

Testifying to God's Goodness Through Science and Technology

American Scientific Affiliation
54th Annual Meeting

July 30 – August 2, 1999
John Brown University
Siloam Springs, Arkansas

Dr. William Phillips
Plenary Speaker, Nobel Laureate
National Institute of Standards and Technology
Gaithersburg, MD

*"There are different kinds of gifts, but the same spirit.
There are different kinds of service, but the same Lord"*
1 Corinthians 12:4–5 (NIV).

Bookstore Hours

Monday–Friday: 8:30 AM – 5:00 PM
Saturday: 10:30 AM – 1:00 PM
Sunday: 11:30 AM – 1:30 PM

The American Scientific Affiliation encourages thoughtful and provocative scientific presentations and discussions. Presenters and discussants are expected to maintain a humble and a loving attitude toward individuals who have a different opinion.

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1999 ASA Annual Meeting Schedule

Thursday – July 29, 1999 Pre-meeting activities

- 1:00–3:00 PM Registration – Learning Resource Center, Lobby
- 3:15 PM Meet at the Mabee Center parking lot for transportation to Passion Play
- 3:30 PM Leave for Eureka Springs and Passion Play
- 6:30 PM Dinner at Mission Buffet Restaurant
- 8:30 PM Passion Play

Friday – July 30, 1999

- 7:30–8:00 AM Serving time for breakfast – Kresge Dining Hall, Mabee Center
- 8:30 AM Family tour of local sites of interest – leave Mabee Center parking lot
- 10:00 AM Affiliation of Christian Biologists Tour – leave Mabee Center parking lot
- 9:00–7:00 PM Registration – Learning Resource Center, Lobby
- 12:00–1:00 PM Lunch – Pre-purchased box lunch
- 6:00–6:30 PM Dinner – Kresge Dining Hall, Mabee Center
- 7:00 PM Evening Program – Bynum Theater, Walton Lifetime Health Complex
 - Welcoming Speakers and Announcements
 - Joseph K. Sheldon, President, ASA
 - Mel Fratzke, Provost, John Brown University
 - Richard Ruble, Local Arrangements Chair
 - Fred Hickernell, Program Chair
- 7:30 PM “Almost Absolute Zero:
The Story of Laser Cooling and Trapping” – William Phillips
- 8:30 PM Mixer – J. Alvin Brown Dormitory Atrium

Saturday – July 31, 1999

- 7:30–8:00 AM Breakfast – Kresge Dining Hall, Mabee Center
- 8:30–9:00 AM Music and Devotions – Bynum Theater – Jay Hollman, presiding
 Music – Larry and Susan Martin
 Devotions – Sara Miles
 Announcements
- 9:00–10:00 AM General Session for commissions symposia
 – Bynum Theater
- 9:00–9:30 AM Intelligent Design Symposium – Charles Thaxton, Chair
 Detecting Design: Theory and Practice – William Dembski
- 9:30–10:00 AM Global Resources and Environment Symposium – Ray Brand, Chair
 The Christian Environmental Professional:
 Oxymoron or Avatar? – John Wood
- 10:00–4:00 PM Poster Session – Bynum Theater Lobby
 Red-Dye, Concrete, Snails, Animal Bones, – Leon Dennison
 Mima Mounds and Noah's Flood
 Giving Sight to the Blind – Carl Resler
- 10:00–10:30 AM Refreshment Break and Fellowship
 – Bynum Theater Lobby
- 10:30–12:15 PM Sessions A1, B1, and Design 1

Session A1: 10:30 AM – 12:15 PM LRC, Room L150 – Paul Arveson, Chair

- Cultural Resistance to Science: A Survey Study – Bill Cobern
- Using The Web-based Assessment to Teach: The Project and “Just-In-Time-Teaching” – Larry Martin
- ASA Webmaster Report 1999 – Terry Gray
- The ASA Web Site: Bringing Resources and Commentary on Science and Christianity to a Diverse Audience – Jack Haas

Session B1: 10:30 AM – 12:15 PM LRC, Room L151 – George Murphy, Chair

- Calculating the Probabilities of Creation and Evolution – David Siemens
- Proposal of a Recent Change in the Dynamic of Human Evolution that Complements Genesis Primeval History – J. Raymond Zimmer

← **Saturday – July 31, 1999**
(continued)

Session B1: 10:30 AM – 12:15 PM
LRC, Room L151 – George Murphy, Chair

- Repeating the Catholics' Galileo Error – Jack McIntyre
Papal Insights for Evangelicals: On the
Relationship Between Science and Theology – Denis Lamoureux

Design 1: 10:30 AM – 12:15 PM
Bynum Theater – Robert DeHaan, Chair
“The Origin of Anthropic Fine Tuning”

- Cosmic Coincidences: Theistic Design or Atheistic
Many Worlds – William Craig

12:15–1:00 PM Lunch – Kresge Dining Hall, Mabee Center

*12:15–1:00 PM Editorial Board Luncheon Meeting – Roman Miller
– Dye Lounge

12:15–1:00 PM Young Scientists Luncheon Meeting – Johnny Lin
– President's Dining Room

*1:00–1:45 PM ASA Business Meeting – Kresge Dining Hall – Joseph Sheldon,
presiding

1:45–3:30 PM Sessions A2, B2, and Design 2

Session A2: 1:45 – 3:30 PM
LRC, Room L150 – Marilynne Flora, chair

- Declaring the Glory and Goodness of God – Jennifer Wiseman
Through Astronomy
God's Love and the Laws of Physics – Arnold Sikkema
Clinical Research Testifies to God's Goodness – Joseph Lechner
Nurturing the Empirical Spirit: A Role for ASA – Walter Hearn

Session B2: 1:45 – 3:30 PM
LRC, Room L151 – Fred Jappe, Chair

- Evolution and Original Sin – Brian Nevins
Are There Gaps in the Creation's
Formational Economy? – Howard Van Till
“Darwin's Black Box” or “Behe's Empty Box” – Terry Gray
Genetic Transilience: A Model of Human Origins? – David Wilcox



Saturday – July 31, 1999
(continued)

Design 2: 1:45 – 3:30 PM

Bynum Theater – William Cobern, Chair

“The Origin of Biological Information”

- The DNA by Design Argument Then and Now – Charles Thaxton
- Small Probabilities and Specification Applied to DNA – William Dembski

3:30–4:00 PM Refreshment Break and Fellowship
– Bynum Theater Lobby

4:00–4:30 PM Workshops I and II – Bynum Theater

- Workshop I Introduction – Fred Hickernell
- Introduction to Workshop I – John Hubley
- Introduction to Workshop II – Terry Morrison

Workshop I: 4:30 – 5:30 PM

LRC ~~Computer Laboratory, Room L148 or L149~~ *L150*

- High Tech and Holy Touch Today – John Hubley

Workshop II: 4:30 – 5:30 PM

Bynum Theater

- Sharing Your Faith With Colleagues Panel: – Terry Morrison, Chair
- Joan Centrello
- Chris Macosko
- Charles Thaxton

6:00 PM Banquet – Kresge Dining Hall, Mabee Center

7:30 PM Banquet program – Bynum Theater – Fred Hickernell, presiding

“Faith, Science and the Nobel Prize” – William Phillips

Announcements

8:45–10:00 PM Affiliation Meetings

- ACB – Gerald Hess, presiding LRC, Room L150 (Biologists)
- ACG – Keith Miller, presiding LRC, Room L121 (Geologists)
- ACE – Ruth Miller, presiding LRC, Room L151 (Engineers)

Communications

Mayfield Lounge

← **Sunday – August 1, 1999**

- 7:30–8:30 AM Breakfast – Kresge Dining Hall, Mabee Center
- 9:00–10:00 AM Bible Study – Bynum Theater – Richard Ruble
- 10:30–11:45 AM Worship – Cathedral of the Ozarks – Richard Ruble
Speaker – Richard Brown
- 11:45 AM Announcements
- 12:00–1:00 PM Lunch – Kresge Dining Hall, Mabee Center
- 12:00–1:00 PM Commission Chairs Luncheon Meeting – Donald Munro
– Dye Lounge
- 1:30–3:15 PM Contributed Papers, Sessions A3, B3,
Design 3 and Workshops

Session A3 1:30 – 3:15 PM

LRC, Room L150 – Ray Brand, Chair

Symposium: Global Resources and Environment Commission

- Meeting the Needs of 2B People, Off-Grid, Using the Renewable Option or, Renewables for Sustainable Rural/Remote Site Power – Kenell Touryan and Jonathan Touryan
- Collision of Values in Siting New Manufacturing Facilities – Jack Swearngen
- The Environmental Technology of Jaguar Creek: A Case Study – James Beard
- Stewardship of the Eden Conservancy: Belize, Central America – Joseph Sheldon
- Discussion of the Task of the ASA Global Resources and Environment Commission – John Wood

Session B3 1:30 – 3:15 PM

LRC, Room 151 – Frederick Trexler

- Do Science-based Apologetics Encourage Rather Than Discourage Atheism? Reflections on Michael J. Buckley's *The Origins of Modern Atheism* – Joel Cannon
- Cross-Based Apologetics for a Scientific Millennium – George Murphy
- Attitudes about Origins: Searching for Appropriate Humility and Accurate Communication – Craig Rusbult
- Statistical Methods and Human Reasoning – Timothy Chen

Sunday – August 1, 1999
(continued)

Design 3: 1:30 – 3:15 PM

Bynum Theater – David Price, Chair

“The Origin of Molecular Machines”

The Bacterial Flagellum: – Scott Minnich
Spinning Tails of Complexity

3:15–3:45 PM Refreshments and Fellowship
– LRC, Artutunoff Library Lobby

3:45–5:30 PM Contributed Papers, Session A4, Design 4
and Workshops I and II (continued from Saturday)

Session A4: 3:45 – 5:30 PM

LRC, Room L150 – Richard Wright, Chair

Real Evangelicals Aren't “Green”? – John Davis
Historical and Theological Roots
of Evangelical Ambivalence Toward
Environmental Concerns

Using Science to Help the Poor: – Martin Price
Several Practical Examples

Astrology in the Ancient World – Edwin Yamauchi

Should Methodological Naturalism Exclude
Numinous Occurrences from Science? – Sherman Kanagy

Design 4: 3:45 – 5:30 PM

Bynum Theater – Walt Hearn, Chair

“The Origin of Body Plans”

Introduction to Design 4 – John Wiester

The Chinese Chengjiang Cambrian Biota and the
Origin of Body Plans – Marcus Ross

Developmental Constraints on the Origin
of Body Plans – Paul Nelson

Workshop I: 3:45 – 5:30 PM

LRC Computer Laboratory, Room L148 or L149 L150

High Tech and Holy Touch Today – John Hubley

 **Sunday – August 1, 1999**
(continued)

Workshop II: 3:45 – 5:30 PM
Bynum Theater – LRC

Sharing Your Faith With Colleagues – Terry Morrison

6:00–7:00 PM Dinner – Kresge Dining Hall, Mabee Center

7:30–9:00 PM Commission Meetings:

Bioethics – Hessel Bouma III, presiding	LRC, Room L151
Communications – Paul Arveson, presiding	WLHC, Simmons Room
Creation – Robert Newman, presiding	LRC, Room L121
Global Resources and Environment – John Wood, presiding	WLHC, Hurte Lounge
History and Philosophy of Science – Edward Davis, presiding	LRC, Room L150
Industrial – John Osepchuk, presiding	MC, Dye Lounge
Physical Sciences – Paul Lepse, presiding	LRC, Room L152
Science Education – John Wiester, presiding	WLHC, Faculty Lounge
Social Science – Richard Ruble, presiding	LRC, Room L153

- LRC – Learning Resource Center
- WLHC – Walton Lifetime Health Complex
- MC – Mabee Center

 **Monday – August 2, 1999**

7:30–8:00 AM Breakfast – Kresge Dining Hall, Mabee Center

8:30–9:00 AM Music and Devotions – Bynum Theater – Richard Ruble
 Music – Larry and Susan Martin
 Devotions – James Pearson

Announcements

9:00–10:30 AM General Session – Bynum Theater – Joseph Sheldon
 “ASA into the Next Century”

10:30–11:00 AM Refreshments and Fellowship
 – Bynum Theater Lobby

11:15–11:45 AM Conference wrap-up – Bynum Theater – Fred Hickernell

12:00–1:00 PM Lunch – Kresge Dining Hall, Mabee Center

Check out
Please return your key to the registration desk.

Abstracts for the 1999 Annual Meeting of the American Scientific Affiliation

July 30 - August 2, 1999
John Brown University
Siloam Springs, Arkansas

Do Science-Based Apologetics Encourage Rather than Discourage Atheism? Reflections on Michael J. Buckley S.J.'s "*At the Origins of Modern Atheism*"

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I examine Buckley's well-documented thesis[1] that modern atheism originated in Christians' embrace of philosophy and science as the grounds on which faith must be justified, and these Christians' related denial of the relevance of Jesus and the Christian's experience as grounds for justifying belief.

According to Buckley, atheism's seminal figures were not the philosophers normally associated with atheism (Denis Diderot and Henri D'Holbach), but Christians Rene' Descartes and Isaac Newton, and their defenses of Christianity. With small changes, Newton and Descartes's elaborate arguments for Christianity (which assumed or explicitly acknowledged the irrelevance of Jesus for answering the question of God's existence and Christianity's truth) became potent arguments for atheism rather than Christianity.

Buckley asserts that a Christianity that denies the relevance of Jesus to the question of God and God's existence (as done by Descartes and Newton) denies itself, terming this "self-alienation."

"Atheism is not the secret of religion, as Feuerbach would have it, but is the secret contradiction within a religion that denies its own abilities to deal cognitively with what is central to its nature."

I present examples from some current science-related apologetics that seem to embrace the self-alienated defense pursued by Descartes and Newton and implicitly deny the relevance of Jesus for answering the question of Christianity's truth. In particular, I examine: 1) the spirit and logic of "The Creation Hypothesis," edited by J. P. Moreland [2], and; 2) the work of Phillip Johnson, focusing on his apparent agreement with atheists (such as Richard Dawkins, and William Provine) that evolution and a materialistic metaphysics are inseparable, an agreement that affirms the logic of the atheists' anti-Christian argument (that evolution by natural selection (if true) implies Christianity is false. I consider also in this context the logic of his argument in "Defeating Darwinism.[3]"

I further suggest in light of this history and some of the close parallels between these works and Buckley's historical examples, that, even if such arguments prove persuasive to the general public, they may ultimately prove counter-productive for the same reasons Newton, Descartes, and later William Paley's "Divine watchmaker" arguments proved counter-productive to Christianity.

Michael J. Buckley, S.J., *At the Origins of Modern Atheism*, (Yale, 1987).
J.P. Moreland, ed., *The Creation Hypothesis: Scientific Evidence for an Intelligent*

Designer, (InterVarsity Press, 1994).

Phillip E. Johnson, *An Easy-To-Understand Guide For Defeating Darwinism by Opening Minds* (InterVarsity, 1997)

Statistical Methods and Human Reasoning

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There are many approaches to statistical reasonings, such as frequentist, Bayesian, or likelihood methods. This talk will explain the correspondence between different approaches with the different types of human reasoning. I will demonstrate the appropriateness of each method in some application settings.

I will also explain the research in biblical textual criticism, biblical authorship, and Christian apologetic claims in statistical terms. This will illustrate the relationship between statistics and human reasoning, and help us to have proper understanding of issues in these areas.

Cultural Resistance to Science: A Survey Study

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Many scientists and science educators are concerned about the public's ambiguous relationship with science and this public includes elementary teachers. Like many citizens, too many elementary teachers find science disconnected from everyday life and thinking. Science is a school subject not an important part of everyday life. Some may believe that science conflicts with important personal beliefs they hold about other areas of life such as religion and art. Elementary teachers who feel this disconnection with science will at best approach science teaching as something one does if school authorities demand it. Given that we are now promoting constructivist approaches to science teaching among teachers who frequently face the challenges of multiculturalism, and in addition the rising challenges to science itself, society's demands of elementary teachers is all the more greater. The demands increasingly require of teachers an engagement with science at a significant level of depth and sophistication. Our research is about developing new insight on the processes of elementary science teacher education and development, and in general the development of the public understanding of science, vis-a-vis social and cultural factors that contribute either to science resistance or affirmation of science. In this paper we report on the development of a quantitative instrument for assessing socio-cultural resistance to, and support for, science that can be employed in efforts to quantitatively document the presence or absence of significant cultural concerns. Of specific interest is the teacher perception of the compatibility of science with religion and morality.

Real Evangelicals Aren't 'Green'? Historical and Theological Roots of Evangelical Ambivalence toward Environmental Concerns

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SUMMARY OF ARTICLE: This article would explore historical and theological influences which have contributed to ambivalent (or at time, hostile) attitudes toward Creation Care among the evangelical community. For example, the controversies concerning evolution and creation, especially since the Scopes Trial in 1925, deflected much scholarly and popular attention away from the biblical concern for stewardship of creation toward issues of origins which are not at the heart of the biblical doctrine of creation. Dispensational eschatologies may have contributed to disinterest in caring for the present world (cf. studies by Finger and others). The major focus of the article would be Christology, arguing that evangelical christologies have ignored the cosmic dimensions of the person and work of Christ, e.g., Christ as the creator, sustainer, and redeemer of the created order (e.g., Col. 1:15-20 and elsewhere), leading to a theological "blindspot" in evangelical environmental awareness of stewardship.

"Darwin's Black Box" or "Behe's Empty Box"

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Michael J. Behe's *Darwin's Black Box: The Biochemical Challenge to Evolution* was published over two years ago and came out in paperback last summer. It has been fawned over by the evangelical community and nearly universally despised by the evolutionary biology community. This paper will review and analyze the various responses to Behe's thesis that "irreducible complexity" at the biochemical level gives a decisive blow to Darwinian evolution. I will show that Behe's claim is fundamentally tautologous: if a Darwinian or even any evolutionary pathway for the origin of some structure can be given, then it by definition is not irreducibly complex. I will also examine in detail Behe's argument that DNA and protein sequence comparisons are irrelevant to his thesis. Finally, I will speculate on some of the reasons for the great disparity between the responses of the two communities mentioned above.

ASA Webmaster Report 1999

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The website of the American Scientific Affiliation is at <http://asa.calvin.edu>. I will review the history of the web site, some of its technical aspects, the content and organization of the web site, and some of the statistics and

patterns of web site usage. The two main areas of content at the ASA web site are 1) papers and book reviews from the Journal of the American Scientific Affiliation (JASA) and *Perspectives on Science and Christian Faith* (PSCF) and 2) resources published elsewhere or published exclusively for the ASA web site. There were 970 visits to the ASA Home Page in November 1998 and 1151 visits in December 1998. The resource paper [Radiometric Dating: A Christian Perspective](#) by Roger C. Wien continues to be the most heavily accessed resource with 748 hits in November 1998 and 778 hits in December 1998. A FileMaker Pro database of articles from *JASA* and *PSCF*, originally developed by Paul Arveson, is also accessible on the web. I will demonstrate the use of this database and discuss ideas for its further development. At the end of the talk I will list some of the future directions of the web site that have been discussed and invite suggestions from those attending the presentation.

The ASA Web Site: Bringing Resources and Commentary on Science and Christianity to a Diverse Audience

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Over the past year there has been serious effort to expand the outreach of our page through the addition of new articles and the arrangement of materials into 15 subject matter fields that reflect ASA member interests. Each category has an introductory statement laying out the field and offers general and specialized articles from a Christian viewpoint plus a bibliography. Links are included to other sources of material. Articles are drawn from *PSCF* (most from the past 10 years), a few from other journals, and some are commissioned for the page.

A strong start has been made on several categories including Environment, History of Science, and World View. A searchable set of book reviews from *PSCF* in the last decade is now available. Materials from the *Newsletter* and a number of other features have been added recently.

A Steering committee made up of the Communication Commission Chair, Webmaster, Web Editor, and other interested ASA members is responsible for the site.

In coming months we will seek to more clearly identify the nature of our user community. While it is safe to assume that we reach Christian students at various levels, Christian teachers, clerics and the church laity, and *others* of all sorts, we need to identify ways to measure our effectiveness in meeting the needs of these diverse interests. We wish to foster a loyal user community that often comes to us for ideas and to see what new features have appeared. This requires constant updating and a sense of *look* and *feel* for the page that will attract interest. We look for volunteers to help us with graphics and short articles that would appeal to younger readers.

Nurturing The Empirical Spirit: A Role for ASA

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For the first half-century of the American Scientific Affiliation, the overwhelming majority of papers presented at ASA meetings dealt with the theological or philosophical issues. Yet the overwhelming majority of ASA members have been practicing scientists rather than professionally equipped theologians or philosophers. In 1992 ASA's Committee for Integrity in Science Education began a five-year experiment intended to encourage more members to present empirical papers at ASA meetings. Each year small cash awards for up to three papers exemplifying what the committee termed "Caring Research" were made, in three categories: Caring for Science; Caring for People; and Caring for Creation (later, Caring for the Earth). One goal was to enrich the ASA meeting program with at least a few papers based on investigations in which empirical data were obtained by the authors. Another was to generate effective publicity for ASA at the national level and for the award-winners and their institutions at the local level. The present paper includes: 1) a "progress report" on the outcomes of that experiment, 2) an argument that nurturing an empirical spirit in the Christian community as a whole would be a worthy role for ASA in the 21st century, and 3) a discussion of possible ways to carry out that role.

High Tech and Holy Touch Today

John W. Hubley, Th.D.
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The objective of this workshop is to establish that any High Tech, which is ethically structured, is a product of the continuing creativity of God, and one exemplary application of computer technology among many is through addressing the societal and spiritual needs of the physically impaired and homebound.

The theological foundation of High Tech is contained in the statement that technology is the continuing work of creation exercised by the Holy Spirit through the human intellect and imagination. A truly significant application of High Tech is in creating Holy Touch through the development of computer-based online communities of support and information that lift up Jesus Christ as Lord, illustrated by Kingdom Online Ministry, Inc. for the physically impaired and homebound throughout the nation.

Papal Insights for Evangelicals: On the Relationship between Science and Theology

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Three papal documents delivered in this century offer valuable insights on how Roman Catholicism views the relationship between science and theology—"Humani Generis" (1950), "Lessons on the Galileo Case" (1992) and "Message to the Pontifical Academy of Sciences on Evolution" (1996). The most notable feature through these documents is the intellectual evolution that occurs in the light of modern science.

In 1950, Pius XII was quite open to the evolution of the human body, but the Biblical text played a significant role in limiting human evolution to monogenism. That is, the notion that all of humanity has descended from a single pair, Adam and Eve. Despite acknowledging the challenge in determining the literary genre of Genesis 1-

11, cosmological concordism was still an important element in this Pope's hermeneutics.

In the 1992 document by Pope John Paul II that became known as "the apology to Galileo," the notion of cosmological concordism was sharply dismissed, at least for matters dealing with astronomy. The reconciliatory tone of the document made it clear that the relationship between science and theology is not only complimentary, but even necessary.

In 1996 John Paul II offer another important contribution to the science-theology dialogue by claiming that the theory of evolution was "more than a hypothesis." He emphasized the great ontological discontinuity between humanity and the rest of the created world. That is, it is clear that the Bible's role involves spiritual or metaphysical concordism. However, no mention is made of monogenism, nor is there any reference to the hermeneutics of Genesis 1-11.

Evangelicals can glean three important insights from these Papal documents. First, Roman Catholicism does not view the relationship between science and theology as warfare. Second, though there is a natural tendency toward cosmological concordism, its dismissal with regard to astronomy should predict a similar fate with biology. Finally, the central thrust of the Holy Spirit inspired revelation in Genesis 1-11 involves non-negotiable spiritual or metaphysical truths; in particular, the reality that we have been created in the precious Image of God.

Clinical Research Testifies to God's Goodness

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Medical research in the last two decades has reached the conclusion that excessive intake of saturated fat is the most significant risk factor for cardiovascular disease, more important than cholesterol, which was previously considered the major culprit. Since 1989, Americans have been urged to consume less fat, and to choose unsaturated or polyunsaturated as a larger portion of total fat intake. Government recommendations for achieving these goals have included trimming the visible fat from meat, restricting quantities of fat-rich foods, and avoiding pork products as well as certain organs of other species. All of these instructions were included in the Old Testament dietary laws, and they have been practiced by Jews for over three millennia. Recent Israeli medical studies have demonstrated better cardiovascular health (judged by serum triglycerides, HDL, LDL and total cholesterol) among observant Jews compared to non-observant Jews. Clinical science is testifying to God's goodness by demonstrating the health benefits that result from obeying His instructions.

Using the Web-based Assessment to Teach: The WebAssign Project an "Just-in-Time-Teaching"

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During the past several years I have written WebAssign, a web-based homework system. I will demonstrate that program and show how it is being used in schools for assessment.

Our marketing hype promises "a convenient and useful way to deliver, collect, grade and record assignments instantly and accurately! Students using WebAssign can receive immediate feedback on their homework and use the service to master information and skills, leading to more competence and better grades. Teachers using WebAssign can free themselves from the drudgery of grading papers and recording scores, resulting in more free time for meeting with students and preparing for class presentations." Versions of this program have been available for over two years, and there are over 500 schools using it worldwide, even in several languages. Student response has been extremely favorable, and new methods are being investigated to provide automated feedback even on essay type responses. Ethical questions arising from developing such a technology have constantly occurred to me and I will reflect on my answers in this talk and ask for your input.

Repeating the Catholic's Galileo Error

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The new science of the Big Bang and the expanding universe presents a challenge to the interpretation of Scripture. This new science describes a universe with an age of at least 10 billion years in contrast to the six days of creation in Genesis.

This confrontation between science and Scripture is not new for Christians. In 1633, Galileo supported the new science of a solar system with a stationary sun. This science was in conflict with an old science with a stationary earth. Before the scientific conflict could be resolved, the Catholic Church condemned Galileo for supporting the new science because it disagreed with Scripture which said that "the earth shall not be moved". The error of the Church was to introduce Scripture into a scientific controversy.

Today, the new science of the Big Bang is opposed by a "creation science" which incorporates the six days of Genesis into its system. Some Evangelicals are asserting that "true" Christians must accept "creation science." Such an assertion is repeating the error of the Catholic Church which introduced Scripture into a scientific controversy. Evangelicals today should wait for the scientists to decide between the truth of the new science and "creation science."

Cross-Based Apologetics for a Scientific Millennium

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The Church must proclaim the gospel in a new millennium which will be increasingly influenced by science. An apologetic which is faithful to the apostolic witness and takes scientific understandings of the world seriously

will be needed.

Christian apologists have often used natural theology arguments. Observation of the world and reason are supposed to show the existence of God and other religious truths as preparation for the gospel. This approach, while sometimes successful, ignores basic problems with independent natural theology noted by Luther, Pascal, Barth, and Torrance.

An approach which is more satisfactory theologically invites people to view reality, including scientific knowledge of the world, from the standpoint of the cross of Jesus, for the Christian claim is that this is God's fundamental self-revelation. This apologetic is in the spirit of Luther's theology of the cross.

A crucified God is not plausible to human reason in the way that arguments such as "design" are. Science has taught us, however, that the test of basic hypotheses should not be their common sense character but their fruitfulness in explaining things. A cross-based approach can deal with aspects of science which create problems for traditional apologetics. The apparent lack of "need" for a creator in some scientific cosmologies and the problem of theodicy raised by evolution through natural selection are two important issues to be discussed.

Evolution and Original Sin

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Mankind has a sublime and tragic desire for knowlege. The results of knowlege and civilization are represented in the myths of Eden, Gilgamesh, and Prometheus. The transition from life in small tribes of hunter-gatherers towards living in farms and cities had a great psychological cost. Cain is the first farmer, and later the first city builder, according to Jewish legends. Technical knowlege brought security and long life at the expense of freedom and personal intimacy.

"Original sin" is the result of the "fall," an event in the prehistoric past. Anthropologically, the fall was the rapid growth of technology and civilization after the evolution of human psychology in a biological environment.

Eden represents the situation of pre-historic men, living in the biological and social environment that their bodies and emotions had evolved for. Though fraught with physical risks, it was a highly comprehensible and intimate life. The fall from "paradise" was caused by the aquisition of agricultural knowlege and written language. This knowlege made possible the city state of Mesopotamia, with its dense population, impersonal cities, extremes of wealth and poverty, and professional military.

"Original sin" means that man's evolved psychology is in strife with his urban lifestyle. Some traits, which gave a survival advantage to prehistoric man, are destructive in a modern society: excessive desire for sex, caloric food, and material property.

The biological and mythical perspectives of human history combine to show the full meaning of fall, original sin, and civilization.

Development and a Caring Attitude

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This paper inquires into the logical characteristics of the term 'development.' 'Development' is frequently used as an empirical/scientific term. Presupposing certain physical/physiological structures in the human being, a child psychologist, for example, talks of stages of child development. This is 'development' in its unfolding sense. Similarly, development projects, say those in Third World countries, are taken to be empirical/technical in nature. Problems that arise out of them are dealt with empirically, perhaps one of technique or a miscalculation of means-end relationship. There is an empirical/scientific aspect to 'development' but it is not all there is to it.

I will show and argue that 'development' is basically a moral or an ethical term (using both terms interchangeably in this paper). Its end-state is an expression of a value. If so, what values should inform the end-state of development? If consequences are brought about by developmental activities, then moral value questions, for example, "what ends do these projects fulfill?" or "who is served by these projects?" must be central to its deliverations. Obscuring moral value aspects of development has allowed developmental projects, especially those in Third World Countries, to carry on regardless of consequences, whether or not they are harmful, respectful of rights of people to self-determination, or unjust. Or, it could be that developmental projects are informed solely by economic/business/profit values. To view 'development' solely in its empirical/scientific aspect could lead to some ethical/moral questions.

The above does not suggest that Christians, therefore, ought to cease altogether from their activities, for fear of contaminating planet earth or tampering with the animals' capacity for independent life and their awareness of it. But that in being aware of moral/ethical aspects of development, one could be observing of its wide ranging consequences not only on the quality of human lives but of all living entities of the earth. Whether a Christian tends to favour developmentalists or environmentalists, or whatever one does, the one necessary criterion that must be employed in one's activities is the one criterion that God Himself employed to judge His creation, namely, "And God saw that it was good."

My paper presents a brief explication on what God's judgment could possibly mean and argues for a case of development which, at the same time, expresses a caring attitude toward our environment. Concepts related to development, for example, sustainable development, will also be explored.

Symposium: Detecting Design In Creation

Sponsored by the
Science Education Commission

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The Psalmist asserts that "he heavens declare the glory of God and the firmament displays his handiwork." ASA members agree with the Psalmist that there is a God who has created the universe. A difference of opinion exists, however, concerning how this creation proceeded. Some might say that God created through a gradual process with no apparent special intervention. Others might believe that God intervened to add new information at certain stages in the historical development of the universe. It might even appear to outsiders who did not understand the capacity of the ASA to assimilate a wide diversity of opinions, that the ASA was divided on the issue of origins.

It is evident, however, that ASA members agree that God designed the universe. This should be the common ground upon which all ASA members can unite. Whether the empirical data eventually demonstrated that information was added directly or indirectly should not be the major issue. The major issue, rather, should focus on the significant differences existing between those who believe creation is the result of an Intelligent Designer, and those who do not believe God was in any way involved in the formation of the universe.

In recent years, a growing number of scientists have become increasingly aware that certain biological organisms display distinctive hallmarks of intelligent design. Recent publications include *Darwin's Black Box* by Michael Behe, *The Creation Hypothesis: Scientific Evidence for an Intelligent Designer* edited by J. P. Morland, *The Design Inference* by William Dembski, *Mere Creation: Science, Faith and Intelligent Design* edited by William Dembski, *Of Pandas and People* by Percival Davis and Dean Kenyon, and *On Common Descent* by Paul Nelson.

The symposium will focus on the growing amount of empirical data which supports the view that the universe was intelligently designed and will examine the explanatory power of Intelligent Design Theory across a broad range of disciplines. Presenters will discuss recent developments from cosmology, biochemistry, molecular biology, embryology, paleontology, and information theory that make possible scientifically-based reformulations of the design hypothesis.

Throughout these discussions particular attention will be given to the principle known as "methodical naturalism" and the extent to which it is, or ought to be, normative for all scientific investigation. Areas where additional empirical information is needed will be emphasized.

Detecting in Design Creation Symposium Abstracts

William Dembski will explain the theoretical basis for the Intelligent Design Theory. He will explicate his two notions of small probability and specification as they have been developed in his ground-breaking book *The Design Inference*. He will also relate these notions to concepts from classical information theory. Dembski will provide the foundational theoretical basis for detecting intelligent design, upon which subsequent evidential arguments will build.

William Lane Craig will make the first application of design theory by discussing the evidence of Design in physics of the so-called anthropic fine-tuning. Craig will show why the theistic design hypothesis is a better explanation for the fine-tuning than any of the current naturalistic competitors, including especially the much touted many-worlds hypothesis.

Charles Thaxton will summarize the critique and presentation of the design argument he, Walter Bradley, and Roger Olsen made in the epilogue of the ground-breaking book *The Mystery of Life's Origin* (Philosophical Library 1984). He will review how it developed in years since.

Dean Kenyon or **Gordon Mills** will critique perhaps the most popular scenario for the origin of life, the so-called RNA World. The RNA World hypothesis asserts that life began initially with self-replicating RNA molecules that acted both as information-carrying templates and as catalysts for a broad range of reactions. Kenyon and Mills will present a multi-faceted critique of this hypothesis by discussing the RNA World and its proposed explanation of sequence specificity and the origin of biological information. Mills will also discuss recent problems that have arisen regarding the origin of multiple genetic codes.

Scott Minnich expands on Michael Behe's critique of Darwinism in his widely-publicized book, *Darwin's Black Box*. Behe argues that the intricate "irreducible complexity" of the living cell (specifically of molecular motors within the cell) cannot be accounted for by Darwinian chance and natural selection. Minnich strengthens Behe's argument by asserting that not only are the molecular motors irreducibly complex, but so are the genetic instructions for their manufacturing.

John Wiester and **Paul Nelson**, having returned from the Origin of Body Plans Conference in western China will update ASA members on the status of discussion of the Cambrian explosion. In the first part of the presentation, Wiester will argue that the date from the Chengjiang find in China reinforces the decidedly non-Darwinian character of the Cambrian explosion. Wiester will also explain why the Chinese fossils now

undermine the various versions of the Artifact Hypothesis which attempt to explain away the Cambrian explosion as a result of an incomplete fossil record. Nelson will add to this presentation by discussing the challenge that data from the Cambrian Explosion pose to the neo-Darwinian mechanism. Nelson will also discuss new evidence from developmental biology in relation to the origin of novel body plans.

Jeff Schloss will provide a critique of the neo-Darwinian account of morality and altruism. He will show how neo-Darwinists have typically sought to explain these phenomena, and explore the relationship between this explanation and the traditional theistic accounts of the origin and nature of morality.

Using Science to Help the Poor: Several Practical Examples

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The quality of our lives is immeasurably greater because of science and technology. However, nearly all of those benefits are ours because either the government or we pay money for them (medicines, textiles, transportation, air-conditioning etc.) What would science look like if the goal were that its benefits would be readily available to the impoverished people of the world who can spend nothing to enjoy them? God has placed many resources that can help the poor if we study His creation with them in mind. This talk will mention several examples:

How bean beetles that normally ruin stored beans can be eliminated by rotating the bag twice a day for two weeks. How farmers can readily make their own insecticide from the tephrosia plant, and apply it even if they cannot afford a backpack sprayer. A tree whose leaves can be used to restore malnourished infants to health and help their mothers regain ability to nurse, or that can replace corn as a pig feed, and whose seeds can purify water. How a technique in West Africa uses termites to increase the yield of grain. How a few sprouted grains can make thick, starchy weaning foods more palatable to infants. How a tropical vine can double the yield of corn and produce seeds that will help control Parkinson's disease.

Giving Sight to the Blind

Poster

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Because bats are so obviously successful at utilizing reflected ultrasonic sound for navigation, many inventors have sought to use ultrasonics in their designs of electronic aids for the blind. One device that is on the market, the "Mowat Sensor", uses ultrasound to judge distance, and then vibrates with a greater intensity corresponding to a closer proximity. Another device beeps with a frequency that is higher for a closer proximity. That neither is popular is evident from that fact that you never see the blind using them.

I am developing a device that more faithfully mimics the manner of echolocation in bats. The device emits a signal identical to that the bats make, receives the echoes, and immediately slows down the waveform to present it in headphones in the human audible range. Distance is encoded as the time of sound travel to and from the object, just as for the bat. Azimuth is encoded by interaural intensity, just as for the bat. Greater size of an object, and closer proximity both make the echo louder, just as for the bat.

The device is not difficult to build with today's available electronics. It remains to be seen if this device, which can present to humans that which only bats could previously hear, gives humans the capacity to perceive the environment as does the bat.

Attitudes about Origins: Searching for Appropriate Humility and Accurate Communication

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In the controversial area of origins, it is easy to get carried away by our natural inclinations to build and maintain an "us versus them" attitude, and to make "winning the debate" our main goal. In the long run, however, other approaches may be more productive. Of course, we should aim for an appropriate humility that avoids the errors of two unhealthy extremes—an arrogant overconfidence that claims too much empirical/logical support for a theory about science or theology, and a timidly cautious relativism that refuses to take any position or claim any support. But whether the degree of support being claimed is high or low, we can try to respect the rationality of other people, especially fellow believers, by assuming that they may have good reasons (both intellectual and ethical) for adopting other positions, and by trying to understand these reasons, and the positions, and the people. If our empathetic attitudes and understandings are genuine, we should notice a concrete manifestation in the form of improved communication. A good way to show our respect for other people, in a way that is personally and intellectually meaningful, is to describe their ideas with precision and accuracy, by thoroughly examining their ideas and by carefully choosing our words. My talk will outline some problems and potential solutions, will question the usefulness of commonly used terms such as "God of the Gaps" and "naturalism," and will try to stimulate a productive discussion about humility and communication.

Calculating the Probabilities of Creation and Evolution

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Theistic evolution is a denigrated minority view among evangelicals, though commonly espoused in Catholic and liberal Protestant circles. In contrast, recent creationism is the sole theory held by fundamentalists and Adventists, and is so common among evangelicals as to be the majority view in some political subdivisions. It, along with day-age and gap theories, are, or have been, the views almost universally accepted among evangelicals during this century. All three views involve sequential miracles, numerous separate creative acts. Their popularity seems to have produced the assumption that positing a Creator makes evolution unlikely (microevolution excepted), even if all empirical data are included. This paper considers some of the ramifications of this claim. On theological grounds, it excludes the notion that fossils, such as whales with legs and the multitudes of extinct animals and plants, can be a deity's preliminary designs for the more successful survivors. On philosophical grounds, it concludes that the popular views are less likely than two excluded by empirical considerations. Other empirical considerations, such as the genetic code and numerous control sequences that even cross phylum boundaries, produce problems with all sequential-creation views. The final conclusion is that the Creator-evolution combination is most probable.

God's Love and the Laws of Physics

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After briefly reviewing how twentieth century physics has significantly altered notions of determinism and divine agency, I address questions of the ontological and regulative status of the laws of physics. I discuss how God's love for the cosmos could be connected with the Scriptural concept of kenosis (God emptying Himself) via the divine fiat "Let there be..." occurring in Genesis 1. The blurring between fundamental particles and laws governing them, which is made evident in quantum field theory, proves helpful in developing this understanding. (Research supported in part by The Pew Charitable Trusts.)

Collision of Values in Siting New Manufacturing Facilities

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Students of business, manufacturing engineering, and industrial engineering are taught about the importance of site selection for new production facilities from a competitiveness perspective; but social and environmental impacts per se of these economics-based decisions are not included in the criteria. Often the new location is an ecologically or agriculturally productive area, and the former site becomes a brownfield candidate. Thus site selection is inherently coupled to wider issues of urban vitality, land use, greenfield loss, and economic world views.

Cities are efficient organizational forms for human enterprise, and thus will become essential as population grows. The two-thirds world cannot aspire to a ten-fold increase in per capita petroleum consumption to achieve Western lifestyles; there will be neither space nor petroleum for all to live in low-density suburbs or rural areas. However, high population density need not equate to grimness: creative planning can mold variety and diversity into vibrant human habitat. Reversing the present momentum of land use will require public/private cooperative programs and, more importantly, will require a major change in present paradigms of development, together with the worldviews that underpin them. A systems-level approach is urged as a means to assure that all the variables, including those that are worldview-dependent, get identified and weighted during the decision process. The approach augurs for cooperative action of the public and private sectors to stem and reverse the trend toward urban decline and greenfield loss.

Are There Gaps In The Creation's Formational Economy?

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From the perspective of the historic Christian doctrine of creation, to be a 'creature' is to be a member of the Creation that has been given being by the Creator-God of whom the Scriptures attest. The being of a creature is in part defined by a set of capabilities for action and interaction. Some of these capabilities, especially those which enable creaturely systems to self-organize and/or transform, contribute to 'the Creation's formational economy.'

Within the Christian community there are vastly differing concepts regarding the extend to which the Creation's formational economy can account for the assembly of basic material units into the full array of physical structures and life forms over time. Is the formational economy of the Creation sufficiently robust to make possible the evolutionary formation of all life forms, or are there gaps (missing capabilities) that had to be bridged by occasional divine acts of 'special creation' or of 'intelligent design?'

In its strident form, the rhetorical challenge directed at Christians by proponents of a naturalistic worldview could be stated, If there are no gaps in the formational economy of the universe, then what need is there for a Creator? Differing Christian responses to this rhetorical challenge, along with their attendant apologetic strategies, will be evaluated.

Genetic Transilience a Model of Human Origins?

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A review of the large number of recent investigations into the diversity of the human genome supports the concept that the human species is unique among primates in its population structure. In some cases, it has very low diversity, and in other cases, it has high diversity. This pattern has significant implications if one proposes a speciation mechanism, and also for evaluating the date of such a speciation event. Alan Templeton has proposed a speciation model which he termed genetic-transilience which might produce the sort of pattern seen in the human data. If this model were proposed for human speciation, it could have theologically significant implications.

Declaring the Glory and Goodness of God Through Astronomy

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Recent astronomical discoveries provide a wonderful platform for proclaiming God's care and continual creativity in the universe. I will present some of the latest discoveries from a variety of telescopes, demonstrating three ways astronomy can serve both the Church and the public.

1) Astronomy can be used to show the awesome age of the universe, without delving into the theological

complexities and controversies of biological evolution. I will present simple arguments from astrophysical calculations which point to a universe several billion years ago. I will also compare recent observations of very distant galaxies, which appear to be disrupted and merging, with galaxies nearer to us in space and time, showing how galaxies have changed over time.

2) Astronomy shows that Creation is an ongoing process. In particular, my own research concerns current star formation on our Galaxy. I will show the latest images from radio telescopes and the Hubble Space Telescope of young "proto-stars", and the spectacular outflows of gas that emanate from their poles. As God "created all the stars" (Genesis 1:16), He provided for their continual birth!

3) Astronomy is a process of continual discovery of things not created or altered by human hands. Since most matter in the Heavens is beyond our reach, we can only observe and be amazed by the Creator's creativity. I will present some of the latest discoveries, including at least 17 planets now discovered outside of our own solar system. If time permits, I will mention some of the deep Christian convictions which have inspired astronomical discoveries throughout the ages (Kepler, etc.).

Astrology in the Ancient World

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The ancient Sumerians, the world's first literate civilization in Mesopotamia (Iraq), regarded the sun, moon, and five planets as gods. The cuneiform sign for the star (dingir) became the prefix for divine names. The later Babylonians made careful observations of the heliacal rising of Venus from the Old Babylonian period (early second millennium B.C.).

The names given to the planets were later transmitted to the Greeks and then to the Romans, for example, the planet Inanna (Sumerian), became known as Ishtar (the Babylonian goddess of love), then Aphrodite among the Greeks and Venus among the Romans.

Astrology, as we know it today, depended upon the discovery of the Zodiacal constellations, at the earliest c. 700 BC. The first known horoscopes date only from 400 BC. Astrological texts are now known from the Dead Sea Scrolls. The Magi who brought gifts to Bethlehem were astrologers. Astrology became so widely accepted in the Hellenistic/Roman world that the later Byzantine synagogues in Israel displayed the zodiac on their mosaic floors.

Proposal of a Recent Change in the Dynamic of Human Evolution That Complements Genesis Primeval History

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Three formats of language have been practiced in human evolutionary history. First, language capabilities evolved within the format of hand alone talk during the evolution of the Homo genus. Third, speech alone talk is the primary format of language in complex society and civilization. It is here proposed that the second format, hand speech talk, was the cultural product of adding speech talk to hand alone talk in the speciation of Homo sapiens, was practiced through the Paleolithic and Early Neolithic, and gave way to speech alone talk prior to the emergence of complex society in the Developed Neolithic. Speech alone talk was adopted as a technical innovation by band level societies that were unaware of the long term consequences of that adoption. The experiential qualities of hand speech talk and speech alone talk differ. Each format of language engenders a unique Lebenswelt (total anthropological experience). The difference supports the hypothesis that the formation of complex society was potentiated by a unique cultural transition, from hand speech to speech alone talk, that changed the dynamics of human evolution. The natural {local/global} association of {Ubaid adopts speech alone talk and becomes the first complex society/universal change in Lebenswelt as band level societies adopt speech alone} complements the Biblical association of {Genesis 2-4 / Romans 5:12-14}.

Symposium
Sponsored by the
Environmental and Global Resources Commission

The Environmental Technology of Jaguar Creek: A Case Study

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Jaguar Creek is an Environmental Research and Education Center located in Belize, Central America, and operated by Target Earth International (TEI) (formerly known as the Christian Environmental Association). The facility is located on 10 acres of sub-tropical rain forest adjacent to thousands of acres of virgin rain forest that is protected by TEI's Eden Conservancy Program. The facility is used to host college students for up to four months, professors, guest lecturers, scientists, short-term volunteer teams, and other guests. *Jaguar Creek* accommodates up to 40 people in facilities totaling nearly 10,000 square feet.

Due to its remote location and pristine environment, *Jaguar Creek* presented a unique opportunity to design and construct an "off-the-grid" facility which models the use of state-of-the-art environmental technology and demonstrates good stewardship of God's creation. The concept of "independent living" was the basis for all of the infrastructure design decisions that led to the selection of the various technologies described in this case study. These technologies were thoroughly researched and final equipment selections were based on long-term environmental impacts, reliability, and ability to preserve the ambiance of the rain forest setting.

This case study describes the facilities and various technologies utilized at *Jaguar Creek* including:

- Solar power system
- Lighting and fans
- Refrigeration system

- Domestic water system
- Hot water system
- Wastewater system

The theoretical and practical problems associated with the design and construction of this facility are explored and its operational history is reviewed.

Symposium

Stewardship of the Eden Conservancy: Belize, Central America

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This paper presents the preliminary mapping and biological inventory of the Eden Conservancy, Belize, Central America conducted during January, 1999.

The 8000 acre tract referred to as the Eden Conservancy is being purchased by Target Earth, International (formally the Christian Environmental Association) with plans to transfer the title to the Belize Audubon Society as a major addition to Blue Hole National Park. The property represents an important stewardship effort by the Christian community. The mature rainforest of the Eden Conservancy covers a landscape of karst topography with steep ridges and deep valleys.

It is known to harbor large vertebrate predators (Jaguar and Puma) and has a high potential to yield new species of plants and insects. Eden Conservancy serves as a vital biological corridor linking the present Blue Hole National Park and the forest reserves to the south. The protection of this critical habitat will assure that the Lord's blessing of fruitfulness and reproduction for its creatures may continue.

The initial biological inventory documented the presence of four species of amphibians, 12 species of reptiles, 16 species of mammals, and 140 species of birds. A significant collection of insects was also returned to the U.S. for identification. Midway through the biological inventory, a large-scale illegal logging operation was discovered within Eden Conservancy. After working with government officials to shut down the logging operation, the research team shifted their focus to evaluate the environmental impact of the logging operation.

Collision of Values in Siting New Manufacturing Facilities

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Students of business, manufacturing engineering, and industrial engineering are taught about the importance of site selection for new production facilities from a competitiveness perspective; but social and environmental impacts per se of these economics-based decisions are not included in the criteria. Often the new location is an ecologically or agriculturally productive area, and the former site becomes a brownfield candidate. Thus site selection is inherently coupled to wider issues of urban vitality, land use, greenfield loss, and economic world views.

Cities are efficient organizational forms for human enterprise, and thus will become essential as population grows. The two-thirds world cannot aspire to a ten-fold increase in per capita petroleum consumption to achieve Western lifestyles; there will be neither space nor petroleum for all to live in low-density suburbs or rural areas. However, high population density need not equate to grimness: creative planning can mold variety and diversity into vibrant human habitat. Reversing the present momentum of land use will require public/ private cooperative programs and, more importantly, will require a major change in present paradigms of development, together with the worldviews that underpin them. A systems-level approach is urged as a means to assure that all the variables, including those that are worldview-dependent, get identified and weighted during the decision process. The approach augurs for cooperative action of the public and private sectors to stem and reverse the trend toward urban decline and greenfield loss.

Meeting the Needs of 2B People, Off-Grid, Using the Renewable Option or, Renewables for Sustainable Rural/Remote Site Power

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It is estimated that two billion people live without electricity and its services, worldwide. The National Renewable Energy Laboratory (NREL) in Golden CO, initiated a program that involves small wind/solar/diesel hybrid systems, to address these potential electricity opportunities in the rural communities. The paper describes the multi-disciplinary, multi-technology and multi-application aspects of these hybrid systems. At present, 13 countries are actively engaged in hybrid rural systems and another dozen countries have requested assistance in installing such systems. Case studies of several such systems will be presented, with emphasis on technological, economical and institutional issues inherent in the success of hybrid systems. Successful deployment of such systems worldwide, will have a significant effect in reducing (a) power generation costs, (2)the greenhouse gas emission levels in third world countries.

The Christian Environmental Professional: Oxymoron or Avatar?

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What is a Christian environmental professional? That question recently has animated discussions among Christians across North America. Some professionals accept the title as a self-evident expression and outworking of their faith commitment. Others reject it resisting the notion that Christians should be concerned about environmental problems. So, who is right?

It is time to change the terms in the debate over the environment. We need to find a renewed understanding of creation and redemption that is faithful to both the Biblical witness and to nature's voice. Evangelicals in general, and the ASA in particular, have a unique evangelistic opportunity here.

The basis of stewardship of the earth is the incarnation, death, and resurrection of God in Jesus Christ. We are at our strength when we act out of this theology. From it we have something genuine to contribute to the environmental debates of our day. Without it, we will miss the opportunity to speak to this generation.

Secular scientists opened this decade with a call for the religious community to join them in efforts to care for the earth. In the past year the leaders of the major US scientific societies (NSF, AAAS, and NAS) have called for a new, interdisciplinary global science of the earth focused on the policy implications of biocomplexity. The ASA mission commits us to providing advice to Church and society on science and technology while preserving the integrity of God's creation. To do this we need to begin to see ourselves as Christian environmental professionals.