue in the university would not lead to a better understanding of the issues; it would only become a further embarrassment to effective Christian apologetics. While there are a few legitimate arguments that can be made about ID (cf. "A Survey/History of ID Arguments" below), most of what is said on the subject is just a new kind of creationism—predicated on the same hostility to the scientific tradition as the old kind.

I do share Groothuis' view that we should not merely accept the materialist prejudices of many in the scientific establishment. Certainly, Christians affirm that God is the Creator of all things, visible and invisible, and this necessarily implies a different view of the legitimacy and scope of science than materialists commonly hold; it also implies a very different understanding of "naturalism." I have written some key articles on this particular subject, two of which were published as a tandem pair in PSCF six years ago.² (I called Groothuis' attention to these, but he seems not to have explored the points made in them.) In the same issue, there are responses to my articles from twelve very different people, and a brief concluding reply on my part. Apart from his proposal to teach ID in the university, there is nothing about ID in Groothuis' article that was not already discussed in that issue of PSCF by myself or others.

What concerns me most here is the harmful effect on ASA and *PSCF* of continuing controversy over ID. As in the 1950s, many ID advocates are skating pretty close to the same attitudes to science and scientific inquiry that mark "recent-earth creationism" – and determined its eventual, discredited future. If you are going to argue for ID, you should

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A Response to Douglas Groothuis

first be very sure that you know enough about science and scientific tradition to make a competent argument. Unfortunately, many ideas Groothuis presents in his article do not meet that standard, and Groothuis himself does not know enough about the issues entailed to recognize that. As a practical matter, I do not think *PSCF* should be wasting space on superficial arguments for ID.

Biological Evolution as the Nexus of Debate over ID

The effect (and perhaps the intent?) of many arguments for ID is to discredit *all* aspects of biological evolution as a framework for biology. Oddly, many people who argue for ID as "the answer" to materialism in science hold the same view of biological evolution as the materialists they oppose. In particular, they assume that anyone who believes that biological evolution has a factual, scientific basis must also be convinced of the adequacy of neo-Darwinist theory. I have already pointed out that Groothuis' article misrepresents my own views on this matter.

Phillip Johnson observed in the 1990s that there are many different meanings to the word "evolution," and people who have a stake in promoting the idea find it convenient to play a kind of "shell game" with these. Johnson was thinking of the proponents of a materialistic and reductionist neo-Darwinism when he made this point – people like biologist Richard Lewontin, whom Groothuis cites in his article as representative of the views of "scientists" in general. (Richard Dawkins is not really a working scientist, but a dogmatic proponent of atheism on alleged scientific grounds; see the brilliant critique of Dawkins' views recently published by Alister and Joanna McGrath.3) But Johnson may not have anticipated the extent to which the same "shell game" is played by some IDers and other opponents of evolution.

Evolution as a "Fact"

There is a very weak sense in which evolution is a scientific fact. A huge increase in both the variety and complexity of living things has occurred since the first primitive life forms appeared some 1–2 billion years ago. This claim is based on lots of solid information, both from the fossil record and from the study of genetic information in present living things. Most of the increase in variety and complexity occurred about 570 million years ago, in "the Cam-

brian explosion." Since then, while there has been some evolutionary development, it has been relatively limited in extent compared to that in the original "explosion," and some biologists even argue that the process has been neither gradual nor continuous. It is scientifically reasonable to argue further (on the basis of DNA and other molecular evidence) that this "unfolding" occurred by biological descent from a common ancestor or limited group of ancestors; and finally, that natural selection by the environment for advantages conferred by genetic change is an important driving force in the process.

It is crucial to recognize what is *not* claimed here: apart from the hypothesis of common descent and the statement that natural selection by the environment plays an important role, no further assertion is made about the process or "mechanism" of evolution. We do not have *any* adequate theory of how evolution occurred.

Theories of Evolution—Neo-Darwinism in Particular

Current theories of evolution make much stronger claims. The dominant theory is neo-Darwinism, formulated earlier in the twentieth century: in addition to claims made in the "weak" definition of evolution, neo-Darwinism asserts that an adequate mechanistic theory of the process is provided by natural selection plus random genetic mutations plus lots of time. The claim that chance can adequately account for change is a critical issue. There is no convincing demonstration that mutations occur randomly, or that those which do so occur are constructive. The overwhelming majority of mutations are destructive and even lethal; the genetic system has an elaborate checking mechanism to weed some of these out.

I do *not* think neo-Darwinism is scientifically credible as an explanation of biological evolution. This opinion is shared by a great many thoughtful scientists, many of whom are not even theists—let alone Christians. This is why I particularly object to the way in which Groothuis (like many opponents of evolution) has played the "shell game" by assuming that belief in the "weak" claim of biological evolution and the hypothesis of common descent must also imply belief in neo-Darwinist theory. A good scientist can accept the evidence for the factuality of biological descent with variation from a common ancestor, while at the same time recognizing that no satisfactory theory of the process yet

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exists; it is a problem still to be solved. I find it strange that opponents of evolution, including many who argue for "intelligent design," cannot seem to comprehend this open state of affairs, and demand alternative "answers" instead. In doing so, they display their ignorance of what science is like—an open, unfinished inquiry into the "book of nature."

People generically opposed to biological evolution need to recognize that special creation of individual species, often derived from literalist readings of Genesis 1, *cannot* be reconciled with the scientific evidence. Belief in special creation demands that one also believe that information from the fossil record or the study of genetic material is in some way misleading, only seeming to appear as it is interpreted. So far, only recent-earth creationists have advocated such a theologically dubious and capricious view of God.

It is therefore pertinent to ask whether belief in ID, or asserting it as a "Christian or theistic alternative" to current scientific accounts, is motivated by deep-seated opposition to evolution in any form (and asserting special creation in its place). In a recent article, I have argued that opposition to evolution is rooted in an unexamined philosophical commitment of evangelical Protestant theology to Aristotle.⁴ It is Aristotle's philosophy, not the Bible, that teaches the fixity of biological species-and Aristotle's reasons for that doctrine are extremely problematic theologically. When evangelicals insist (as many do) that the phrase "after its kind" in Genesis 1 implies the fixity of biological species, they are really insisting on Aristotle's doctrine, not what the biblical text actually says (such a rendering of the text also happens to be bad exegesis). But Aristotle has already been proved wrong about a lot of things in creation-starting much earlier with physical science.

I should emphasize that most ID advocates are much more open to scientific evidence and reasoning than recent-earth creationists. The fact that so many ID arguments are focused on the problem of information in the DNA "code" nicely illustrates this difference—as does the fact that most ID proponents accept the validity of modern physics/cosmology. The ID movement is somewhat ambivalent about biological evolution; a few clearly accept it in a "weak" sense as a valid paradigm for biology (e.g., biochemist Michael Behe). That is why I have emphasized the incompatibility of "special creation" with the scientific evidence—and with any evolutionary paradigm. I believe it is important for people in the ID movement to recognize this incompatibility—and come to terms with it in thinking about biology.⁵ For example, if someone argues for ID, and the real agenda behind the argument is to maintain belief in special creation, it will honor the cause of truth to acknowledge that—and will also help those hearing such arguments to know where the speaker is really going. The intent and grounding of particular arguments for ID matter a great deal; sound philosophical judgment and scientific competence are both required.

A Survey/History of "Intelligent Design" Arguments

Perhaps the first modern presentation of an argument for ID appears in a book by Thaxton, Bradley, and Olsen entitled *The Mystery of Life's Origin.*⁶ A few years before publication of that book, Charles Thaxton shared the teaching of a summer course on issues in science and philosophy of science at Regent College in Vancouver, BC, with myself and Davis E. Young of Calvin College; I therefore had opportunity to know about ideas in Thaxton's later work. A large class of arguments about ID ever since has been addressed to the same issue, namely, the problem of "chemical evolution," or "origins-of-life" scenarios.

"Chemical evolution" is the name for a number of efforts in the second half of the twentieth century to account for the origin of the most primitive life forms using a purely mechanistic theory and starting with inorganic chemicals. The whole enterprise grew out of a rigidly mechanistic approach to biology, and for a time, in the period 1950-1990 or so, it became a kind of cottage industry among certain chemists and biologists. Research programs in this area assumed that life on earth is the result of a complex chemical accident-or rather a series of accidents building one upon another. The overall goal was to account for the high degree of information and functionality exhibited in genetic material (the so-called "DNA code"): elements in the program were to account, first, for the existence of primitive chemicals common to living things (e.g., elementary amino acids); second, for the higher-order organization of such materials in potentially active forms

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(polypeptide chains); finally, for the sophisticated, information-specific and functional structures in DNA that control synthesis of essential ingredients for life, such as proteins and enzymes. It is not my intent here either to describe this work in detail or to offer a detailed critique of it. Research on "chemical evolution" has now mostly been discontinued because the outcome has been negative at every stage. It is even more significant that some of the scientists involved publicly recognized the project as a failure-in many cases, long before it received attention by ID proponents. From Thaxton's presentation at Regent College in the early 1980s, the main lesson was that if one undertakes a scientific project with motivations philosophically inadequate to the task (in this case, mechanistic and reductionist assumptions), the result is likely to be some pretty poor science.

The failure of a mechanistic theory of biology does not lead us to infer design as the best scientific alternative; but ID is legitimate as natural theology, if it has a sound scientific basis.

Most arguments for ID are addressed to the origin of the information content in genetic material. Articles and books by William A. Dembski⁷ and Stephen C. Meyer⁸ are primarily concerned with this particular topic.

Meyer, whose academic training was in philosophy, devoted himself to an extremely thorough study of the chemistry and biology necessary to understand and evaluate the "chemical evolution" project. His study is somewhat more sophisticated than that of Thaxton et al.9 Meyer's negative critique of the philosophical and scientific inadequacies of "chemical evolution" is accurate and constitutes a valid scientific contribution. His ensuing positive argument that the failure of a mechanistic and reductionist theory leads to inference of ID as the best explanation is much less convincing. I shared with Meyer and others the teaching of a course on "Naturalism and Design in Biology" at Regent College in June 2002; Meyer and I understand each other's arguments and points of agreement and disagreement fairly well. In my view, Meyer and other ID proponents need to leave open a significant "unexcluded middle" in thinking about biology. I have argued in a number of articles that the failure of a mechanistic theory of biology does *not* lead us to infer design as the best scientific alternative¹⁰; but ID is legitimate as natural theology, if it has a sound scientific basis.

The work of both Meyer and Dembski is predicated on the assumption that the only or best alternative to a mechanistic, materialistic, and reductionist "naturalism" is ID. I argue that a scientific response might begin instead by recognizing that (a) biological systems are organized logically toward function, a fact that suggests there is much more to understanding them than mechanism, and (b) until we have done a good deal more in exploring this kind of "naturalistic" thinking about how they are logically organized, it merely short-circuits a scientific approach to understanding them if ID is introduced as an alternative explanation. I have developed this argument in some detail.¹¹

Dembski's approach to the same subject is more aggressive than Meyer's – and illustrates clearly my concerns about short-circuiting scientific thinking. Dembski argues that ID is necessarily the only scientific alternative, given the failure of a purely mechanistic account, and claims to offer mathematical proof (!) that this is the case. He does not consider that there may be "naturalistic" but nonmechanistic alternatives to his arguments. I do not think his mathematical arguments are valid, or even mildly persuasive-a judgment I share with many fellow scientists. Unfortunately, Dembski's work is really not addressed to scientists, but to an uncritical community of persons not generally qualified by experience or training to make scientific judgments. In short, I think Groothuis' arguments are deficient for the same reason: they are not backed by enough historical and scientific judgment to give them substance.

Michael Behe, a professor of biochemistry at Lehigh University, is the other ID proponent whose work is cited by Groothuis.¹² Behe is concerned with the complexity of biological systems and the problem of their functionality. He shows by careful study of several systems, especially in the molecular biochemistry of eukaryotic cells, that biological organization is similar to that characterizing

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machines. He introduces the idea of "irreducible complexity" in a biosystem: complex assemblies of components working together to achieve some essential function, such that, if even a single component is removed, this function is not merely impaired, but entirely disappears; and he infers design from the universal presence of such complexity in biological systems.

I have argued that "irreducible complexity" is an important scientific concept: It points directly to the fact that biosystems, like machines, are logically organized toward performing certain limited functions or tasks.¹³ The existence of such an organizing logic shows that biosystems cannot be understood purely in terms of the mechanistic concepts and assumptions adequate to the purely physical sciences. Something else *is* present—but we can still discuss it in a "naturalistic" framework. This idea is not new; it was first argued in the 1950s by Michael Polanyi.¹⁴

Darwin's Black Box was criticized by several people because Behe did not explore the possibility of naturalistic approaches to understanding the systems he discussed.¹⁵ A better treatment can be found in a second Behe work, The Edge of Evolution.¹⁶ In this book, Behe explores much more carefully what can and cannot be explained by a mechanistic Darwinism and shows in his discussion that he is thinking about the issues in a scientific context. Although he argues for ID, these arguments are given in a separate concluding chapter. While one may disagree with some details, it is clear that (1) Behe is fully committed to scientific understanding as his aim; that (2) he works within the framework of evolution in the "weak" sense as a paradigm for biology; that (3) he understands the open character of scientific inquiry; and that (4) he recognizes that a distinction must be made between science and natural theology. This is a far better approach to ID than the material Groothuis cites, and I commend it as possibly the best work in the genre yet written.

This discussion should make it clear that I remain open to arguments for ID—provided they are competent, made in a firm commitment to the legitimacy of science, and recognize that ID is natural theology, *not science*. There is a semi-permeable membrane between these two discourses, with an unspecifiable traffic between them; and each may be fruitfully influenced by the other. But I am getting very tired of persistent, generic, and uninformed attacks on "naturalism" as a philosophical presupposition of science, which only reveal deep ignorance of both its history and subject matter. It is an unfortunate fact that most discussion of ID has so far only served to reveal what has been called "the scandal of the evangelical mind" – the scandal being that mostly, there *is* none.

Concluding Remarks on "Naturalism"

Groothuis' easy dismissal of *naturalism* as a presupposition of science is a key part of his argument. Here he follows Phillip Johnson and others in the 1990s who began promoting ID. Groothuis claims that ID is "legitimately scientific," and that "it gives science another tool for empirical discovery" (p. 233). But I assert that these statements are false (or, perhaps, meaningless)—and suggest that persons who make such claims should instead get down to serious work on the alternative approaches to biology they imagine. There is no such thing as "ID science," and no "ID scientists" to carry it on—and I believe there never will be.

In this response to Groothuis, I have focused more directly on the scientific issues, rather than taking up the philosophical issue of "naturalism" as a scientific presupposition. I have written extensively and carefully on the theological legitimacy of naturalism in science in *PSCF* and elsewhere, and it is pointless merely to repeat those arguments here. For me, the dismissive attitude to "naturalism" in science adopted by Groothuis (and some other proponents of ID) presents the most alarming parallel with recent-earth creationist thinking. I believe it has deep internal contradictions.

To expose these, we should ask whether the tradition established for the physical sciences by Christians like Robert Boyle, Isaac Newton, and others more than three hundred years ago ("the mechanical philosophy") was fundamentally mistaken on philosophical or theological grounds? While deploring "the monopoly of naturalistic explanation in the sciences" (p. 233), Groothuis, like most ID proponents, manages to sidestep the obvious fact that in the physical sciences, "naturalism" has proved entirely apt to the subject matter for more than three centuries. If there were some serious philosophical

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or theological defect in "naturalism" as a presupposition of physical science, I would think it might have become evident by now. On the contrary, the naturalistic assumptions of physical science are entirely appropriate to its limited subject matter. The fact that ID advocates have nothing important to say about "naturalism" in physics points to a major flaw in their thinking about biology.

To a person who understands the historical tradition of science ..., simply dismissing "naturalism" ... is the most serious defect of ID arguments.

The obvious reply is that there are fundamental differences between the behavior and logical organization of living things-and the mechanistic phenomena the physical sciences describe. This is quite true, and also very important-and I have strongly emphasized that fact in previous articles.¹⁷ But "naturalism" in science is not the cause of the problem. A true biological science does not need a radical shift from naturalistic to theistic explanations, but a more modest change: from the mechanistic and reductionist paradigms proper to physics, to a set of (naturalistic) paradigms proper to biology's subject matter. Both physics and biology are concerned with "mundane" aspects of the world - things routinely subject to the rational scrutiny of human beings in their vocation of cultivating and caring for creation. Neither subject deals with the miraculous or supernatural – the sorts of things that specifically require an appeal to divine agency or divine intention to make them comprehensible. It is a category mistake to argue that in studying biological creation we must introduce direct surrogates for divine agency in our explanatory paradigms. Saying "God did it" merely avoids thinking about the problem; in the ASA, such intellectual laziness should always be answered, "But how?"

To a person who understands the historical tradition of science from the seventeenth century onward, simply dismissing "naturalism" as a presupposition is the most serious defect of ID arguments. One just does *not* lightly discard a historically well-established tradition of thought about creation—one begun in the first place by devout and intelligent Christians. For me this is not simply a matter of historical or antiquarian interest. The legitimacy of present scientific tradition is an important theological and philosophical matter. If the tradition is mistaken in its fundamental presuppositions, the place to start "fixing" it is physical science—not just biology.

In conclusion, I suggest that Groothuis and others with like concerns need to understand science and the historical tradition of science much more competently, and, above all, more sympathetically and positively, before they undertake to "fix" it. Controversy over ID well illustrates C. P. Snow's concern that ignorance of science and its tradition by influential segments of society has potentially dangerous consequences. I believe that a deeper understanding of the historical, philosophical, and scientific issues involved would dampen Groothuis' enthusiasm for this quixotic proposal.

Notes

¹Ronald L. Numbers, *The Creationists: The Evolution of Scientific Creationism* (New York: Knopf, 1992; paperback ed., Berkeley, CA: University of California Press, 1993).

²Walter R. Thorson, "Legitimacy and Scope of 'Naturalism' in Science. Part I. Theological Basis for a 'Naturalistic' Science," *Perspectives on Science and Christian Faith (PSCF)* 54 (2002): 2–11; and, as a representative proposal for a "naturalism" more appropriate to biology than the mechanistic/ reductionist paradigms adequate for physical science, see Walter R. Thorson, "Legitimacy and Scope of 'Naturalism' in Science. Part II. Scope for New Scientific Paradigms," *PSCF* 54 (2002): 12–21.

³Alister McGrath and Joanna Collicutt McGrath, *The Dawkins Delusion? Atheist Fundamentalism and the Denial of the Divine* (Downers Grove, IL: InterVarsity Press, 2007).

⁴Walter R. Thorson, *"Telos* in Biology: Steering between Aristotle and Darwin," *CRUX* 39 (June 2003): 22–33. *CRUX* is a quarterly journal of thought and opinion published by Regent College, Vancouver, BC.

⁵Uncritical adherence of many evangelicals to Aristotle's mistaken dogmas about creation is partly the result of a lingering scholasticism in most conservative theological training (Catholic scholars are already quietly rethinking their own Thomist traditions in this respect). It will be a great help in reading Scripture if we can rid ourselves of such unnecessary medieval baggage; what does Genesis 1 *really* have to say about biology?

⁶Charles B. Thaxton, Walter L. Bradley, and Roger L. Olsen, *The Mystery of Life's Origin: Reassessing Current Theories* (New York: Philosophical Library, Inc., 1984).

⁷William A. Dembski, *Intelligent Design: The Bridge between Science and Theology* (Downers Grove, IL: InterVarsity Press, 1999). There are other articles and books since by the same author, but the work cited here contains all Dembski's significant arguments to date.

⁸See, for example, Stephen C. Meyer, especially in two articles: (1) "DNA by Design: An Inference to the Best Explanation for the Origin of Biological Information," in *Rhetoric and Public Affairs* 1, no. 4 (1998): 519–55; (2) "Evidence for Design in Physics and Biology: From the Origin of the Universe to the Origin of Life," in *Science and Evidence for Design in the Universe* (San Francisco: Ignatius Press, 2000), 53–112. Cf. also Stephen C. Meyer, "DNA and other Designs," in *First Things* 102 (April 2000): 30–8.

⁹Thaxton, Bradley, and Olsen, *The Mystery of Life's Origin*.

¹⁰For some discussion of philosophical issues in relation to Meyer's views, see Walter R. Thorson, "Naturalism and Design in Biology: Is *Intelligent Dialogue* Possible?" *PSCF* 56 (March 2004): 26–36.

¹¹Compare Thorson, "Legitimacy and Scope of 'Naturalism' in Science. Part I"; Thorson, "Legitimacy and Scope of 'Naturalism' in Science. Part II"; Thorson, "Naturalism and Design in Biology." ¹²Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996).

¹³Thorson, "Legitimacy and Scope of 'Naturalism' in Science. Part II," *PSCF* 54 (2002): 12–21.

¹⁴Michael Polanyi, *Personal Knowledge: Toward a Post-Critical Philosophy*, cf. Part Four, chapter 11, "The Logic of Achievement" (Chicago: University of Chicago Press, 1981). Polanyi's approach to epistemology, based on the understanding that knowledge is held by *persons* in acts of *responsible commitment*, provides a better framework for thinking about and relating issues in science, philosophy and theology than most approaches familiar to evangelicals.

¹⁵Behe, Darwin's Black Box.

¹⁶Michael J. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007).

¹⁷Thorson, "Legitimacy and Scope of 'Naturalism' in Science. Part I"; Thorson, "Legitimacy and Scope of 'Naturalism' in Science. Part II."



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ANTHROPOLOGY & ARCHEOLOGY

PARADIGM SHIFTS IN CHRISTIAN WITNESS: Insights from Anthropology, Communication, and Spiritual Power by Charles E. Van Engen, J. Dudley Woodberry, Darrell Whiteman, eds. Maryknoll, NY: Orbis Books, 2008. 208 pages. Paperback; \$25.00. ISBN: 9781570757716.

TRANSFORMING WORLDVIEWS: An Anthropological Understanding of How People Change by Paul G. Hiebert. Grand Rapids, MI: Baker Academic, 2008. 368 pages. Paperback; \$24.99. ISBN: 9780801027055.

Paradigm Shifts is a *Festschrift* collection honoring the contributions of the influential missiologist Charles Kraft. The book's structure is grounded in the recognition that contemporary missiology has been profoundly influenced by Kraft's application of ideas from the discipline of cultural anthropology, the field of communications, and his own experiences with spiritual phenomena. Contributions from specialists in each of these spheres constitute the body of the book.

Anthropologists Darrell Whiteman, Paul Hiebert, Robert J. Priest, and Michael A. Rynkiewich make clear the relationship between anthropology and mission. Whiteman's history of that relationship focuses on the increasing attention to the importance of applied anthropology in missionary training in the second half of the twentieth century. Hiebert invokes a kind of cultural determinism as a reminder that Western Christians' ideas of mission have latent worldview influences and that a failure to appreciate those influences can have unintended outcomes. Priest's essay is in many respects a continuation of the history begun by Whiteman, and concludes with a set of recommendations needed for the formation of a missiological anthropology. Rynkiewich continues along these lines by suggesting that some of the foci of contemporary anthropology - Culture, Person, Identity/Ethnicity, Agency, and Migration and Diaspora – have important implications for Christian mission.

Eugene A. Nida, Viggo Søgaard, Roberta R. King, and Knud Jørgensen author contributions that focus on communications (or, perhaps more precisely, applied linguistics). Nida offers some "vintage musings" (pp. 47, 49) that center on language-learning and culture-learning, the vagaries of language and translation, and the importance of interpersonal relations. Søgaard attempts to lay out a biblical basis for communication based on the rather rash idea that the Bible can be seen as a "textbook on communication" (pp. 59–60). King's essay is a reminder that communication is a *negotiated* phenomenon that entails a continuous back-and-forth of signals between interlocutors, while Jørgensen, in his largely autobiographical chapter, maintains the semiotic theme with a call for a rethinking of evangelism as "meaning-making" (p. 74).

The third section, "Spiritual Power," is represented by chapters from C. Peter Wagner, J. Dudley Woodberry, John and Anna Travis, and Tormod Engelsviken. Each of these essays is rooted in the notion that any dismissal of "signs-and-wonders" is a kind of ethnocentrism. Rejecting ethnocentrism, therefore, means rejecting the rejection of "signs-and-wonders." These four authors all agree that Christian conversion and development are best accomplished through attention to the dynamics of supernatural forces.

A final essay by Robert J. Schreiter deftly recaps the book's themes, noting that this homage to Kraft acknowledges that he "has indeed shifted perspectives within missiology and brought new methods of interpretation to bear upon our understanding of Christian mission" (p. 129).

Hiebert's wide-ranging *Transforming Worldviews* contends that Christian conversion – and, by implication, the way we think about mission – must take into consideration a person's worldview, which is defined (in one instance; there are variations) as the "fundamental cognitive, affective, and evaluative presuppositions a group of people make about the nature of things, and which they use to order their lives" (p. 15; cf. pp. 25–26, 80, 84, 324). Worldview is a subset of the socially transmitted understandings known as culture that goes largely unexamined and which significantly affects other aspects of culture and behavior.

The centerpiece of the book is a seventy-page critique of the Enlightenment and the Modern Worldview. Occupying over twenty percent of the book, this chapter argues that in many instances, Christian mission has failed-or has been compromised-by (Western) missionaries' uncritical acceptance of Enlightenment assumptions, including mechanistic rather than organic ways of conceptualizing the world and humanity, and an embrace of empiricism that discounts the difficult-toquantify. In contrast, Hiebert argues that a worldview that includes an epistemological stance of *critical realism* is the best one for Christians to adopt-and to pass on. The "realism" of critical realism assumes that there are many features of the universe that are discovered, not invented. "Critical" is a humble recognition that no one sees the world as it truly is, and that our own perceptions are flawed. Such a worldview circumvents a bodies-plusideology minimalism as well as the hubris of certainty. From this stance, Hiebert proposes the fundaments of a biblical worldview, which would include, among many other things, a linear view of time, a strict distinction between the Creator and the created, and a critical realist epistemology.

Both books are characterized by two ideas that attend cross-cultural ministry. One is the profound importance of a shift in thinking, which Hiebert calls "worldview" and the Kraft volume calls "paradigm," and the idea that Western Christians are unwittingly limited by their own worldview/paradigm with the result that the transmission of the gospel can be garbled. The other is the idea that people in other societies have worldviews or paradigms that provide insights that our own does not.

These books are ultimately intended to make a difference in missionary practice. Van Engen, one of the editors of the Kraft *Festschrift*, hopes that "this volume will serve as a textbook in the field" (p. xiv). It is probably more suitable as a reference handbook, as the chapters lend themselves more aptly to provocative rumination than to seminar discussion. Hiebert notes that "if behavioral change was the focus of the mission movement in the nineteenth century, and changed beliefs its focus in the twentieth century, then transforming worldviews must be its central task in the twenty-first century" (pp. 11–12), although behavior, beliefs, and worldview remain heuristically tangled throughout.

Not surprisingly, given both Kraft and Hiebert's anthropological expertise, culture is central to both books. Alas, the term "culture" is not used consistently. It is employed variously as a synonym for "society," as the beliefs in the minds of people, and as a metaphorical container (e.g., people are described as being "in" a culture). This lack of precision can be found throughout anthropology and is certainly not unique to these books, but it does preclude coherent theologizing about the concept. We will not, for example, be able to think clearly about the relationship between culture and "the world" (e.g., *aionos* in Luke 16:8; *schema* in 1 Cor. 7:31) until we can at least think clearly about culture.

There is, of course, more to anthropology than culture, and the missiological implications of a broader anthropology are left untouched in these books. How, for instance, do taboos that proscribe protein-rich foods for young children affect cognitive development and subsequent understanding of the gospel? Or in what ways has gene-culture coevolution generated what we think of as rocky, shallow, and fertile soils (Matt. 13:4–8)?

While readers familiar with Kraft and Hiebert will find little new material here, those who would like to know more about these two missiological luminaries, or about anthropology in missions, will find these volumes a very good place to begin.

Reviewed by Alexander H. Bolyanatz, Department of Anthropology, College of DuPage, Glen Ellyn, IL 60137.



WHERE WE STAND: A Surprising Look at the Real State of Our Planet by Seymour Garte. New York: AMACOM American Management Association, 2008. xiv + 290 pages, index. Hardcover; \$24.95. ISBN: 9780814409107.

Seymour Garte asserts that public health and environmental quality are in better shape now than how we have been led to believe, and should continue to improve. Garte is professor of environmental and occupational health sciences of the Graduate School of Public Health, University of Pittsburgh, and author of two other books and 180 scientific publications. These improvements occur particularly in democracies where free citizens, exercising their civil rights, get their governments to enforce regulations protecting their health and environment. Garte's hope is that by learning from past successes in these areas, people can make ongoing progress in resolving problems that remain. After a preface explaining its purpose, the book's introduction reviews historical trends and contrasts political beliefs and religious faith with science, which should always be the basis for decisions.

Part I, "Where We Stand Now: Reasons for Optimism," has five chapters. Life expectancy has increased; cancer and AIDS are decreasing, but obesity and emergent diseases (such as drug-resistant tuberculosis) remain concerns. However, while air and water pollution is decreasing, partly because of more use of alternative energy technology, global warming due to emissions of carbon dioxide still must be confronted. Toxic chemicals are under control. Biodiversity is improving, with species being taken off the endangered list, although deforestation in the Amazon basin needs to be stopped. People's welfare around the globe is improving, as measured by diet, literacy, and other indicators. Rates of population growth are decreasing. Garte is distressed that warfare continues to devastate the poorest countries, but argues that warfare may lessen as democratic cultural values replace ethnic and religious ones. Unfortunately, some of his rising indicators (pp. 126-7) are not sustainable: the number of fish caught in the wild will decline as a result of over-fishing, and irrigated farmland will degrade from exhaustion of aquifers and salinization.

Part II, "Where We Have Been: Historical Lessons," begins with data showing that countries enjoying political freedom have higher levels of human development than dictatorships. Under Communism, Eastern Europe had bad pollution leading to health disorders; today, the region's empowered citizens are correcting these problems. Strong environmental regulations enhance economic performance and corporate success. The third and last chapter in this part closes with four case histories in which a free citizenry has acted to restrict use of certain products: lead, chlorofluorocarbons (CFCs) which deplete stratospheric ozone, tobacco, and genetically modified organisms (GMOs), only the first three being praiseworthy. Garte notes that the scientific-research community, which provides factual information for good decisions, is often in conflict with industry advocates or activists motivated more by faith than by reason. Yet the victories may not be as complete as Garte implies; for example, over 2800 industrial chillers in Canada still use CFCs, only one half of them having been replaced or converted since 1995.

In the single chapter of Part III, "The Way Forward," Garte states that ecosystems—the natural world—are without morality: "evil cannot be found in nature, except for man." He commends a new morality in which we strive for the well-being of our own species, other species to be preserved only because their loss might harm us. Garte is encouraged that nuclear weapons have not been used since 1945, and thus ends the book by stating that people are "the best hope for ourselves and for our planet." The book also includes a nine-page bibliography and an eight-page index.

Garte argues convincingly that the state of our planet "where we stand" is actually improving, in an accessible book of moderate length. Most of the information he provides is in big university texts, such as the one by ASA Fellow Richard T. Wright, *Environmental Science: Toward a Sustainable Future* (9th ed., 2005). More cautious in his optimism than Garte, Wright emphasizes sustainability and the Christian ethic of stewardship. *Where We Stand* is valuable for its facts on progress and needs in public health and the environment, but Garte's human-centered worldview and disdain for faith do not commend it to the Christian reader.

Reviewed by Charles E. Chaffey, Adjunct Professor of Natural Science, Tyndale University College, Toronto, ON M2M 4B3.



CONCEIVING PARENTHOOD: American Protestantism and the Spirit of Reproduction by Amy Laura Hall. Grand Rapids, MI: Eerdmans, 2008. 460 pages. Hardcover; \$32.00. ISBN: 9780802839367.

Mark A. Haller in Eugenics: Hereditarian Attitudes in American Thought and Daniel Kevles with In the Name of Eugenics have traced the sorry story of sterilization that embodied coercive eugenics in North America in the first half of the twentieth century. In Conceiving Parenthood, Amy Laura Hall focuses that cultural history specifically on the visuals and sermons produced by mainline Protestants. She has found chilling examples. One is a collection called Preaching Eugenics that begins with an award-winning sermon by the rector of St. Mark's Unitarian Church in Minneapolis. The preacher ostensibly expounds on the refining fire of Malachi 3:3, that Christians are to support coercive eugenics in order to free the future from those who handicap the Holy Spirit's Incarnation with their physical disabilities. Conceiving Parenthood is replete with visual examples as well as with commentary on what each illustration assumes and conveys.

These documents are not gathered as a mere historical exercise. Hall is concerned that eugenics marketed exaggerated promises for what genes could provide, and excused leaving behind those genetically less able. Hall sees the pattern of ambition and misdirection repeated in the expectations for the atomic age after World War II and even now in expectations for the new genetics. She finds genetics used to justify exclusive attention on the best schools and friends for one's own children to aid their social climb, while ignoring the less successful as unworthy of effort. The problem is their genes. Invest effort where it will bear more fruit. Hall argues to the contrary, that a person should be welcomed and nurtured regardless of potential utility. She does briefly acknowledge that one could seek to prevent children from having disabilities while caring deeply for those who do, but sees these approaches as in tension. Mainline Protestants should "allow their strategically protected and planned lives to become entangled in the needs of families and children judged to be at risk and behind the curve" (p. 250). Her concern extends as well to abortion for Down's and other children differently-abled.

Hall is an associate professor of theological ethics at Duke Divinity School. The book includes eleven pages of acknowledgments that convey a sense of a community of church and scholars working together and centered in North Carolina's Research Triangle. The author is speaking into the lives of her local community that, in many neighborhoods, is pervaded by highly educated parents who press their children to excel. Hall wishes to upturn what she calls "responsible parenthood" for a felt solidarity that deeply entwines the lives of all children and parental care regardless of biological or social start. In the book, she is happy to affirm an interlocutor's comment that "You apparently want to do away with piano lessons." For Hall, children and parents have a higher calling than maximizing the potential of their biological children.

Pursuing her argument, the text tends to read as if there is a univocal conspiracy determining culture. Also, hopes for better uses of technology are generally dismissed as if without warrant. When describing the overreaching of advertising designed to grab attention, or *Life* magazine articles touting possible future uses of nuclear science, there is not even an allusion to use that has turned out to be positive. A recent example comes from the Chalk River nuclear plant, which temporarily suspended its production of medical isotopes. Patients missed lifesaving treatments, causing an international uproar that highlighted how much those nuclear products were appreciated. The use of technology for good or ill is often complex. *Conceiving Parenthood* is about marketing and cultural disposition, not specific policy analysis.

With extensive illustrations and documentation, *Conceiving Parenthood* warns that not long ago there were influential mainline Protestants who were willing to trade the gospel's call to inclusive care for an excluding technological fix. Mark Twain suggested that history does not repeat itself, but it often rhymes. Hall's concern is well taken: the history she describes so vividly should not be repeated or rhymed, especially by Christians called to care for "the least of these."

Reviewed by James C. Peterson, R. A. Hope Professor of Theology, Ethics, and Worldview, McMaster University Divinity College and Faculty of Health Sciences, Hamilton, ON L8S 4K1.



THE NEW FLATLANDERS: A Seeker's Guide to the Theory of Everything by Eric Middleton. Philadelphia: Templeton Foundation Press, 2007. 164 pages, including glossary, endnotes, and index. Paperback; \$16.95. ISBN: 9781599471235.

I recently visited L'Abri Fellowship in Switzerland to give a couple of lectures and to discuss various questions with a group of young twenty-somethings. They were intensely concerned with how Christian faith can be rooted and sustained in real life and real learning, and they knew that a modern scientific understanding of the material world was somehow important to this concern. But none were students of natural science; their scientific understanding drew mainly from classroom experiences and cultural stereotypes. I wish I had had a few copies of Eric Middleton's book *The New Flatlanders* to leave with them.

Middleton is a college chaplain with a background in natural science, philosophy, and psychology. He is familiar with the kind of student I am talking about. His book opens with a dramatization of the actual conversation that precipitated his unusual project: four young friends exchange speculations about the ancient stone circle in which they have gathered. Recognizing their inability to resolve the tensions they find between mystical and scientific ways of understanding, they decide to turn to Middleton for help. They meet with him weekly for a semester, sustaining a single conversation in thirteen installments. Each of these meetings is the basis for one of Middleton's chapters, and in each chapter an organizing thread of questions echoes his students' train of thought. This makes for easy reading that could be taken up within many other group discussions, particularly those animated by the fervency of young "seekers."

The first three chapters provide a quick overview of big-bang cosmology, quantum mechanics, standardmodel particle physics, and string theory. These chapters can be read as a useful but all-too-quick tour of modern physics for the scientifically uninitiated. Their more useful function is to point out the metaphysical indeterminacy at the heart of all scientific understanding. The fourth and fifth chapters serve as a fulcrum in the discussion: here Middleton looks to Plato's allegory of the cave and Edwin A. Abbott's *Flatland* novella for analogies that will provide leverage for prying into the metaphysical possibilities that have opened up.

The explicitly Christian message, which first takes shape as the group discusses the Flatland story, is filled out in subsequent chapters that are organized around themes including the anthropic principle, evolution, consciousness, the question of other religions, and the problem of evil. The discussions draw frequently, and for the most part winsomely, from the Flatland analogy in order to broker a philosophical deal between different modes of understanding. A well-placed chapter on "Chaos and the Hidden Order" describes the visualization methods and graphing techniques adopted in complexity research. It is surprisingly successful in reinforcing the Flatland analogy, to the extent that Jesus can be compared with a strange attractor without the discussion jumping the tracks of orthodoxy. It refreshed me to see the gospel creatively but faithfully proclaimed in an introductory science-and-religion book.

It is only in the last paragraph of the book that I think Middleton oversteps his bounds, predicting "that taking M-theory seriously is how scientists will investigate all areas at the sharp end of science today. Science and faith will be seen as mutually compatible insights within a multidimensional universe, the new worldview of contemporary science." That prediction requires a grandiose view of M-theory, for there are lots of sharp ends of science today. Moreover, I remain unconvinced that seeing the mere "mutual compatibility" of science and faith is much of an achievement. A worldview in which science and faith are just compatible insights is the thinnest possible hope that one can draw from the Flatland analogy. Middleton cannot intend this as the final take-home message. The rest of the book has built up and filled out much of the rich and textured message of the Christian gospel; why deflate and flatten that message and conclude with M-theory filling the role of intellectual mediator?

That ending is one of a few minor flaws in the book's execution, and all of these might be justifiably explained away in terms of the author trying to remain faithful to the trajectory of his group's actual conversation. One thing that is missing (not entirely, but in large part) is attention to Abbott's original concern with socialecclesial commentary. And while the book is an easy read, I wonder whether it is, at times, *too* easy. Do the successive questions really follow one upon another? To what extent has Middleton reconstructed the conversation using rhetorical shortcuts in order to move the discussion along or to avoid difficult technicalities? A related concern involves Middleton's repetition of standard scientific phraseology, such as, "In current theory these four [forces] are transmitted by the exchange of messenger particles; for example, electromagnetism is carried by photons." One wonders whether these descriptions would carry much meaning for dialogue partners like Middleton's.

A group using the book might benefit from having one or two patient members with expertise in the sciences and possibly philosophy. Their input not only would help with particular knowledge gaps that the book cannot fill, but they also might help clarify some subtler distinctions that Middleton ignores, such as those between complementarity and indeterminacy in the discussion of the Heisenberg uncertainty principle, or those between weak and strong versions of the anthropic principle. But discussion leaders would be wise to match Middleton's stride at the start of a group journey. His first-pass tour of science introduces key ideas at a level accessible to students like those I met at L'Abri, most of whom had never heard of either the uncertainty or the anthropic principle. If I find myself in such a setting again, I will suggest to my fellow seekers that we read *The New Flatlanders* together, and I will expect us to enjoy some long and rewarding conversations as we do.

Reviewed by Matthew Walhout, Professor of Physics, Calvin College, Grand Rapids, MI 49546.



RADICAL GRACE: How Belief in a Benevolent God Benefits Our Health by J. Harold Ellens. Westport, CT: Praeger Publishers, 2007. 209 pages, appendices. Hard-cover; \$49.95. ISBN: 9780313348167.

In 2004, Ellens edited the four-volume set *The Destructive Power of Religion*. In *Radical Grace*, Ellens shifts his focus to the power of religion for optimal human health and flourishing. Ellens argues that psychology and theology are deeply interrelated. To talk about God, we must have an understanding of ourselves; to talk about ourselves, we must have an understanding of God. Human health requires unity in body, mind, and spirit.

In particular, Ellens advocates a holistic, integrated model of people-care based upon a healthy concept of God. For the last 4,000 years, many humans have viewed God as a psychotic being involved in a cosmic battle with another god who threatens to undo God's work. Sick gods make people sick. The author contends that much of what has been attributed to God can be understood as a projection by people who are scared to death of the unknown and the unpredictable in life. Ellens challenges the Hebrew notion that illness represents God's chastisement with the story of Job and by the ministry of Jesus.

Ellens believes there is an urgency to identify the psychopathological factors that shape religions to support an attack on the World Trade Center, suicide bombers, and national policies such as preemptive defense. He suggests that radicals are attempting to settle their feelings about being disempowered. In response Ellens contends that "God's grace is *radical* in that we cannot hide from it or defend against it or sin ourselves out of it" (p. 36). This concept of radical grace may be likened

to Carl Rogers's theoretical tenet of unconditional positive regard, the healing dynamic of grace incarnated in humans for each other. For the Greeks visiting the oracle at Delphi, the inscription on the temple portals, "Know thyself," came to mean "Remember your mere humanness and accept it compassionately and joyfully, not despairingly." The predicament of human existence is not our lostness, but our perceived lostness. The prodigal son is the epitome of our human predicament. Our destiny is to accept our status as compatriots in building God's kind of world in human society and culture, rather than attempting to achieve a successful power play to get right with God.

Conceiving of others and ourselves as divine image bearers elevates communication to a theological level because it must take seriously the fact that God is for humankind. As we share our stories with others, we become a part of each others' stories. The ideal case occurs when a healthy God story intertwines with one or both of the human stories. When we are motivated by fear, we become psychologically and spiritually sick. When we are motivated by grace, we grow and become psychologically and spiritually healthy.

Ellens believes that most of us resist the acceptance of God's radical grace because (1) it means we must give up our attempts at self-justification and cast ourselves on the mercy of God and (2) we must give up our attempts to keep others under control through conditional acceptance. Instead, the author advocates embracing our role as God's compatriots in promoting God's kingdom. Sharing acceptance and kindness will enable us to love one another, since feelings follow behavior.

I find Ellens's argument compelling, that the unconditional acceptance of God's unconditional acceptance of us can lead to the affirmation of our real selves and lessen the stress and emotional upset that comes from attempts at self-justification. Although the author advocates a holistic view of human health, including the physical realm, his theology of grace is most directly related to psychological and spiritual well-being. It seems to me that the physical health benefits attributed to religious practice in some studies may be more attributes of healthy behaviors, such as avoidance of tobacco and moderate use of alcohol, a sense of hope for the long-term future, and the gender effect since women are more religiously active than men and women outlive men.

In *Radical Grace*, Ellens builds upon some themes he introduced in *God's Grace and Human Health* (1984). His most recent work should be helpful for those interested in the influence of religious belief and practice on psychological health.

Reviewed by H. Donald Merrill, Professor of Psychology and Dean of the College of Arts and Sciences, Wingate University, Wingate, NC 28174.



SCIENCE AND EMPIRE IN THE ATLANTIC WORLD by James Delbourgo and Nicholas Dew, eds. New York: Routledge, 2008. xiv + 365 pages. Paperback; \$31.95. ISBN: 0415961270. Interdisciplinary books are not easy reading for most scholars, trained in an academic culture that stresses specialization and in a general culture that defines an "expert" as one who knows more and more about less and less. Hence neither most professional scientists nor most professional clergy know a great deal about the others' field. Throw in another discipline—history of science and both scientists and theologians have a tendency to throw up their hands and despair of understanding the material, much less seeing its relevance to their own discipline. Even historians of science have their specialties based on scientific discipline, geographic region, or chronological period. So why should anyone read an interdisciplinary history of science book?

The authors who contributed to this book are all seeking to answer the question "How did the sciences shape the Atlantic world, and how did the Atlantic shape the sciences?" (p. 1) The overriding concept of the editors and authors is to see how the sciences spread from the sixteenth to eighteenth centuries from various intellectual and politically powerful centers to the "periphery," i.e., from European capitals to the New World, and how the New World influenced the sciences in those centers. Scientific topics covered include navigation and cartography, metrology, oceanography, medicine, climatology, and botany. Yet each of these topics is dealt with from a perspective that includes some combination of moral philosophy, political and economic influence, historical assumptions about race and climate, and who can be the discoverer or author of knowledge. So, for instance, we learn how the political competition between Spain, England, France, and the Netherlands created a scientific culture that hid findings from "enemies" of a particular country and allowed only its own citizens access to that knowledge. We find out that the New World (especially North America) was initially viewed by Europeans as "a garden, where Fallen man would labor to redeem the sin of tasting forbidden knowledge. Particularly in Puritan New England, spiritual election required the cultivation of land and the soul; agriculture and botany were sacred tasks" (p. 256). We discover some of the "scientific" and "theological" bases for attitudes justifying white superiority (and why "Negroes" and "Indians" should not have access to scientific knowledge). In other words, we see vividly that the growth and spread of scientific knowledge has not been objective, unbiased, and neutral.

And that is one of the reasons we need to read books like this in the history of science. They challenge preconceptions, they force us to look at elements in science and theology that we would normally ignore, and they inform us of assumptions that begin to explain actions and attitudes that we know existed (or exist) but have not known why. For the non-specialist, this book will not be easy reading, and there may be many individuals, places, events, and ideas with which one is not acquainted. But reading it will enhance one's understanding not only of the growth and spread of science, but of the need to move beyond one's disciplinary specialization.

Reviewed by Sara Miles, Founding Dean Emerita, Esperanza College of Eastern University.



CHRISTIAN AND HUMANIST FOUNDATIONS FOR STATISTICAL INFERENCE: Religious Control of Statistical Paradigms by Andrew M. Hartley. Eugene, OR: Resource Publications (Wipf and Stock Publishers), 2008. xii + 126 pages. Paperback; \$18.00. ISBN: 9781556355493.

Andrew Hartley poses the question "Does the Christian faith have anything distinctive to say ... about the foundations or practice of statistics as a science?" His answer is a resounding "yes!" and in this book he shows us how. As he does so, he exposes and refutes the dogma that statistics is religiously neutral. If such a claim seems intriguing or even outrageous, then this book is for you.

Hartley maintains that statistics has for the most part been controlled by non-Christian, humanist beliefs. His desire is to see the Christian faith integrated with statistics; hence the descriptive, if not snappy, title of the book. He claims to write for a wide audience, yet the mathematical equations may put off many humanities and arts students. This is a pity; they would benefit from this excellent introduction, as Hartley writes clearly and explains the difficult mathematics well (though there were one or two places I had to read and re-read slowly!).

Hartley begins by looking at four popular paradigms within statistical inference: direct and indirect frequentism, subjective and objective bayesianism. He also cites numerous examples of these from the statistical literature.

He then provides a brief overview of the biblically consistent philosophy of such thinkers as Herman Dooyeweerd and Abraham Kuyper—the so-called philosophy of the law idea (PLI). The PLI demonstrates how religious beliefs control all scientific enterprises: these beliefs delimit ranges of acceptable philosophical overviews of reality, which in turn delimit ranges of acceptable scientific theories. The PLI also proposes an overview of reality, coherent with biblical revelation, which regards the modal aspects (numeric, spatial, kinetic, biotic, sensory, logical, historical, symbolic, social, economic, aesthetic, moral, legal and certitudinal) as mutually irreducible and mutually interconnected.

Hartley then reviews in more depth the PLI's analysis of one particular religious ground motive, the naturefreedom motive. This ground motive has two main poles or ideals: the nature or science ideal and the freedom or personality ideal. The former emphasizes nature and the latter freedom. He sees how these apply to the statistical paradigms. The nature ideal (over)emphasizes and absolutizes the mathematical aspects of reality; this is seen in direct frequentism and objective bayesianism. These paradigms tend to be the most dominant because, as Hartley states, many statisticians have first placed their trust in mathematicism: reality is reduced to quantitative functioning. The subjectivist approach fits into the personality ideal, and indirect frequentism fits well with this framework. Indirect frequentism absolutizes the role of subjective elements, the individual scientist becomes the "last word concerning the credibility of a hypothesis" (p. 76).

The only statistical paradigm that could provide a Christian basis is then subjectivist bayesianism. This is then examined, in chapter 7, to see how well it does comport with a Christian worldview. Subjective bayesianism makes no claims that scientific hypotheses "must follow solely from quantitative data" and it holds to the "coherence of inter-aspectual meaning" (p. 82). Hartley identifies some apparent conflicts between the PLI and subjective bayesianism but these are not insurmountable. Though he rejects the other three paradigms as being inconsistent with a Christian perspective, he does note that their numeric results could be implemented non-reductively, insofar as these results in some cases "approximate subjective bayesian conclusions" (p. 106).

There is a useful six-page glossary of key statistical terms and Dooyeweerdian terms and an eight-page bibliography. Unfortunately, there is no index.

This brief book is not an easy read; nevertheless it demands and repays careful attention. It should be required reading for all statisticians, mathematicians and scientists as it shows how religious beliefs control statistical inference. It provides an excellent role model for the application of Dooyeweerd's philosophy to a subject.

This book is not the last word on the relationships between Christianity and statistics—as Hartley notes in his conclusion, where he identifies other areas for reflection and investigation (p. 111)—but it is an important step towards them. It is a pioneering book and will provide the basis for much needed research and discussion.

Reviewed by Steve Bishop, City of Bristol College, Bristol, UK.



THE CELL'S DESIGN: How Chemistry Reveals the Creator's Artistry by Fazale Rana. Grand Rapids, MI: Baker Books, 2008. 336 pages. Paperback; \$16.99. ISBN: 9780801068270.

The Cell's Design by Fazale Rana represents a new line of argument for the Intelligent Design hypothesis, a new argument that somehow is as old as William Paley's watchmaker argument. Rana, vice-president at Reasons to Believe and co-author of *Origins of Life* with Hugh Ross, describes his strategy in the preface:

Instead of arguing for creation by relying on the perceived inability of natural processes to generate life's chemical systems, this approach frames the support for intelligent design in positive terms by highlighting biochemical features that reflect the Creator's signature.

Rana uses "Biochemistry as Art" as a consistent metaphor for design throughout this book, beginning most chapters with a famous painting and inventive links to a school of art. Often "Biochemistry as Engineering" is used as a secondary metaphor, with analogies drawn to quality assurance steps in manufacturing and other similar processes.

As a practicing biochemist, I welcome this change in strategy and tone from the increasingly narrow confines of the irreducible complexity argument found in Michael

Behe's Darwin's Black Box (referred to passingly but approvingly by Rana). The complexity of DNA polymerase III, for example, deserves admiration, as do other complex biochemical processes. Rana carefully explains these biochemical workings for an audience with no prior experience with biochemistry. Unfortunately, while the verbal descriptions are adequate, the cartoons depicting these processes are oversimplified and drab. Standard biochemistry textbooks convey the wondrous complexity of these machines better, although for a different audience, as does the online video "The Inner Life of the Cell." The level at which Rana describes biochemical mechanisms seems chosen to depict proteins as irregular simple shapes, which minimizes their fluidity. This helps the central metaphor of comparing biochemical assemblies to cogs in a watch but makes the proteins seem more "designed" than they are. Most importantly, this depiction of proteins as solid, varied shapes de-emphasizes the fact that all these proteins are polymers of the same twenty amino acids, in every species, on every continent, an unacknowledged universality that allows for adaptation and transformation.

Often Rana's arguments boil down to describing how molecules work and calling it "fine-tuning," when it alternatively could have been simple adaptation to available conditions. Chapters include discussions of minimal genomes, assembly of protein machines, production of protein sequence and structure from DNA, gene structures and organization, membrane structures, and rebuttals to previous claims of poor design. A few strong arguments are mixed in with weaker ones. The speed of the development of the genetic code is indeed astonishing, occurring just about as soon as the earth cooled enough to support life. The finding that DNA replication machinery may have two origins instead of one is also "too wonderful for me" to fully describe. But the argument that this machinery may have evolved twice is too quickly glossed over, as is the counter-argument that out of millions upon millions of organisms, we can reduce DNA polymerases to only two possible ancestors, which really is a small number if so many systems were individually designed.

Chapter 11, on evidence for convergence of biochemical function, is a prime example of the missed opportunities in this book. Several fascinating examples of convergence are listed, but in a list that tells little more than the titles of papers that could be obtained from a perfunctory PubMed search. Stephen Jay Gould's argument that evolution is contingent is recapped and rebutted, but the ideas of Simon Conway Morris, who has made a career out of collecting examples of convergence, are not mentioned. What could be a strong point for the book becomes little more than a laundry list.

To Rana's credit, he does describe some alternate evolutionary explanations, such as in the case of the formation of the genetic code. Most times, however, possible evidences for common descent and divergent evolution are not included. The most complex examples of biochemical machinery are cherry-picked and described in detail, while similar, simpler prokaryotic versions that accomplish the same task are omitted. Much is made of the precise location of a few specific amino acids for protein function, while it is left unsaid that these crucial amino acids are only 1–2% of the total, and many other amino acids can be changed or deleted without significant loss of function. Overlapping genes are emphasized as evidence of deliberate design, while the fact that these genes are a tiny minority of cases, often at the very ends of genes in genomes under extreme pressure, is downplayed. No mention is made of the endosymbiotic theory for formation of mitochondria, although that event would hold several possibilities for discussing artistry, theology, and the methods of a creator.

I would like to know what specific predictions are made by Rana's model of creation, in which separate species are designed and accumulate only deleterious mutations over time. Why are bacterial and human polymerases so similar if they were created separately? Why are there no designs that are clearly impossible without a Creator, such as a species that uses twenty unique amino acids or a different genetic code? (Surely not every designed species must be optimized identically!) What phylogenetic patterns should be deduced if mutations are only harmful, reducing proteins from an optimized starting point? What old, optimal proteins can you identify, and what stepwise progression downward is observed?

The wonder of biochemistry and what it may reveal about the Creator is indeed a worthy topic, and Rana often tells us how elegant and efficient these protein machines are. But if the Creator chose to form a universe where all life sprang from a single point, and one in which chemical changes could cause life to adapt itself to the world around it over millennia, that by itself does not seem to decrease the wonder of biochemistry, which is the main point of this book. In fact, if the Creator chose to do so through chemistry rather than direct manipulation of atoms, that seems a more elegant and efficient solution than having multiple, directly manipulated starting points. It also would give a book like this more wonders to describe if evolutionary processes could be detailed or at least alluded to. I personally would argue that such processes would be more aesthetically satisfying and would reveal a Creator more worthy of praise.

As a statement of biochemical wonder, this book is a step in the right direction. As scientific discussion, it is decidedly slanted toward a particular model of creation. Evidence of this can also be found by counting the promotional quotes inside the book's cover: most are from ministers, none are from scientists. I hope other scientists will follow Rana's lead and develop more substantial books about the wonder of biochemistry in creation, while remaining open to all possible techniques by which the Divine Artist may have created.

Reviewed by Benjamin McFarland, Assistant Professor of Biochemistry, Seattle Pacific University, Seattle, WA 98119.



NATURALISM by Stewart Goetz and Charles Taliaferro. Grand Rapids, MI: Eerdmans, 2008. viii +132 pages, bibliography, index. Paperback; \$16.00. ISBN: 9780802807687.

In Naturalism Stewart Goetz and Charles Taliaferro come to grips with the dominant worldview of the contemporary academy, especially in the sciences and in philosophy. They address early on the problem that "naturalism" is not a single view but a large and diverse family of views, united more by what they deny (God, the soul, the supernatural) than by what they affirm. In an effort to impose some order on this chaos, Goetz and Taliaferro distinguish "strict naturalism" from "broad naturalism"; the distinction is inevitably rough and a bit messy, but it serves the purpose. According to strict naturalism, "nature is all that exists and nature itself is whatever will be disclosed by the ideal natural sciences, especially physics" (p. 7). Mental categories such as intelligence, purpose, and consciousness cannot be given any ultimate explanatory role; if they are recognized at all, it is mandatory that they be fully explainable in terms of causes that are neither intelligent, nor purposive, nor conscious. The authors show how radically strict naturalism conflicts with the view of human beings as rational, purposeful, free, and responsible beings-a view that we all take for granted, and cannot help taking for granted, in the conduct of our everyday lives. They criticize effectively and at some length the "argument from causal closure," a key supporting argument for strict naturalism which contends that every physical event must have a sufficient physical cause. They point out that while a scientist conducting an experiment must assume that the experimental setup is causally closed-that there are not significant external influences that will affect the outcome of the experiment-this neither requires nor justifies the assumption that the physical world as a whole and in all its parts is immune to influence by nonphysical causes.

The authors then move on to broad naturalism, which relaxes the strictures on what counts as natural so as to include in nature consciousness, intelligence, and purposefulness as manifested in human and animal behavior. Broad naturalism still rejects a substantial soul; the authors respond by defending a modified Cartesian dualism according to which the soul, while immaterial, is extended throughout the living body. They present a lengthy defense against the argument from the impossibility of mind-body interaction - probably the most overrated argument in all of philosophy, but requiring attention because it is still often taken as a conclusive refutation of dualism. They go on to demonstrate naturalism's difficulties in giving an adequate and plausible account of consciousness and values. In their final chapter, "Beyond Naturalism," they criticize several naturalistic arguments against theism. Interestingly, they give only brief mention to the problem of evil, arguably the most potent and influential anti-theistic argument; probably this is because the complexity of the issues would require a longer treatment than space would permit. In an appendix the authors explain the "argument from reason" against naturalism, an argument familiar to many from C.S. Lewis's Miracles (and often thought, quite erroneously, to have been refuted by Elizabeth Ânscombe).1

Not all of Goetz and Taliaferro's arguments will be convincing to everyone; that is hardly to be expected in a philosophical discussion. Some of their omissions, however, seem significant. They discuss at length the objection to mind-body interaction, but there are several other important objections to Cartesian-type dualism that they leave unmentioned. (For example, Cartesian dualism does not fit at all well with the well-established fact of biological evolution.)² In detailing naturalism's problems in accounting for the mental, they argue against the notion of mind as emergent from the biological organism. They succeed in showing that the mental cannot be emergent in the rather simplistic way proposed by John Searle, but this leaves untouched (and unmentioned) more sophisticated varieties of emergence such as have been advocated by Timothy O'Connor and me.³

Notwithstanding these limitations, Goetz and Taliaferro have produced an admirable book, one that can serve an important purpose. They make it clear that the reputation of naturalism far outruns its argumentative support; theists in particular have no reason to be intimidated, or to think that they have to concede major portions of the naturalistic agenda in order to maintain intellectual respectability. The book is philosophically responsible, yet written in a readable and appealing style which should make it accessible to scientists, theologians, and students on a wide variety of levels.

Notes

¹For an excellent and accessible discussion of the argument, see Victor Reppert, *C. S. Lewis's Dangerous Idea: A Defense of the Argument from Reason* (Downers Grove, IL: InterVarsity, 2003).

- ²For this and other objections, see my book *The Emergent Self* (Ithaca, NY: Cornell University Press, 1999), 148–60; also, "On Behalf of Emergent Dualism," in Joel B. Green and Stuart L. Palmer, eds., *In Search of the Soul: Four Views of the Mind-Body Problem* (Downers Grove, IL: InterVarsity, 2005), 95–9.
- ³See Timothy O'Connor, *Persons and Causes: The Metaphysics of Free Will* (New York: Oxford University Press, 2000), 110–23; also Hasker, *The Emergent Self*, 171–96; and Timothy O'Connor and William Hasker, "On Behalf of Emergent Dualism," in Green and Palmer, *In Search of the Soul*, 75–83.

Reviewed by William Hasker, Professor Emeritus of Philosophy, Huntington University, Huntington, IN 46750.

MAKING THE BEST OF IT: Following Christ in the Real World by John G. Stackhouse, Jr. New York: Oxford University Press, 2008. 370 pages, index. Hardcover; \$27.95. ISBN: 9780195173581.

This book would be a fine gift for that sister or brother in the faith who looks with a jaundiced eye at any fellow Christian who has not yet discovered the one right approach all Christians should always follow in engaging contemporary culture. John G. Stackhouse Jr. argues that our judgment is too limited and our culture is too multifaceted to settle on one approach. To explore the intersection of faith and culture, he uses the dialogic style of one of his champions, Reinhold Niebuhr, stating perspectives incisively with persuasive force, only then to make the opposite case compelling as well. Stackhouse frequently does not resolve the resulting paradox, but rather advocates that the kingdom might be best witnessed and furthered by some Christians holding one view and some another, so that each is tempered by awareness of the other and together the gospel has a more complete witness in the world.

Stackhouse may have readers who are already aware of our finite and fallen state, for whom one paradox upon

another could become enervating. If whatever one does is so mixed in its intent and effect, why do anything at all? Stackhouse advocates that we should still act out of faithfulness. As mixed as our results will be for now, we are to make the best of it. He devotes chapters to the integrated life and thought of both C. S. Lewis and Dietrich Bonhoeffer as exemplary in this regard.

To think through the mix of possible relations between following Christ and living in our contemporary context, Stackhouse uses H. Richard Niebuhr's classic typology of five different ways Christ can be related to culture. "Christ of Culture" and "Christ above Culture" are quickly dismissed as rarely relevant. Usually the distance is too great between Christianity and contemporary cultures for either of these to apply. Stackhouse focuses instead on critiquing the "Christ against Culture" model championed by Yoder and Hauerwas, although characteristically he is quick to acknowledge that there have been times and places such as in Nazi Germany when following Christ was diametrically opposed to most of the dominant culture.

He also argues against the "Christ *transformer of* Culture" model that is rooted in the Reformed tradition. Stackhouse describes an extreme version of the transformation view to differentiate it from his own perspective that he labels as a hybrid between "Christ *transformer of* Culture" and "Christ and Culture *in paradox.*" It seems to this reader that his arguments are closest to a nuanced view of the Christ transforming culture perspective. By God's grace and call, we work toward the kingdom in every endeavor, including the arts, government, and politics, but realize that the kingdom will not be fully instituted until Christ establishes it in the new world to come.

Stackhouse is one of the most prolific and informed Christian writers in theological ethics today. The text is clear and insightful, while the extensive footnotes are not to be missed. There are many interesting comments, connections, and moves there. Granted, a bibliography would have saved extended hunts for the full citation of numerous abbreviated references. *Making the Best of It* is an erudite and timely addition to an important conversation. Recommended.

Reviewed by James C. Peterson, R. A. Hope Professor of Theology, Ethics, and Worldview, McMaster University Divinity College and Faculty of Health Sciences, Hamilton, ON L8S 4K1.

CAN THESE BONES LIVE? A Catholic Baptist Engagement with Ecclesiology, Hermeneutics, and Social Theory by Barry Harvey. Grand Rapids, MI: Brazos, 2008. 303 pages, index. Paperback; \$24.99. ISBN: 9781587430817.

Barry Harvey makes the provocative proposal that the contemporary Western church increasingly resembles a scattered collection of dusty skeletons. These lifeless bones are the remains of a once vibrant and transformative church, now paralyzed by compromise, privatization, self-interest, and corruption. But hope is not lost. Harvey proclaims, along with the prophet Ezekiel, that by the grace of God in Christ and by the life-giving breath and power of the Holy Spirit these bones can live again. Through allegiance to God's in-breaking kingdom and by rethinking its own constitutive practices, the church can recapture its true identity and mission as a pilgrim people en route to the already, but not-yet, City of God.

Harvey argues that the church is where Christ takes form concretely in the world. By the church's distinctive practices and language, it bears witness to the reality of God in its worship, teaching, witness, and work. From Barry's perspective, the church's present lifeless state has resulted from several factors, including the rise and fall of Christendom, the emergence of the modern state, the invention of "religion" as a set of private, internal beliefs, and the impact of consumerism. The upshot of all this is a tragic shift in the church's identity and mission that has compromised its prophetic message. Instead of being an alternative community of disciples, bound intimately to God and to one another by the Spirit and in loyalty to God's in-breaking kingdom, the Western church has generally become a collection of individual consumers with shared, but private, beliefs who gather together to consume religious goods and services.

Harvey narrates and analyses this deterioration in Part One of the book. In Part Two, he asks how the church might by God's grace be resuscitated by the Holy Spirit to be Christ's living earthly-historical body. Harvey proposes that a renewed devotion to four constitutive practices in particular is crucial in this regard. These are scriptural reasoning, doctrine, sacraments, and spiritual formation, each of which Harvey rethinks and reformulates in order to help the church be faithful to its true identity and calling.

Harvey describes scriptural reasoning as Bible reading that engages our imagination and intellect to direct our steps toward God's future. He rejects interpretive approaches that attempt to isolate abstract and universal meanings (Hodge's "facts" or Scheiermacher's "experience") from concrete life and practice in a typically modern "kernel and shell" fashion. In contrast, Harvey emphasizes the performative and dramatic dimensions of scriptural reasoning, in line with similar proposals by Kevin Vanhoozer, N. T. Wright, Francesca Aran Murphy, and Samuel Wells. Doctrine, the second practice, engages contemporary thought and scholarship to wrestle with questions about God, Christ, and the world that cannot be resolved strictly within the scope of biblical imagery and narration. Third, the sacramental practices of baptism and the Eucharist draw us to participate liturgically in God's mysterious and transformative presence and action in the world. These sacraments "take isolated producerconsumers and produce martyrs, witnesses to the apocalyptic activity of God in Christ" (p. 228). Finally, spiritual formation is crucial for sustaining the church's identity and mission as an alternative society. Authentic spiritual formation includes what Harvey calls "unselfing," a process in which our identities as disembodied consumers and faceless producers (formed by state and market) are unmade and then remade as members of Christ's body through Christian narrative, virtues, and practices.

Harvey's cultural critique is penetrating and his suggestions for moving forward are insightful and practical. Enriched by the thought of several key ecclesial and cultural thinkers, such as Dietrich Bonhoeffer, James McClendon, Rowan Williams, and to a lesser extent Alasdair MacIntyre, John Milbank, and Stanley Hauerwas, Harvey produces a well-informed and thought-provoking diagnosis of where the Western church stands today. Moreover, he provides a helpful contribution to the ongoing discussion of what it means for the church to be the church in our contemporary, post-Christendom context. I commend this book to all thoughtful Christians that are interested in the intersection of church and culture.

Reviewed by Patrick S. Franklin, McMaster University Divinity College, Hamilton, ON L8S 4K1.

A UNIVERSITY FOR THE PEOPLE: A History of the Institute for Christian Studies by Robert E. Vander Vennen. Sioux Center, IA: Dordt College Press, 2008. 273 pages. Paperback; \$18.00. ISBN: 9780932914750.

The Institute for Christian Studies (ICS) in Toronto, Canada, is unique on the North American educational scene: a graduate school without organizational ties to an undergraduate institution. From the day it opened its doors in 1967, ICS has critically employed the unique philosophical theories of the Dutch philosopher, Herman Dooyeweerd. For Dooyeweerd, philosophy is not rooted in the autonomy of rational thought, but rather is based on worldviews, particularly as they relate to our everyday experience and faith commitments. From this starting point, he developed his ideas about levels of being and the creational laws that hold for them, about societal structures and their distinctive tasks, and about the ground motives that have shaped Western thought.

The charter faculty members brought this central vision to bear on their individual disciplines and research programs. Thus, ICS has been a distinctive and valuable voice on the North American educational scene, not only in the courses offered, but also in the books and lectures its faculty produced, and in a number of other ancillary activities. Although ICS was started by the post-war Dutch, reformed, immigrant community, its students have come from all over North America and, indeed, the rest of the world.

Robert E. VanderVennen has been associated with ICS almost from its inception in a variety of administrative positions. He describes ICS in its troubles and its triumphs, its quarrels and achievements, its early chaos and present organization. The initial ups and downs were caused as much by the countercultural influences of the day and the inexperience of its young faculty as by the financial limitations of its supporting constituency. Early struggles of the ICS focused on gaining a legitimate place in the world of post-secondary education, by affiliation with an existing university or by an Ontario government charter. Eventually the provincial government passed legislation that gave the ICS the right to confer masters and PhD degrees. This has allowed the Institute to have an even greater shaping influence through its graduates who teach in Christian and secular institutions of higher learning across the globe.

VanderVennen's book gives detailed accounts of the various aspects of the history of ICS. There are portions of the book that will only be appealing to a certain audience, but its detail also serves to document the history of a unique educational voice. It is regrettable, but important

to note for the readers of this journal, that ICS has not extended its range of activities into the area of philosophy of science and the religion-science interface.

Reviewed by Harry Cook, The King's University College, Edmonton, AB T6B 2H3.

BEYOND THE FIRMAMENT: Understanding Science and the Theology of Creation by Gordon J. Glover. Chesapeake, VA: Watertree Press, 2007. 228 pages. Paperback; \$16.00. ISBN: 9780978718619.

Beyond the Firmament is written by an evangelical Christian layperson (Gordon Glover is a former Navy diver) for evangelical Christian laypersons. It is neither theologically nor scientifically academic in tone—although, to give Glover credit, he has read and referenced a number of serious theological texts. Glover's purpose is to persuade his fellow evangelicals to abandon "creation science," particularly young earth creationism, while maintaining fidelity to biblical authority. This is not a particularly new endeavor, but Glover shares his readers' commitment to biblical infallibility and, unlike more academic texts that may be inaccessible to the average evangelical, here Glover employs popular language.

The book is divided into four parts. Part I is titled "What Do We Know and How Do We Know It?" and consists of a discussion of the epistemologies of revelation and reason. This chapter reminded me of a church sign that asked, "Are there sources of truth other than the Bible?" It is a striking question in a culture that increasingly wonders whether there is truth to be found anywhere and that seldom looks to Scripture as one of those sources. Glover and his readers, however, are firmly committed to the primacy of revelation as humanity's source for knowledge of God. Glover uses the traditional theological distinction between general and special revelation to persuade his readers that God has also revealed knowledge through reason and through observation of the natural world.

Part II asks, "What can the Bible tell us about nature?" Here Glover introduces his readers to the hermeneutical principle of accommodation, that God has accommodated himself to the language and worldview of the original recipients of his revelation. Long utilized in higher criticism, which is, of course, anathema to most of Glover's evangelical readers, accommodationism is here employed to assert that the creation story is clothed in the language of myth in order to be understandable to its ancient hearers, and thus should not be interpreted as scientific truth:

So if God can limit His very nature by entering time and space in the person of Jesus Christ, shedding His own eternal and infinite attributes and voluntarily submitting Himself to His own creation, even to the point of death on a cross, certainly He has the artistic license to make sure of the foolishness of popular mythology in order to contextualize the creation account so that the original non-scientific audience could receive it (p. 78).

Having invited his readers to abandon the mythology of the creation narrative in favor of truth gained through "general revelation," he then asks in Part III, "What can nature teach

us about itself?" Here he introduces geological and biological arguments in favor of a long evolutionary process, stopping frequently to counter arguments raised by the young-earth creationists (which he calls the "YEC" crowd). He is particularly persuasive in demonstrating the inconsistencies in their projections for the age of the earth and chastises them for their arrogance:

I can honestly say that I see more humility when I read secular scientific literature than when I read YEC literature and it's embarrassing ... Will scientists ever take seriously our claims about the person and the work of Jesus Christ if some of us keep pushing these questionable scientific theories through the back door? (p. 136).

Part IV asks, "What about evolution?" Assuming his readers will accept that the creation story is largely myth, that the natural world can reveal God's truth, and that the cosmos is much older than the YEC folks have been willing to admit, Glover suggests that the theory of evolution is neither unbiblical nor untrue, but is a means that God has used to bring the world we know into being. This is the classic "theistic evolution" stance. By an interesting sleight of hand, he argues that the theory of evolution is more consistent with Intelligent Design (ID) than youngearth creationism:

... All this evidence for common descent shows us that Intelligent Design theories make more sense if the actual mechanism of creation is material. Having each species appear "out of thin air" with a "built-in" evolutionary history that never actually happened only makes God a *deceptive designer* (Italics his, p. 207).

So what should readers of this journal do with Glover? First, read other books. This one is not for you. Second, order several copies of this book and give them away to those who are still struggling with these issues. Glover has done us a favor by boldly making an argument to those least willing to hear it and doing so with their own language and from within their own worldview. For that, I both commend and recommend him.

Reviewed by Anthony L. (Tony) Blair, Dean of the Campolo College of Graduate and Professional Studies of Eastern University, St. Davids, PA 19087.



REWIRED: Exploring Religious Conversion by Paul N. Markham. Eugene, OR: Pickwick Publications, 2007. xii + 244 pages. Paperback; \$28.00. ISBN: 9781556352942.

Dallas Willard calls it *The Great Omission*. Ronald J. Sider thinks it *The Scandal of the Evangelical Conscience*. Dietrich Bonhoeffer once gave it the name "cheap grace." Each sees a devastating gap in popular Christian culture between profession of faith and serious discipleship. In *Rewired*, Paul N. Markham raises this concern specifically for American evangelicalism. Markham charges the latter with having an incomplete view of Christian spirituality, one that is excessively inward-oriented, individualistic, and detached from broader societal concerns. As a result of that truncated spirituality, evangelicals tend to read the Bible through an individualistic and spiritualized lens.

They treat the Kingdom of God as a sub-category of personal salvation, so that the church is merely a contractual association of independent individuals.

Markham identifies two contributing factors to this discouraging state of affairs. The first is a tendency to dichotomize outward and inward spirituality, often resulting from a commitment to body-soul dualism. Such an orientation leads many evangelicals to focus on individual spiritual fulfillment while neglecting the public and communal dimensions of Christian faith. Their goal becomes saving souls, while corporeal aspects are seen as peripheral or secondary. In contrast to both body-soul dualism (whether in Platonic, Augustinian, or Cartesian forms) and the opposite extreme of reductive naturalism (in which all of human existence is explained purely in biological terms), Markham proposes as a third alternative a "nonreductive physicalist" view of human nature and existence. Building upon the theological work of Nancey Murphy and the latest research in neuroscience, this view proposes that the human person is a physical being. However, the human form is sufficiently complex as to allow for the emergence of capacities such as morality and spirituality. Notably, such dimensions are capable of emerging without requiring the existence of an immaterial, ontological entity such as a soul or spirit. Markham avoids falling into reductive materialism by appealing to the inter-relating phenomena of supervenience, emergence, and top-down causation.

The second contributing factor is crisis conversion spirituality, a popular view in American evangelicalism (intensified through some versions of the holiness movement) that sees conversion as something simple and instantaneous. It concerns a change in one's personal beliefs, which can be (but is not necessarily) worked out subsequently in one's actions and behavior. In contrast, Markham envisions conversion as a process leading to a holistic, socio-moral transformation that encompasses all of one's life – one's attitudes and actions, beliefs and behaviors, personal spirituality and public engagement.

Markham calls upon two broad resources to support his case. First, he combines his nonreductive physicalism with insights from virtue ethicists (notably A. MacIntryre and S. Hauerwas) to argue that conversion is a processoriented phenomenon of character reformation. He discusses character as an emergent property of the brain's self-organizing activity, which is shaped through goaldirected practice. Such character-shaping practice "involves purposeful repetition commensurate with the reorganization of frontal lobe systems active in planning, motor command and execution" (p. 152). In other words, consistent practice creates habits of perception and action that are embodied in the brain. Virtue involves rewiring.

Second, he invokes the Wesleyan tradition to construct a progressive and holistic theological portrait of conversion (Markham explicitly equates his understanding of conversion to Wesley's doctrine of sanctification). Wesley's doctrine of salvation is holistic in that it addresses spiritual, socioeconomic, and cosmic dimensions of the human condition simultaneously. By cosmic, Markham is referring to the ultimate sources of good and evil as addressed in the *Christus Victor* description of the atonement. Moreover, Wesley's doctrine of salvation is process-oriented in its explication of grace as being prevenient, justifying, and sanctifying and in its emphasis on growing into perfection in love. Salvation involves the cultivation of holy tempers, which are virtuous or holy affections that have been habituated through practice in community. Accordingly, Wesley prefers to speak of salvation as a multifaceted and nonlinear "way," rather than attempting to work out its successive steps by means of a traditional order. Ultimately, for Wesley, salvation is about being renewed in the image of God, which he defines as a capacity for relationship with and imitation of God rather than an inherent human possession. It involves being healed and delivered from the penalty, plague, and presence of sin.

A complex and carefully argued book, it is no wonder that Pickwick Publications (an imprint of Wipf and Stock) included the present volume in its Distinguished Dissertations in Christian Theology series. Markham's research is extensive and his engagement in interdisciplinary dialogue is impressive. Moreover, his skill in summarizing and condensing complex ideas and data makes his writing relevant and accessible both to specialists and lay readers. Those with only a basic knowledge of the biological sciences will find his chapter on nonreductive physicalism challenging but well worth the effort. Theologians will likely wonder about the implications of nonreductive physicalism for doctrines like Christology (particularly Christ's two natures) and eschatology (is there an intermediate state after death?), which Markham does not address. Unfortunately, Markham has a tendency to portray evangelicalism somewhat simplistically as a uniform entity (dialogue with theologians such as K. Vanhoozer, C. Pinnock, or M. Volf would be fruitful here). This also prompts the question: why the one-sided focus on evangelicals? While he criticizes dualist evangelicals for prioritizing the inner life over social engagement, he does not explicitly criticize dualists who reverse the trend and reduce the gospel to mere social activism. What about faith groups that implicitly or explicitly adhere to reductive materialism? He directs his critique only at one side. Nevertheless, Markham's case for understanding conversion as a process of holistic socio-moral transformation of the whole person is compelling.

Reviewed by Patrick S. Franklin, McMaster University Divinity College, Hamilton, ON L8S 4K1.

NEW EVIDENCE FOR TWO HUMAN ORIGINS: Discoveries That Reconcile the Bible and Science by Gary T. Mayer. Bloomington, IN: AuthorHouse, 2007. 482 pages. Paperback; \$22.00. ISBN: 9781425973223.

Mayer attempts to do two things in this book. He tries to convince readers that at least some of the descendants of Adam and Eve had offspring by some other type of being, and that it is possible to reconcile what Genesis says about creation with modern scientific evidence, for example, evidence that the earth is very old.

The publisher's name suggests that the book was more or less self-published. Mayer could have used some help since the book cries out for some serious editing. There are too many usage errors. The first part, especially, needed either some critical peer review or better evidential support. The book could have used a lot of qualifying ifs or maybes, but they are almost entirely absent.

Genesis 6:1–5 may mean that some of Adam and Eve's offspring married some other type of being. Mayer claims that it does based on his training in the original languages (I have no such training). There are some who agree. For example, The NIV Study Bible, 10th ed. (Grand Rapids, MI, 1995) has a note on this passage indicating that some scholars believe that the passage refers to cohabitation between angels and humans or that it refers to those who followed God, namely offspring of Cain, but married those who were not. There is even the suggestion that it may mean that some men set themselves up as rulers and took harems. Mayer holds that the original language supports the idea that the other type of being was human which was already present when Adam and Eve were created. If other experts agree with him, my limited research did not find any of them. He does address one old commentary that dismisses his theory, but no one else seems to support it.

Mayer then spends about seventy pages presenting what he believes is evidence. This "evidence" comes from the life spans given in Genesis. He claims that the decline in life span given is because of intermarriage. There are a number of serious problems with this claim. The first, of course, is the assumption that there were two types of beings. Although we do not know how long the pre-Adamites" lived, Mayer states that "archeologists inform us that there are no prehistoric men that have been discovered who have shown a life span of over fifty years" (p. 21). Averaging this figure with the seventy years mentioned in Psalm 90:10, Mayer chooses a life span of sixty years for the "pre-Adamites." Mayer further holds, based on no evidence, that most of the characters of early Genesis married "pre-Adamites," or people who were partly descended from them. He goes on to calculate predicted life spans, based on the number of "pre-Adamite" and, to coin a word, "Adamite" ancestors. To hold this, he must assume that life span is simply inherited – one's life span is the average of the life span of your parents, which is questionable. Mayer then calculates predicted ages, to two decimal places for Genesis individuals. For example, Noah's wife is given as 277.25 years (p. 66 – Mayer does not seem to know about significant figures). He compares these ages to the life spans given in Genesis, where those are available. Then he uses his calculations to "explain" the shortening life spans. The more "pre-Adamite" ancestors a patriarch had, the shorter was his life.

Mayer finds remarkable agreement between his calculations and his predictions. But that is not surprising, since he can decide how many "pre-Adamites" he needs as ancestors without any scriptural support. There are, as I say, too many assumptions in his work. What if (assuming there were such beings, and that life spans were inherited as Mayer thinks they were) the pre-Adamite's life span was not sixty, but thirty? Or eighty, not sixty? I do not think it is worth my time, or yours, to do the mathematical calculations. Mayer holds that his ideas explain the decline in life span shown in Genesis. Other, less tortured explanations are certainly possible.

The second part of the book is well-intentioned, but has been treated far better by other writers. To cite just two weaknesses, Mayer is not aware of the numerous scientific criticisms of Michael Behe's *Darwin's Black Box*, and he is woefully weak on some scientific points: "Chro-

mosomes are connected laterally to each other to form a double helix" (p. 193). Ouch!

There are a lot of references, charts, appendices, and tables, which are mostly well done, and there is an adequate index, but I cannot recommend this book to anyone.

Reviewed by Martin LaBar, emeritus, Southern Wesleyan University, Central, SC 29630.



SCIENCE FOR SALE: The Perils, Rewards, and Delusions of Campus Capitalism by Daniel S. Greenberg. Chicago: University of Chicago Press, 2007. 285 pages, appendix, index. Hardcover; \$25.00. ISBN: 0226306259.

Daniel S. Greenberg is a seasoned science journalist who has been reporting on research and industrial science for over forty years. In *Science for Sale*, Greenberg explores the web of relationships among the academic sciences, private industry, and government.

A primary strength of Greenberg's approach to this question is his journalist's ability to tell colorful stories, often based on personal interviews with key players, which elucidate both individual personalities and big questions. For example, Greenberg has Drummond Rennie, an activist and editor of prestigious medical journals, explain a key problem in scientific publishing: "What we're talking about ... is the influence of money on research that my journal and other journals publish. The distorting influence of it. And this distorting influence is huge." This sort of first-hand testimony—and there is much of it in this book—is a powerful indictment of the supposed Mertonian neutrality of academic-industrialgovernment science.

The primary strength of Greenberg's book, alas, is also a major weakness. Very often, the book reads like a string of tedious, unending anecdotes and quotations lacking a cohesive vision for reform - which is a fair description of the book as a whole. In a very brief concluding section on "Fixing the System," Greenberg suggests "transparency" is the key to reform, but he never explains what this might mean. In a major omission, he does not examine at all whether "open access" publishing models might help push things toward greater transparency. Moreover, his dismissal of the Bayh-Dole Act and other legal developments that have encouraged universities to privatize their research through patent protection is so cursory that it flies by almost unnoticed. Yet the tension between "open" and "property" models of scientific research surely is both a driver and a symptom of the problems Greenberg exposes in his anecdotes and interviews.

On the whole, *Science for Sale* contains some useful source material for those who are interested in the sociology and business of institutional science in an age of money. It also will open the eyes of those who naively assert the neutrality of the scientific establishment. It does not, however, provide any meaningful proposals for reform.

Reviewed by David W. Opderbeck, Associate Professor of Law, Seton Hall University Law School, Gibbons Institute of Law, Science and Technology, Midland Part, NJ 07432.



OUT OF POVERTY: What Works When Traditional Approaches Fail by Paul Polak. San Francisco, CA: Berrett-Koehler Publishers, 2008. 232 pages, index. Hardcover; \$27.95. ISBN: 9781576754498.

Paul Polak is an optimistic man with an audacious goal. He writes about his purpose:

I wrote this book to create a revolution in how we think about poverty and what we can do about it. That revolution begins with you.

Many people who work on poverty issues write with a tone that indicates how desperate the situation is, and how we have a duty to work hard at this very difficult task. Polak's writing (and speaking) has a very different tone. Throughout the entire book is a sense of excitement, bordering on joy, about the exciting opportunities we have in working to help poor people. In the preface, he makes his position clear.

I hate books about poverty that make you feel guilty, as well as dry, academic ones that put you to sleep. Working to alleviate poverty is a lively, exciting field capable of generating new hope and inspiration, not feelings of gloom and doom.

The organization that Polak started in 1981, International Development Enterprises, has helped millions of people escape from extreme poverty to much better lives.

This book is not written from an explicitly Christian perspective, but it is Christian friendly. The actions he recommends are things anyone (Christian or not) can do to help make a difference. As a way to explain his perspectives, he follows the path of one poor Nepal farming family, that of Krishna Bahadur, who went from making about \$1 per day growing rice to a net income of over \$4,000 per year, which put him within the Nepalese middle class. Polak describes ways in which westerners can help rural people in developing countries escape extreme poverty. It is not in the way many of us might think. He writes that we cannot donate people out of poverty, nor can we reach the rural poor by helping the overall economy of a country grow. Steps must be taken to help the rural poor where they live.

Polak's perspective is that top-down governmental or foreign aid programs almost never work. What works is a bottom-up approach that deals with individuals. He sees market-based approaches as offering the only long-term solution. With some training and very cheap products, such as the human-powered Treadle pump and a drip irrigation system, farmers like the Bahadurs can begin to grow labor-intensive cash crops that will bring them much more money than they could ever obtain by growing subsistence foods.

Polak makes the point that most engineers design products for the richest 10% of the world. He encourages us to design for the other 90%. Profit margins may be smaller, but the markets are so large, that substantial profits can still be made. The Treadle pump is an example. These pumps are simple enough that they can be made by small manufacturers. In Bangladesh and Kenya, there are hundreds of small companies making them

(generating income for additional poor people). It is estimated that this one invention alone has improved village economies around the world by over \$600 million per year, lifting millions of people out of extreme poverty.

Polak describes methods that work to help alleviate extreme poverty. He includes recommendations of how individual engineers and scientists can become involved. Anyone in the sciences/engineering who is serious about working on poverty issues should read this book.

Reviewed by William Jordan, Professor of Mechanical Engineering, Baylor University, Waco, TX 76706.

THE FUNDING OF SCIENTIFIC RACISM: Wickliffe Draper and the Pioneer Fund by William H. Tucker. Urbana, IL: University of Illinois Press, 2007. 304 pages, index. Paperback; \$20.00. ISBN: 9780252074639.

William Tucker has written extensively on racism. He is a professor of psychology at Rutgers University, and this book is the result of many years of research. It includes a Table of Contents, a useful list of archival materials consulted, comprehensive notes by chapter, and an index. Tucker states that his concern is with the improper use of social science to support oppressive policies, especially those relating to race. In this book, Tucker demonstrates his concern that racism has been a significant ongoing problem in America.

This volume is about Wickliffe Preston Draper who belonged to a southern aristocratic family that took pride in its background of wealth, privilege, and power. He attended Harvard University and was accepted as an educated millionaire and philanthropist—at least by those who agreed with his aims. Draper wanted to do something practical in life, but through his vast wealth, he eventually perpetuated a legacy of hate. He is remembered as a vehement racist and an ardent anti-Civil Rights advocate. William McDougal of Harvard University, Draper's *alma mater*, declared that blacks and non-Nordic immigrants were a biological threat to the American white civilization. It is not surprising that matters relating to segregation became Draper's mission.

Draper initiated two major projects: the publishing of the *Mankind Quarterly*, and then, in 1937, the setting up of the Pioneer Fund. The former provided an outlet for the publishing and distributing of racist and fascist materials, and the latter permitted the channeling of monies necessary for a variety of ventures that harmonized with Draper's ideas. His intention was to prove that blacks were intellectually inferior to whites, justifying their repatriation to Africa. This would preserve white racial purity in the homeland. However, the details of his financial support for all these projects, especially for Fund grantees, and the ultimate source of these monies, were carefully kept in the background.

Sometime in the mid-1930s, Draper met Ernest Sevier Cox and they became close friends. Together they lobbied many in powerful positions of State in order to guide policies that included the support for eugenics and the publishing of warnings about miscegenation. In their view, if racial purity were to be achieved, then, amongst other measures, Jews must be barred from entry into America. The activities of Draper's group encouraged the State Legislatures to enact measures supporting the compulsory sterilization of 75,000 individuals who should not be allowed to breed. Tucker outlines how neo-Nazis were inevitably attracted to Draper's activities. These racists maintained communication with the Third Reich through contacts with Professor Hans Gunther and Eugene Fischer, power brokers who were formulating the Nazi racial policies. Hitler used the Draper-inspired American Eugenics Model as the basis for the Nuremberg Laws, relying on the expertise already available to him in the United States.

The US Supreme Court was pointing the way toward a desegregated future in America. Opposed to this aim were the efforts of the racists who hoped to prove that blacks and other minorities were intellectually and racially inferior to whites. If successful, then Draper and his coterie would be able to demonstrate to Americans the immediate need to preserve white purity in order to ensure their own ongoing supremacy in the nation. This goal could be achieved by effectively opposing the threat from blacks and undesirable immigrants, especially the Jews, and countering the leveling effect of equality of status of the races.

Tucker then elaborates on the activities of other racists who were Draper's associates. Draper contributed \$3.5 million to those "scientists" whose work was acknowledged by the authors of The Bell Curve, a book with a possibly disguised political agenda. They included some with pro-Nazi affiliations who were also contributors to the Mankind Quarterly. Psychologist Arthur Jensen of Berkeley, a Stanford physicist, implied that blacks might be genetically less intelligent than whites; Jensen was obsessed with the presumed racial differences in intelligence. He received over \$1 million toward his studies as a grantee of Pioneer. His contributions to different Nazi publications were numerous. It was implied that if a Negro was intelligent then he or she had a white ancestor. Nobel laureate William Shockley encouraged involuntary sterilization measures, based on the observation that the least-capable persons in the community were producing the largest numbers of offspring. Although he did no research, he was rewarded financially by Pioneer for many years. Carleton Putman, an influential advocate of racism, opposed the right to education or any other form of equality for blacks. In 1961 he wrote Race and Reason, Draper paying for the publishing and distributing of 60,000 copies of the book. W. C. George wrote The Biology of the Race Problem and over 45,000 copies were paid for and distributed to selected recipients by Draper. The mailing of vast amounts of literature from Pioneer continued.

The "Draper Clique" believed that the Jews from Germany were responsible for creating problems by supporting equality for blacks. Blacks were held to be victims of their own biology, whereas the mulattos showed the ambition of the whites, but the inadequacy of the blacks. Pioneer pursued its immediate goal, attempting to prove scientifically the intellectual inferiority of blacks, because then its battle would be won. It had long been assumed that the genetic limitations of black children meant the necessity to link corrective programs with eugenics and sterilization that had already been initiated by law in

many states decades earlier, and applied to those judged socially and genetically inadequate.

In 1956 Draper chose Harry F. Weyher to head the Pioneer Fund and act as money-launderer for Draper. At this time, the basic premise was that the minorities were not like whites and never would be. As the underlying aim was domination of the world by whites, aid given to the underprivileged elsewhere was seen as defeating the racists' aims. It was held by them that although integration seemed to offer no benefits to blacks because of their genetic shortcomings, it handicapped the white students in classes with them. Weyher continued to hold power after Draper's death, exerting financial pressure to oppose integration and to support the repatriation of blacks to their homeland although ultimately accepting the fact that the Jews were in America to stay. It was noted with approval that Germany was now free of Jewish financial domination. America's problems were still seen by the racists to stem from the presence of inassimilable minorities, now comprising 30% of the population. Pioneer still hoped to use science to oppose racial equality.

In 1979 Bouchard, a physicist, was granted large sums of money from Pioneer to carry out his ill-conceived twin study. The Nordic peoples were held to be a superior race. It was feared that integration, possibly having a leveling effect on the nation, was also allowing the emergence of Jewish ascendancy. But these nonwhites would never become real Americans so "universal mongrelization" must be stopped.

Pearson, a British-born anti-Semite, came to America. He played a significant role in the aggressive distribution of literature. He initiated a monthly publication, the Northlander, a vehicle for the post-World War II continuation of Nazi racial theories. He sought to establish genetically approved hierarchies that would control the inferior members of society by denying them equality of status. He attempted to form an International Nazi Organization, advocating sentiments enshrined in the Nuremberg Laws of the Third Reich. Pearson had contact with the aristocratic "Cliveden" set in the United Kingdom who seemed to have aligned themselves with Hitler's policies. During the following three decades, Pearson, a neo-Nazi, was a Pioneer grantee, although he was not engaged in research. In December 1999, Race, Evolution and Behavior was distributed to selected individuals.

Tucker documents the uniformity of the racist alignment in the United States, Europe, and the United Kingdom. Pioneer was eventually censured, but Weyher's defense, though accurate, was misleading because Pioneer's intention had always been to oppose equality of the blacks and this policy persisted to the close of the twentieth century. The dust cover points out that this book is a plausible account of a socially dark and intellectually perverse fragment of American conservatism. Since publication, a Nobel laureate expressed his belief that blacks were intellectually inferior to whites; Mavis Staples, still singing freedom songs, says, in 2008, that the fight for equal rights still goes on today.

Tucker has achieved his task, carefully and truthfully outlining the scourge of racism. He demonstrates that Draper's objective, the preservation of white racial purity and therefore supremacy against the threat posed by blacks and undesirable immigrants, especially Jews, was not achieved. The author, in providing a factual, contemporary assessment of racism in America, would suggest that his topic is of concern to all Americans. I highly recommend this book. It deserves a place in libraries and could be used effectively in discussion groups in churches and universities.

Reviewed by Ken Mickleson, 105 St Andrews Road, Epsom, 1023, Auckland, New Zealand.



BIOTECHNOLOGY AND THE HUMAN GOOD by C. Ben Mitchell, Edward D. Pellegrino, Jean Bethke Elshtain, John F. Kilner, and Scott B. Rae. Washington, DC: Georgetown University Press, 2007. 210 pages. Paperback; \$24.95. ISBN: 9781589011380.

This book is the result of a collaborative research initiative at the Center for Bioethics and Human Dignity (CBHD). Its authors include the executive director of CBHD (Ben Mitchell), the chair of the US President's Council on Bioethics (Edward D. Pellegrino), and a Gifford lecturer at the University of Edinburgh in Scotland (Jean Bethke Elshtain). They and their coauthors have written extensively on the topics of reproductive technologies, gender roles, health care, aging, and euthanasia. But rather than doling out the writing of each chapter based on individual expertise, the authors spent significant time drafting and critiquing together. Following external review of chapter drafts, they then solicited feedback from participants in the "Remaking Humanity?" conference in 2003. The final product is a remarkably cohesive, readable book that comprehensively addresses matters underlying important philosophical and religious concerns about present and future biotechnologies: genetic testing and intervention, cybernetics, and medical nanotechnology. However, its greatest flaw is that the authors' common agenda so strongly influences the structure of their arguments that alternative perspectives receive too little attention.

The preface and opening chapter of the book present a sobering—if not a bit alarmist—perspective of human biotechnology. The authors take seriously the notion that the Human Genome Project has launched us on a trajectory in which medicine's goal to heal will be supplanted with a goal to enhance and even "immortalize" individuals. While I surmise that few biotechnologists and medical practitioners take this extreme seriously, an exploration of its implications is worthwhile nonetheless.

The second chapter deals with various foundational narratives that drive the way North Americans tend to think about the role of technology: the second-creation narrative, the recovery narrative, and the wilderness narrative. Mitchell et al. reject each of these as narratives unsuitable for guiding human biotechnology, preferring a fourth option – responsible technological stewardship. Relying heavily on Stephen Monsma's book, *Responsible Technology: A Christian Perspective* (Eerdmans, 1986), they define responsible technology as a human communal activity exercised in freedom and responsibility to God
for the transformation of an object toward a practical purpose. While this definition could be quite affirming of biotechnology, the authors use it to point out some of its risks: namely, that biotechnology can be employed in ways that are irresponsible and in contrast to God's will. This shadow of doubt permeates the remainder of the book. Moreover, their critique of alternative narratives becomes a vehicle to disregard the arguments of Christian authors who view biotechnology more favorably, namely, Ronald Cole-Turner and Philip Hefner, whom they seldom mention. In my opinion, the failure to engage other Christian scholars (e.g., James Peterson, Ted Peters, or Allen Verhey), who offer constructive insights for the appropriate use of biotechnology, seriously detracts from its effectiveness as the guide for the church that its authors intend it to be.

Following this same rhetorical approach, the third chapter turns to alternative worldviews that affect one's view of biotechnology and its application, laying out their arguments why philosophical naturalism and biocentrism are seriously flawed as guiding worldviews. And while few readers of PSCF would argue against their preferred worldview – Christian theism – many will find their five-page treatment of it rather unsophisticated. Non-Christians will find it entirely unconvincing. What is more, in rejecting "environmentalist biocentrism," the authors fail to acknowledge extensive Christian scholarship on the hot topics of creation care, environmental justice, and ecological sustainability. Nor do they address how their view of responsible technological stewardship might contrast with those who view it from a more biocentric perspective. Readers interested in a more ecologically balanced assessment will find more helpful the insights of Dorothy Boorse in "Anti-Aging: Radical Longevity, Environmental Impacts, and Christian Theology" (PSCF 57 [2005]: 55).

The fourth chapter introduces the crux of the authors' ethical analysis, namely the CBHD's concept of human dignity. The concept has many different connotations. The authors define it as an intrinsic human property embedded in our status as image-bearers of God. This definition enables them to avoid slippery slopes associated with defining dignity as rooted to some special human characteristic (e.g., rationality or autonomy), and the CBHD has used it effectively in their evaluations of beginning- and end-of-life medical issues. The chapter concludes with overviews of recent bioethical debates, demonstrating how different conceptions of dignity can lead to opposing conclusions about the ethics of embryonic stem cell research, germline genetic intervention, and human cloning. The authors contend (or at least strongly imply) that these technologies violate human dignity, according to their definition. But a more comprehensive evaluation of Christian scholarship concerning the image-of-God concept might lead to other conclusions. Seen as an interrelational property that mirrors the Trinitarian nature of God, one might conclude that these technologies do not violate human dignity so long as normative interrelationships (such as the love relationships between parents and children) are maintained. To that end, James Peterson's book, Genetic Turning Points: The Ethics of Human Genetic Intervention (Grand Rapids, MI: Eerdmans, 2001), offers more helpful insights.

Chapter five does, in fact, employ a more communal accounting of human nature as the authors examine the quest for control over the human body. Citing overexuberance for the Human Genome Project as a first step toward resolving genetic maladies, the authors urge caution. They note that increased genetic testing has resulted in more abortions of fetuses with Down syndrome, thereby diminishing humanity. Indeed, they argue, we are already on the road toward the "futureperfect body," rejecting our given imperfect bodies as "foe." The danger in this is that we lose sight of the Christian concept of natural as good, and embodied (embedded in nature) as an inseparable aspect of the life God intends for us. The chapter concludes with a call for the church to be that "embodied community of wisdom" that accepts others "as embodied imagers of God, whether they are naturally weak or naturally strong, whether fully abled or less fully abled" (p. 108). Thereby, we must "measure technologies, including biotechnologies, by the ways these technologies either diminish our shared humanity or contribute to our life together" (p. 109).

How do the authors see biotechnologies measuring up against this standard? Chapter six begins with an acknowledgment that "biotechnology has indeed opened a wide, new, and confusing array of doors" (p. 111). Terms such as "health" and "disease," which have traditionally been defined in more restorative ways, will be redefined if bodily enhancement becomes a prominent goal of medicine. Can medicine, so refocused, serve the good of the individual and the common good? The authors argue that this would not be the case. Medical intervention for the purpose of enhancement would tend to foster, instead, pathological narcissism, social injustice, and reduced moral accountability.

If this slippery slope is to be avoided, what use should we make of biotechnology? Readers might suspect that the authors would advocate that biotechnology be avoided entirely, but instead they conclude the book with a set of questions, posed with the intent that they serve as a set of principles for assessing biotechnologies philosophically, theologically, and practically. Their questions include these crucial considerations: Does the technology assist us in fulfilling our stewardship responsibilities? Does it facilitate healing/restoration or is it for reengineering/enhancement? Does it require/promote commodification or destruction of human life? Does the pursuit or use of it make just use of resources? Does it promote human flourishing or does it more likely promote technological and economic imperatives? How much additional technology is necessary to produce, maintain, or safely constrain/contain the technology? Rather than answer these questions (which they propose to do in a pending series), the authors urge that our engagement be based on Scriptural guidance and the pursuit of moral perfection (love).

While I still have misgivings about earlier chapters, I find redemptive wisdom in chapters 5–7. These will help readers to think biblically about the place of biotechnology in medicine. But one will have to go elsewhere for a more comprehensive analysis of Christian thought on the subject.

Reviewed by David S. Koetje, Professor of Biology, Calvin College, Grand Rapids, MI 49546.

Book Notices

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EVOLUTION AND CREATIONISM: A Documentary and Reference Guide by Christian C. Young and Mark A. Largent, eds. Westport, CT: Greenwood Press, 2007. 298 pages, resource list, bibliography, index. Hardcover; \$85.00. ISBN: 9780313339530.

The title of this book is partly right: though not a reference work in the usual sense, it is a reliable guide to many historically important documents about the origins controversy, from the pre-Darwinian period to the recent trial, Kitzmiller v. Dover. This coherent, well-organized collection, representing a wide range of topics and literary genres, is divided into eight sections. Each section has a clear but brief introduction, and each of the forty-six selections has a separate, single-paragraph introduction deftly placing the work and its author in the appropriate historical context. Some selections are very well known, such as the excerpts from Darwin's On the Origin of Species (1859) and Fleeming Jenkin's insightful critical review of it (1867); others ought to be better known, such as Headquarters Nights by Vernon Kellogg (1917) and Reinhold Niebuhr's powerful essay, "Christianity and Darwin's Revolution" (1958). Recommended especially for anyone teaching a historically oriented course about evolution.

MORE THAN DARWIN: An Encyclopedia of the People and Places of the Evolution-Creationism Controversy by Randy Moore and Mark D. Decker. Westport, CT: Greenwood Press, 2008. xxiv + 415 pages, appendix, bibliography, index. Hardcover; \$85.00. ISBN: 9780313341557.

Although not an encyclopedia in the usual sense, this single volume contains 500-plus entries providing a synopsis of the persons, organizations, and places involved in the history of the evolution-creationism controversy. Entries range from Adam and Eve to Evelle J. Younger, the California attorney general who in 1975 made a decision challenging California's Science Framework, which gave equal recognition to creationism and evolution. The entries are mostly short (averaging 800 to 1000 words in length) and include both major and minor scientists, religious leaders, lawyers and plaintiffs, organizations, and places. Even popular culture's involvement in the form of The Flintstones and Inherit the Wind is described. This accessible resource is a good tool for anyone looking for a short and concise background to the controversy. Be ready for surprising alphabetical juxtapositions. For example, an entry on Tim LaHaye (b. 1926) is followed by one on Jean-Baptiste Lamarck (1744-1829). Entries frequently include lists of recommended reading for more in-depth study. The book also has an extensive bibliography of sources, eighty-two illustrations, and an appendix providing a detailed guide to the sites of the 1925 Scopes trial in Dayton, TN.

Reviewed by Edward B. Davis, Messiah College, Grantham, PA 17027.

Reviewed by Arie Leegwater, Calvin College, Grand Rapids, MI 49546.

September 2008

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PS Form 3526, September 2007 (Page 2 of 3)

Perspectives on Science and Christian Faith

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Total Free o	or No	minal Rate Distribution (Sum of 15d (1), (2), (3) and (4))	128	91
Total Distric	oution	(Sum of 15c and 15e)	2267	2220
Copies not	Distr	ibuted (See Instructions to Publishers #4 (page #3))	• 108	171
n. Total (Sum	of 15	if and g)	2375	2391
Percent Pa (15c divide	id d by	15f times 100)	95.90%	94,34%
16. Publication	of St	atement of Ownership		
in the	De	ation is a general publication, publication of this statement iccember 2008 issue of this publication.	is required. Will be printed	Publication not required.
17. Signature a	and T	tle of Editor, Publisher, Business Manager, or Owner		Date
	,	A free Randall D. Isaac, E	Executive Director	September 29, 2008

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