

PERSPECTIVES on Science and Christian Faith

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

In This Issue ...

Noah's Ark near Dogubayazit, Turkey?

Science, the Bible, and Human Anatomy

Reading Genesis

Something Unintended: One Experience of Science
and Vocation

*"The fear of the Lord
is the beginning of Wisdom."*

Psalm 111:10

VOLUME 68, NUMBER 4

DECEMBER 2016

Editor-in-Chief

JAMES C. PETERSON (Roanoke College and
Virginia Tech Carilion School of Medicine)
221 College Lane
Salem, VA 24153
jpeterson@roanoke.edu

Book Reviews

PATRICK FRANKLIN (Providence
Theological Seminary), Editor
10 College Crescent
Otterburne, MB R0A 1G0
patrick.franklin@prov.ca

Subject Area Editors

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

SARA SYBESMA TOLSMAN (Northwestern College)
101 7th St SW
Orange City, IA 51041
stolsma@nwcwiowa.edu

HEATHER LOOY (The King's University)
9125 - 50th Street
Edmonton, AB T6B 2H3
heather.looy@kingsu.ca

DEREK SCHUURMAN (Redeemer University College)
777 Garner Rd E
Ancaster, ON L9K 1J4
dschuurman@cs.redeemer.ca

Editorial Board

ROBERT BISHOP, *Wheaton College*
DOROTHY BOORSE, *Gordon College*
WALTER L. BRADLEY, *Baylor University*
STEPHEN M. CONTAKES, *Westmont College*
EDWARD B. DAVIS, *Messiah College*
OWEN GINGERICH, *Harvard-Smithsonian Center
for Astrophysics*
STEVEN G. HALL, *North Carolina State University*
RANDALL D. ISAAC, *American Scientific Affiliation*
D. GARETH JONES, *University of Otago*
ROBERT KAITA, *Princeton University*
TREMPER LONGMAN III, *Westmont College*
KERI MCFARLANE, *The King's University*
KEITH B. MILLER, *Kansas State University*
GEORGE L. MURPHY, *Trinity Lutheran Seminary*
ALAN G. PADGETT, *Luther Seminary*
ROSALIND PICARD, *Massachusetts Institute of
Technology*
ANGELA SABATES, *Bethel University*
RALPH STEARLEY, *Calvin College*
JUDITH A. TORONCHUK, *Trinity Western University*
DAVID L. WILCOX, *Eastern University*

Managing Editor

LYN BERG (American Scientific Affiliation)
218 Boston Street, Suite 208
Topsfield, MA 01983
lyn@asa3.org

Manuscript Editor

ESTHER MARTIN

Perspectives on Science and Christian Faith
(USPS 28-3740, ISSN 0892-2675) is published
quarterly by American Scientific Affiliation, 218 Boston
Street Suite 208, Topsfield, MA 01983. Periodicals
postage paid at Topsfield, MA, and additional mailing
office. POSTMASTER: Send address changes
to: Perspectives on Science and Christian Faith,
218 Boston Street Suite 208, Topsfield, MA 01983.

Manuscript Guidelines

The pages of *Perspectives on Science and Christian Faith (PSCF)* are open to original, unpublished contributions that interact with science and Christian faith in a manner consistent with scientific and theological integrity. A brief description of standards for publication in *PSCF* can be found in the lead editorial of the December 2013 issue. This is available at www.asa3.org under publications → PSCF → index. Published papers do not reflect any official position of the American Scientific Affiliation.

1. Submit all manuscripts to: **James C. Peterson, Editor, Roanoke College, 221 College Lane, Salem, VA 24153.** E-mail: jpeterson@roanoke.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 considered for publication.
3. Use endnotes for all references. Each note must have a unique number. Follow *The Chicago Manual of Style* (16th ed., sections 14.1 to 14.317).
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 PDF format). Figure captions should be provided as a list at the end of the manuscript text.

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 8,000 words in length**, excluding endnotes. An abstract of 50–150 words is required and should be in both the text of the email submission and at the beginning of the attached essay. 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.

BOOK REVIEWS serve both to alert readers to new books that appear significant and to engage these books in critical interaction. When a subject area editor selects a book for review, the book is then offered to a scholar with the best match in expertise. ASA/CSCA members who would like to be considered as potential reviewers are welcome to express interest to the book review coordinating editor for inclusion in the reviewer database. Publishers may also contact the book review coordinating editor if they are not sure which subject area reviewer would best consider a particular book.

- **Patrick Franklin** (patrick.franklin@prov.ca): book review editor; subject areas: ethics, philosophy, and theology.
- **Arie Leegwater** (leeg@calvin.edu): cosmology, history of science, mathematics, and physical sciences.
- **Sara Sybesma Tolsma** (stolsma@nwcwiowa.edu): biology, environment, genetics, and origins.
- **Heather Looy** (heather.looy@kingsu.ca): anthropology, neurology, psychology, and sociology.
- **Derek Schuurman** (dschuurman@cs.redeemer.ca): computers, engineering, and technology.

The viewpoints expressed in the books reviewed, and in the reviews themselves, are those of the authors and reviewers respectively, and do not reflect an official position of the ASA.

LETTERS to the Editor concerning *PSCF* content may be published unless marked not for publication. Letters submitted for publication **must not be longer than 700 words** and will be subject to editorial review. Letters are to be submitted as electronic copies. Letters accepted for publication will be published within 6 months.

ADVERTISING is accepted in *PSCF*, subject to editorial approval. Please address inquiries for rates or further information to the Managing Editor. The ASA cannot take responsibility for any orders placed with advertisers in *PSCF* and does not imply endorsement by carrying the ad.

AUTHORIZATION TO PHOTOCOPY MATERIAL for internal, personal, or educational classroom use, or the internal or personal use of specific clients, is granted by ASA, ISSN: 0892-2675, provided that the appropriate fee is paid directly to Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923 USA for conventional use, or check CCC online at the following address: www.copyright.com/. No registration with CCC is needed: simply identify the article being copied, the number of copies, and the journal title (*Perspectives on Science and Christian Faith*). For those who wish to request permission for other kinds of copying or reprinting, kindly write to the Managing Editor.



James C. Peterson

Live and Learn

It is a standard phrase that “we live and learn.” Indeed, it is usually in that order. I often take solace in saying to myself, “Well, at least I will not need to make *that* mistake again.” Been there. Done that. Time to go on to new mistakes. Anyone successful in scientific research, experiences such many times.

We see a willingness to change an approach and interpret things in a new way, several times in this issue of *PSCF*. It is characteristic of genuine improvement. There is no intellectual growth when we only understand exactly as we did years before. Even the most important truths that we hold should gain nuance and application. David Barnard, President of the University of Manitoba, writes of this in his communication. It is in looking back that Barnard can now see our Lord’s plan and work, whereas he was not always aware of it at the time. Hindsight might not be twenty/twenty, but a person can see now more than he or she could before. Such is reminiscent of the repeated pattern of the Psalmist who dwells on how God has provided before, to encourage trust for his now-tested present and for a hopeful future.

Robert Branson raises a test case for the idea that God chooses to assure the scientific accuracy of every statement in scripture. He looks in particular at multiple biblical references to the functions of particular human organs. There he finds, for example, the heart thinking and the kidneys as the source of our emotions. He notes that if God did not preserve the authors from mistaking what the human heart and kidneys actually do, why think that God guarantees other assumptions about the workings of physical creation? The texts are teaching crucial truths about God and God’s work in and through us, not physiology. Branson calls for some interpreters to adjust the expectations that they bring to the text.

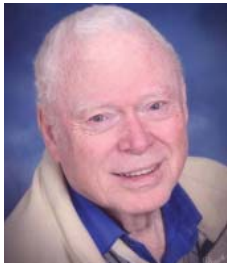
Roy Clouser begins his article by affirming part of what he wrote in *PSCF* in 1991, but just as clearly

rescinds a position that he advocated then. He thinks that he allowed the Augustinian tradition of interpreting the second chapter of Genesis as a second account of creation, to blind him to how the text actually reads. Clouser now sees Genesis 2 as a recounting of Adam and Eve receiving the breath of God in relationship with God—that is, Adam and Eve were the first fully human beings. They are presented as the start of the story of responsibility and redemption, the first covenant people of God, and not as the first anatomical *Homo sapiens sapiens*.

In his article, geologist Lorence Collins explains why a formation on Mount Ararat that is celebrated to this day by some as the petrified remains of the wood of Noah’s ark, is not the ark. While he would be happy to find remains from Noah’s ark, this site is a routine volcanic flow. Later in this issue, Collins recounts, in his letter to the editor, that David Fasold, who first brought this formation to his attention, spent his savings and mortgaged his house to spread the news that these rocks were what was left of Noah’s ark. But when convinced by further investigation that they were not petrified wood after all, Fasold withdrew his own book that was gaining substantial royalties. Fasold pursued the truth and was willing to change his mind, even at great financial cost.

There is a cost to testing and developing one’s understanding. It can be psychologically disorienting. It can trigger censure from those who liked former agreements better. The demands incurred by a paradigm shift often require the coming of a new generation that is not so invested in the former approach. But rather than waiting for generations to come, our generation would do better to emulate the Bereans in Acts 17:11. They received words with all readiness of mind and searched the scriptures daily to see what was so. ☆

James C. Peterson, *editor-in-chief*



Lorence G. Collins

Article

Noah's Ark near Dogubayazit, Turkey?

Lorence G. Collins

Books and DVDs are still being sold, and websites claim, that a boat-shaped structure in the Dogubayazit area of eastern Turkey is what remains of Noah's ark. The formation is described as being composed of petrified wood, with iron washers, rivets, and brackets that held the ark walls together, and anchor stones that served to stabilize the ark. While remains of Noah's ark could conceivably be found at another site, more careful examination of this particular formation shows that (a) the "petrified wood" is actually basalt; (b) the supposed iron washers, rivets, and brackets are cemented grains of magnetite containing manganese and titanium; and (c) the stones labeled as "anchors" naturally occur in the area. Initial findings to this effect were noted by this author in the Journal of Geosciences Education 44 (1996): 439–44. Considering ongoing claims for the Dogubayazit formation, this article more thoroughly describes the geology with additional argument, figures, and information.

In eastern Turkey, 27 kilometers southwest of Mt. Ararat (fig. 1A), is a rock structure that some interpret to be the fossilized remains of Noah's ark. It occurs near Dogubayazit, east of the village of Nasar and north of the Turkey-Iran border. A map of this structure is shown in figure 1B and is illustrated in figure 1C.

This "Noah's ark" site in eastern Turkey was investigated in the 1970s and 1980s by Ron Wyatt, David Fasold, and John Baumgardner. Salih Bayraktutan, a geologist from the Atatürk University in Turkey, acted as a guide and host for the Turkish government during these studies. In the early 1970s, previous investigators dynamited the side of the ark site to look for petrified wood and found none. They decided that this site was a natural geologic structure.¹ Ian Plimer, a professor of mining geology from the University of Melbourne in Australia, also examined the ark site one summer in 1994 with

David Fasold. The belief persists that this site contains the fossilized remains of Noah's ark.² The claims for that judgment are discussed first in this article, and then followed by a scientific evaluation.

The Formation Interpreted as the Remains of Noah's Ark

Different kinds of evidence have been used to support the interpretation that this formation is the fossilized remains of Noah's ark. Its length is 515 feet (157 meters), which circumstantially is the same length as 300 Egyptian cubits and the same dimensions as given by Genesis 6:15 for the ark.³ Noah's ark is described as landing in the mountains of Ararat (Gen. 8:4) and after landing there, the conjecture is that it eventually slid down to its present position where its supposed ribs (gunnels) were exposed following an earthquake and landslide.⁴

Evidence for the ark's sliding down from a higher elevation is said to be the presence of manganese-rich rocks (interpreted as ballast) from the distant mountains.⁵

Lorence G. Collins is a retired professor of geology from California State University Northridge with specialties in mineralogy and petrology. He resides in Thousand Oaks, California, and attends the United Methodist Church. He can be contacted at lorencec@sysmatrix.net.

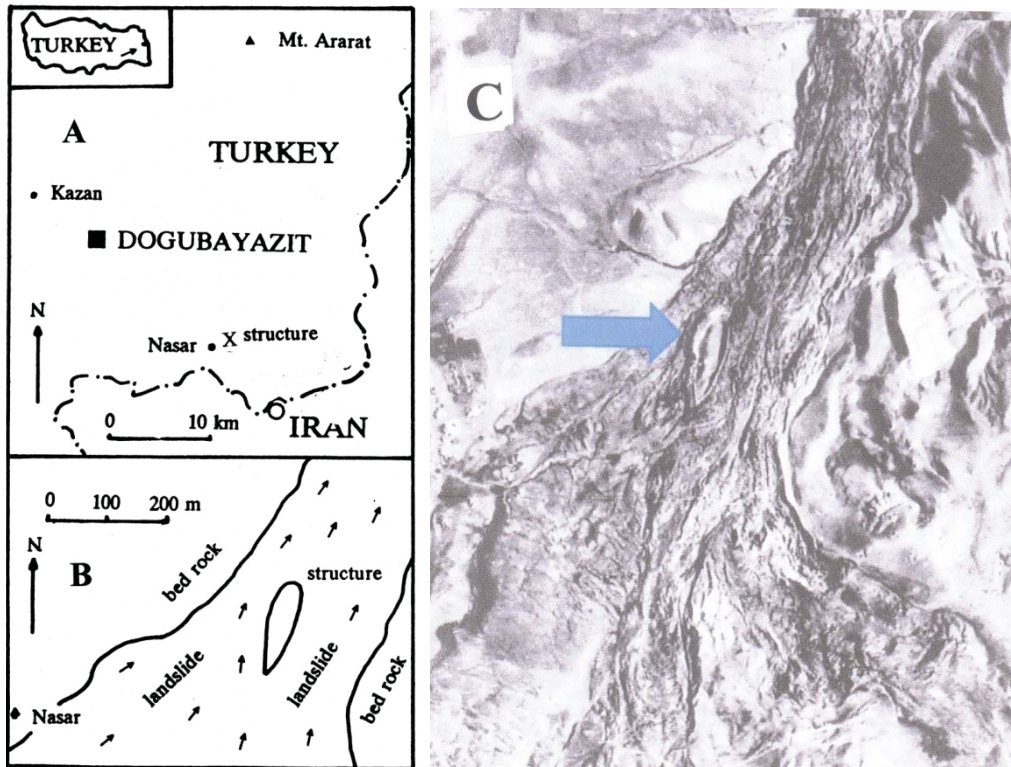


Figure 1A: Map showing location of ark-structure "X"—east of Nasar and north of the Turkey-Iran border. Symbol "O" is Mt. Judi.

Figure 1B: Map of part of what is shown in Figure 1C. Arrows point in the direction of the landslide from mountains in the vicinity of Mt. Judi.

Figure 1C: Aerial view of area in Turkey where the elongate, elliptical, ark-shaped structure is located (near center, arrow). Landslide debris is shown which came down from the slopes of Mt. Judi (from bottom to top of image) and which extends around the ark. Google Earth shows the location of the center of the formation to be: Latitude 39°26'26"N, Longitude 44°14'0.5.3"E; elevation 6,625 feet. (Aerial photo given to David Fasold by Atatürk University.)



Figure 2. Alleged fossilized remains of Noah's ark, as seen looking south toward the mountains in the Turkey-Iran border (fig. 1A). (A) Two people standing on the ark provide scale. (B) Semi-parallel lines are ribbons laid out by investigators. (C) White rock near the center is fossiliferous limestone. (Photo provided by David Fasold.)

Article

Noah's Ark near Dogubayazit, Turkey?

Local accumulations of such rocks there were interpreted to be places where the ballast was scraped off the bottom of the ark as it was sliding down to its present position (fig. 1C). At the completion of its sliding, the ark is said to have been impaled by a wedge of white limestone (fig. 2 at C, middle of the ark in front of the two standing people; right side, outcrop rises above the surrounding surface).⁶

After being transported by a landslide and before being exposed at the surface, the ark is said to have been covered by a volcanic lava flow that protected it from erosion and weathering. It is claimed that through time, water seeping through this volcanic rock-cover leached out various elements (iron, magnesium, manganese, aluminum, and titanium) that enabled the wood in the ark to be converted into petrified wood.⁷

Inside the ark are supposed remnants of iron rivets, washers, and brackets that held the walls of the ark together (fig. 3). Because chemical analyses of these iron artifacts—measured at the Los Alamos National Laboratory by John Baumgardner and at the



Figure 3. Photo of supposed iron washer with central mashed rivet but which, in reality, is a coating of cemented magnetite grains altered partly to limonite.⁸ (Image published by Wyatt Archaeological Museum.⁹)

Galbraith Laboratory in Knoxville, Tennessee—show elemental compositions of iron (Fe), magnesium (Mg), manganese (Mn), aluminum (Al), and titanium (Ti), Noah is said to have been given the ability to forge alloys of these metals when he made these rivets, washers, and brackets.¹⁰ By using metal detec-



Figure 4. The structure, looking south toward Mt. Judi. Epidote-bearing basalt (interpreted as ribs on far side), A–B; white limestone layer, C–D; light-colored sedimentary rock layer, E–F; dark sedimentary layers under light-colored layer, G–G, H–H, and I–I; columns of supposed ribs, up-arrows, J; stream channel on top of lowermost dark sedimentary layer, K; face of landslide block that slid away from the ark structure during three earthquakes in 1948 in foreground, L–M. (Source of photo is Wikipedia.)

tors, David Fasold, John Baumgardner, and Ron Wyatt recorded the positions of these alloy artifacts in what they thought to be walls along the length of the ark in regular intervals and at right angles to the walls (traced out in thirteen orange ribbons along the length and many across the width of the “ark”; only a few of these ribbons are shown in figure 2, at arrow B, and not over the whole ark).¹¹

Remnants of supposed rivets and brackets were also detected by metal detectors as rusted flakes in what were called the “ribs” of the ark. Frost wedging along the eastern side of the ark was suggested as having been the cause of erosion of petrified wood in the ribs, as having deposited the wood fragments as sand-sized particles on the land east of the ark, and as having exposed the former positions of these ribs in vertical columns (fig. 4, up-arrows J).¹²

A rectangular block of black rock (said to be a former wood beam) was unearthed by Ron Wyatt and brought to Galbraith Laboratory for chemical analysis and microscopic study.¹³ A cut-section through this block revealed three different layers that were described as “plywood,” which supposedly had

been cemented together by some kind of glue that had oozed out on one side.¹⁴ Chemical analyses of this material showed that it contained percentages of iron (8.08%) and aluminum (8.06%) as well as carbon (0.71%).¹⁵ Two examples of black rock identified by Ron Wyatt as petrified wood can be seen in a report by Jonathan Gray.¹⁶

Several large stones labeled as anchors for the ark (fig. 5) occur near Dogubayazit (fig. 1A), and the presence of eight crosses on some of these stones is projected to represent Noah, his wife, and family.¹⁷

Another rock found near Kazan (fig. 1A) has a rippled surface (fig. 6) and is described as being a fossilized cast of reeds or bark of wood that were once a part of the ark. When struck with a hammer, this rock sounds as if it were hollow, suggesting to some that the ripples represent hollow fossilized reeds.¹⁸

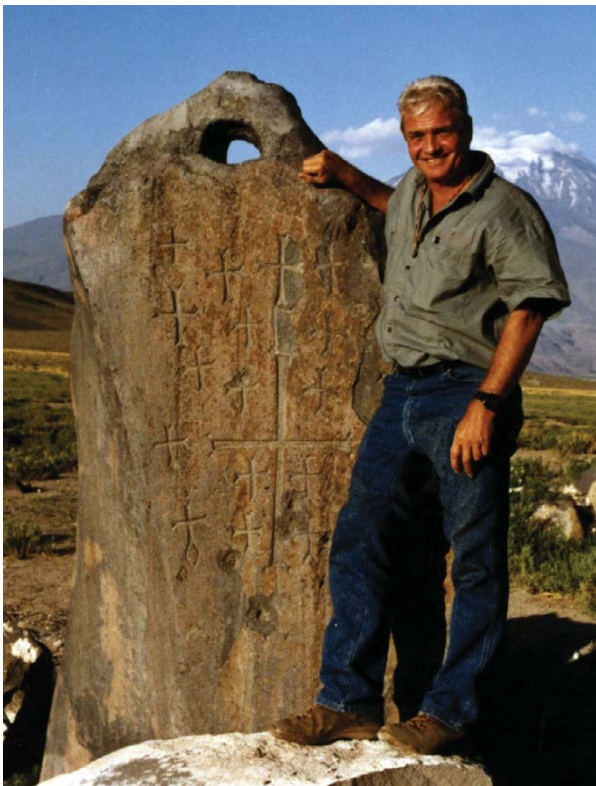


Figure 5. David Fasold standing beside an anchor stone (one of many) with crosses on its face. (Wikipedia is the source of the image; search David Fasold.)



Figure 6. Crinkled rock surface said to be from bark of wood or reeds in Noah's ark.¹⁹ (Fasold; image source.)

Scientific Evidence That the Formation Is Not Noah's Ark

Petrified Wood?

Thin Section Analysis. After being told by Ron Wyatt and others that the various black rocks exposed in the ark were petrified wood, “arkeologist” David Fasold began to entertain some doubts about this identification. He therefore collected twelve samples from various places along its length and width and brought them to me for verification. I made thin sections of each sample and discovered

Article

Noah's Ark near Dogubayazit, Turkey?

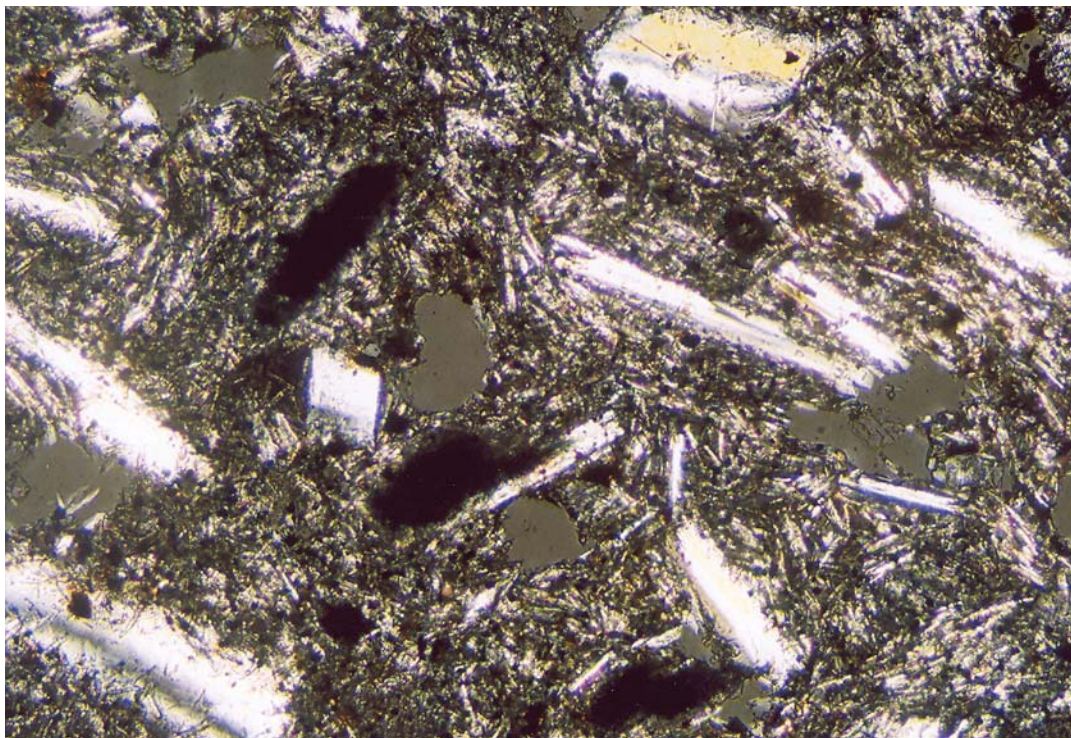


Figure 7. Basalt (40x magnification) showing magnetite grains (black) and elongate rectangular plagioclase feldspar laths (white) under cross-polarized light. Field-of-view width is 5 millimeters. Grey areas are places where friable minerals eroded out during thin section preparation. (Image by author.)

that each was composed of either basalt or andesite volcanic rock (fig. 7). I also brought David to my laboratory so that he could see these thin sections under the microscope. I systematically showed him what verified petrified wood looks like under microscopic examination (fig. 8), as well as many samples of other volcanic rocks of similar composition. Afterwards, there was no doubt in his mind that all black rocks at the “ark” were volcanic rocks.

Whether a volcanic rock is named a basalt or andesite depends on whether the plagioclase has more calcium (Ca) than sodium (Na) in its composition.

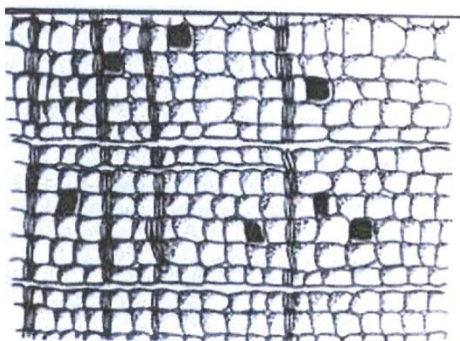


Figure 8. Thin section of petrified wood, showing cellular structure and partial development of tree rings that do not exist in figure 7. (Source is Wikipedia.)

That is, a very small difference in the amount of calcium and sodium can change its name. For example, the plagioclase composition could be 51% Ca and 49% Na and make the rock basalt, or it could be 49% Ca and 51% Na and make the rock andesite. In outward physical appearance, however, they can both have the same dark color and appear to be the same type of rock.

In addition to the thin section shown in figure 7, the other eleven thin sections also show a broad range of textures and mineral compositions. Along with magnetite and plagioclase, some of the basalt and andesite rocks contain pyroxene (a calcium-iron-magnesium silicate mineral), apatite (a calcium phosphate mineral), clay (hydrated aluminum-bearing silicates), interstitial or veins of calcite (a calcium carbonate mineral) or siderite (an iron carbonate mineral), and veins of cryptocrystalline quartz (chalcedony). On that basis, the “glue” that is said to have formed the cement between two wood layers in the plywood beam is likely a vein of calcite or siderite.

A sample of black rock that is basalt but called petrified wood in the Visitors Center of the museum can be seen to have tiny white plagioclase laths; these show that this rock cannot be petrified wood.²⁰

This sample is like that in the basalt outcrop (fig. 4, A–B) and on which a yellowish-green mineral called epidote can be seen coating the surface of the rock. Epidote is a hydrated calcium-aluminum-silicate alteration product of basalt in which steam has moved through the fractures; it cannot form on petrified wood that is nearly 100% silica (microcrystalline quartz).

Chemical Analysis. It was a mistake to ask the Galbraith Laboratory to do the chemical studies of the supposed wood plank from the site. Chemists at Galbraith Laboratory do very competent work when analyzing samples from the food industry and from organizations dealing with environmental problems. But this laboratory is not a place where geologic samples of rock are normally submitted for chemical analysis. There are other labs that specialize in this kind of work. In the types of reports that Galbraith Laboratory produces, chemical analyses are generally given in percentages of *elements* rather than as *oxides*, because their clients typically need to know what trace *elements* are in the submitted samples; for example, the trace *elements* may be contaminating soils, or they may be poisoning foods.

When Ron Wyatt received the chemical analyses from this lab as percentages of elements that were in samples of supposed fossilized wood or supposed rivets, washers, and a bracket, he interpreted these elements as being “pure” metals as opposed to what they actually were, namely, the ionic component of natural minerals.²¹ This misunderstanding implied that Noah was able to make unusual alloys of iron (steel) with manganese, titanium, magnesium, and aluminum, and that these elements as native metals could also be found in petrified wood—such, by the way, has never been observed. Nor would the wood contain 8.08% metallic iron as reported earlier. This same rock analysis reported 0.005% copper. The occurrence of copper is not unexpected in volcanic rock because many of our major copper ores are found associated with basalt.

It was further reported that Galbraith Laboratory made a chemical analysis of an alleged wood plank that listed the presence of 11.54% aluminum, supposedly in the form of aluminum metal (along with other metals). This amount of aluminum is likely a true value because if it, the wood plank, were basalt rather than petrified wood, this amount of aluminum would make sense. Basalt generally contains about

75% plagioclase feldspar crystals (fig. 7 shows the many tiny white plagioclase crystals). In the composition of plagioclase in certain kinds of basalt, its aluminum content is about 15%, and if the basalt has 75% plagioclase with 15% aluminum in it, the rock analysis would show 11.24% aluminum; this is very close to the observed value. Petrified wood might contain micro-traces of aluminum, but never 11.54%, and not as a native metal.

Iron at the Site

Iron readings in the formation can be explained by natural processes such as placer deposits of magnetite grains. This would be consistent with Fasold’s finding that there are seven iron-rich mounds on one side of the proposed ark and four iron-rich mounds on the other side. The deposits are not as symmetrical as one would expect to find in the remains of a symmetrical boat held together by iron.

“Interior Walls of the Ark”

The regular alignment of iron-rich layers along the length and width of the structure that were located by iron detectors and marked with orange ribbons (fig. 2, B)²² can be explained as the result of erosion of the volcanic and sedimentary rocks. Rain and melting snow, seeping down into rectangular-oriented joints and carrying tiny grains of magnetite, could have concentrated the magnetite in the fractures where they would eventually be oxidized to iron-rich limonite. Concentrations of limonite at intersections of the rectangular joints could look like iron brackets.

“Ribs of the Ark”

The supposed ribs of the ark, which are vertically aligned columns of rock (J in fig. 4), are said to have been modified by frost wedging so that the petrified wood was torn apart and deposited as sand below the side of the ark.²³ This scenario seems unlikely for the following reasons:

(a) It is true that frost wedging can tear rocks apart because of the 9% volume increase when water freezes, but this water must fill a crack for it to expand to do the mechanical destruction of the rock. Also, fractures in rocks are seldom, if ever, so closely spaced that water can enter them and freeze to wedge the rock apart to produce sand grains.

(b) Frost wedging, even at a small scale, does not destroy the composition of the rock. It merely breaks

Article

Noah's Ark near Dogubayazit, Turkey?

the rock into smaller pieces. Therefore, if these ribs were truly petrified wood, each small sand grain would still have the cellular structure of the wood preserved in them and this cellular structure could be easily seen in a thin section. They do not.

(c) The appearance of ribs in the side of the supposed ark (fig. 4, J) is not caused by frost wedging, but by differential weathering and erosion of the rock along evenly spaced vertical joints or fractures. Water from rain and melting snow simply seeped down through the walls of the vertical fractures and soaked into both sides of the sedimentary rocks to alter the plagioclase feldspar grains into clay minerals. In those regions with more clay, the rocks are much softer and more easily eroded, whereas areas of less clay are less eroded. It is therefore the differential erosion of the sedimentary rocks (hard versus soft) along these vertical fractures that creates the *illusion* of a former rib structure.

A video given to me by David Fasold shows the side of the ark with ribs composed of sedimentary layers of different compositions and thicknesses that extend nearly horizontally along the face of the steep wall of the exposed side.²⁴ A light-colored layer at the top of the so-called ribs can faintly be seen in figures 2 and 4 at E-F, overlying the dark layers at G-G, H-H, I-I. The dark layers are ancient mud flows which consist of poorly sorted, fine-grained sediments that locally enclose pebbles and boulders of basalt and metal oxide concentrations (the supposed "ballast rocks"). These mud flows came down rapidly from the slopes of Mt. Judi, south of the site. Their rapid flowage and relatively quick deposition caused the poor sorting. All these layers are inclined at a gentle angle (5 degrees) from the white limestone (fig. 4, C-D) down toward the lower end of the structure. The light-colored upper layer intersects the topographic surface near the stern (rounded end) of the structure (figs. 2 and 4, E-F), and the dark layers (G-G and H-H) under this upper layer intersect the surface near the purported stern.

Also, near the "stern," one of the dark sedimentary layers has a small stream channel (fig. 4, K) that cuts into the layer, with stream cobbles filling the channel. This sedimentary layering and the stream channel, 5 feet (1.5 m) wide and 5 feet (1.5 m) deep, were totally ignored by Ron Wyatt and others because it was not what they were looking for and because this occurrence would not fit into their Noah's ark site

model.²⁵ They saw only the vertical jointing that produced the columns (fig. 4, J), which they interpreted as casts of ribs of the ark.²⁶ There is no black basalt that supposedly produced casts of petrified wood on this side of the ark as is interpreted by the ark advocates for the far side (fig. 4, A-B).

"Washer and Rivet"

If washers and rivets were used by Noah in the construction of the ark, then thousands of these iron artifacts should have been found—not just three or four of the supposed washers, with only one washer having a rivet in its center (fig. 3). The purported iron washer with rivet (fig. 3) that was found is on top of a thick black rock more than 3 inches (7.6 cm) in diameter that was presumed to be petrified wood.²⁷ The rivet is alleged to have penetrated into the wood by being struck very hard with a hammer. However, ark videos never show that the "rivet" comes through the backside of this rock. Moreover, below the edge of the supposed washer, along the right side, and in some places in the upper areas, tiny white laths of plagioclase feldspar can be seen that look like some of the large plagioclase laths shown in figure 7. The image (fig. 3) clearly shows that the black rock is basalt and not petrified wood as in figure 8. No cellular structure of wood is visible.²⁸

Note also in figure 3 that the supposed washer has very little thickness so that even tiny white plagioclase crystals show through the washer. Moreover, although round like a washer, it is not also planar as would be expected for a washer. If the washer were composed of an alloy of iron with manganese, titanium, and aluminum, this alloy would have the hardness of steel (6.5 on the Mohs hardness scale), which is the same hardness of plagioclase in basalt (6.0–6.5); and, being made of steel, it would not easily rust away and become thin. Instead, this material probably consists of magnetite grains that are cemented together on top of a curved surface on basalt, where the cement is calcite (or siderite) and limonite with a hardness of 3. This surface material could be very easily eroded to leave only a thin film of oxidized magnetite on the basalt that would be too flimsy to hold the walls of the so-called ark together. Furthermore, if the orange ribbons actually mark the existence of washers, rivets, and brackets (fig. 2) where the walls are said to exist,²⁹ and if these walls (claimed to consist of petrified wood but actually consisting of basalt containing plagioclase which

also has the hardness of steel) are supposed to be held together by these iron artifacts, should not these hard-rock walls also be found at these same sites in which the supposed iron artifacts occur? But no such hard-rock walls presently exist there. This fact also supports the assertion that the regular positions of the supposed iron artifacts actually represent rectangular joint-systems containing magnetite/limonite of a natural sedimentary rock structure.

A thin section cut through this washer would easily show whether it is rusted wrought-iron metal or cemented magnetite grains altered to limonite, but this necessary sectioning was not performed by the ark advocates. Moreover, a diamond saw-cut through the supposed rivet would demonstrate whether a metal rod extends down into petrified wood below the washer or whether this is an unusual surface deposition of magnetite grains that has no depth beyond the surface layer. In a truly scientific investigation, such a saw-cut and a thin section would have been made immediately to confirm the correct model. Just claiming that it is a rivet and washer is not sufficient evidence for the belief that it is a man-made rivet and washer!

A Galbraith Laboratory report on another supposed 3.5 inch crescent-shaped remnant of a washer demonstrated 8.38% iron, 8.35% aluminum, and 1.59% titanium.³⁰ The remnant was found in a clay matrix outside the structure and has this chemical composition because it is composed of concentrations of titanium-bearing magnetite in aluminum-rich clay. Other chemical analyses of supposed rivets in a clay

matrix contain 13.02% iron, 15.84% aluminum, 2.93% titanium, and 45.2% silica as well as small percentages of calcium, magnesium, potassium, sodium, manganese, and phosphorous (oxide percentage of each element).³¹ Because of the large amount of silica, this analysis cannot represent a metal rivet, but instead indicates a mixture of magnetite, clay, feldspars, and apatite (a phosphate mineral).

"Iron Bracket"

As with washers and rivets, the question can be asked: Why was only one bracket found and not 10,000 if Noah used them to construct the ark? They should be abundant, and they are not. A thin section cut through the only purported iron bracket found (fig. 9A) shows that the bracket has no metal in it at all. Instead, it is composed of altered magnetite grains that are cemented together with limonite. Limonite is an oxidized and hydrated alteration product of the magnetite. Where the magnetite grains are not cemented together by limonite, interstitial clay and calcite (or siderite) surround the magnetite grains (fig. 9B). The thin section shows that the supposed iron bracket has a "right-angle" bend in it. However, note that the parts of the supposed iron bracket are not uniformly thick. The bottom slanted-right side is relatively thin, but the bottom left side becomes thicker and has still greater thickness on the top left side. Moreover, additional bending shown on the left side to make it "U-shaped" should not be present if it were intended to be a brace for a wall in the ark.³²

John Baumgardner reported chemical analyses of this proposed iron bracket at the Los Alamos

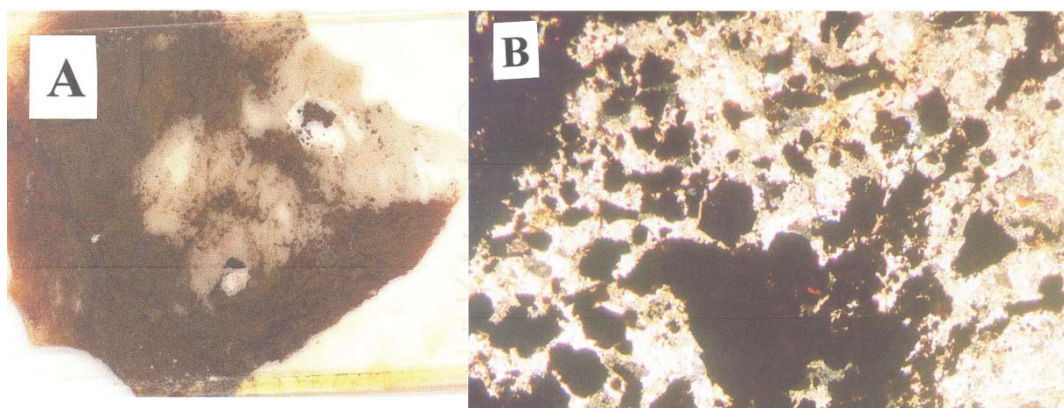


Figure 9A. Thin section cut through a part of the only supposed iron bracket found, containing both magnetite and limonite. The upper left is the thickest. Top to bottom is 5 centimeters. (Out-of-focus appearance is caused by the presence of a glass cover slip.)

Figure 9B. Image (40x) shows magnetite (black) altered to limonite (also black) in a matrix of calcite or siderite (white) and clay (grayish white); image comes from the right part of the thin section shown in 9A. In black-and-white images, these minerals cannot be distinguished from each other. (Images by author.)

Article

Noah's Ark near Dogubayazit, Turkey?

National Laboratory, not as elements but as oxides. These analyses were given as a report to David Fasold (table 1).

Table 1. Chemical analyses of supposed iron bracket, showing ranges of several analyses (Los Alamos National Laboratory)

Oxide	Percentage
SiO ₂	3.56–9.5
Al ₂ O ₃	2.67–4.4
TiO ₂	0.09–3.1
Fe ₂ O ₃	76.14–89.3
MgO	0.00–0.9
MnO ₂	0.11–1.25
CaO	0.20–7.62

Reporting the analyses as oxides is the standard way of reporting elements in rocks, but nevertheless, at the time, Baumgardner thought that he was analyzing an iron alloy that Noah had made in a forge. Galbraith Laboratory did similar analyses of supposed iron washers and rivets but reported the chemical analyses as elements. Baumgardner's method of analysis by an electron-microprobe would not have been able to determine whether the iron was native wrought-iron metal, and the probes would have been made on several parts of the iron bracket (fig. 9A). Because of the irregular messy appearance of magnetite grains in the supposed bracket in this figure, it is not surprising that Baumgardner's many different probes produced such a broad range of oxide compositions. In any case, (a) the reported oxide percentages of Fe, Mg, Mn, and Ti fit the natural composition of magnetite grains, (b) the Al is consistent with interstitial clay minerals, and (c) the Ca is consistent with calcite (or siderite) veins and interstitial cement. None of these elements would have been used by Noah in a forge to form metal alloys in rivets, washers, and brackets!

"Anchor Stones"

Several lines of evidence indicate that the stones (as many as ten)³³ with holes at the top were not anchor stones for the ark.³⁴

(a) The stones weigh as much as 10 tons so that the positioning of the holes at their tops close to the outer surface leaves too little enclosing-stone to support their heavy weights if they were intended to be hung vertically from a strong rope. Breaking along the top is what should be expected of these hole positions,

and in fact, some of the stones are broken in just this configuration. The holes at the top of the stones could have been used to insert ropes that would have enabled them to be pulled on sleds in winter over slick snow or ice to where they were erected—perhaps as memorial stones.

(b) A thin section of one of these supposed anchor stones shows that it consists of magnetite-bearing anorthosite that does not occur anywhere in Southern Mesopotamia (Sumeria) where Noah is said to have built the ark. Therefore these stones were more likely obtained from a quarry local to where this structure occurs.

(c) Many of the stones have up to twenty-three crosses engraved on them,³⁵ and so the eight crosses shown on the stone in figure 5 do not necessarily represent Noah, his wife, and family.

"Reed Casts"

A thin section of the rock that looks like a cast of reeds or possible bark on wood (fig. 6) shows that this rock consists of crinkled layers of pyroxene and olivine crystals that were once part of an igneous rock type called peridotite.³⁶ Because the rock shows no weathering or alteration, and because the crystals are well interlocked with each other, the rock vibrates with a hollow sound when struck with a hammer instead of making a dull thud sound when hit. Such igneous rocks are found in this part of Turkey where plate tectonics has brought them to the earth's surface.³⁷ Therefore, this rock is not a former part of the ark.

"Ballast Rocks"

In an exploration section of the "ark" that was dynamited by other investigators in the 1970s, investigators found heavy rocks (9 inches in diameter) within the dark sedimentary layers of the structure (fig. 4, G-G and H-H).³⁸ These rocks consisted mainly of manganese (87%), titanium (41.95%), or titanium oxide (74%).³⁹ On that basis, they thought that these rocks were used as ballast (heavy material carried in the bottom of a boat to control draft and stability). They also found similar rocks at higher elevations south of the structure in the mountain slopes below Mt. Judi (fig. 1B), which are surrounded by a supposed boundary of petrified wood. Therefore, they reasoned that the ark had slid down from Mt. Judi, and during the slide, the bottom of the ark had been scraped off, leaving most of the ballast there

along the slide. However, there is a natural explanation for these manganese- and titanium-rich rocks. Because of their high manganese (Mn) and titanium (Ti) content, these were probably derived from an ophiolite—a sequence of layered dark volcanic and upper mantle igneous rocks—which occurs on the slopes of Mt. Judi.⁴⁰ In ophiolites, concentrations of Mn and Ti oxides commonly precipitate as heavy masses during the crystallization process.

In Sum

Although some persist in claiming that this natural formation is the fossilized remains of Noah's ark, the scientific evidence points to the fact that its partial boat shape was created by erosion of bedrock by landslide debris, extending from the mountains south of the area (figs. 1, 2, and 4), and that the bedrock mostly consists of layered light and dark sedimentary rocks (fig. 4, E-F, G-G, H-H, I-I). These clastic sedimentary rocks were former flood-plain mud and silt deposits that locally contain placer concentrations of magnetite grains that have been altered to limonite, so that there appears to be rust on metallic iron. In some places, these layers contain transported pebbles and boulders of basalt and andesite volcanic rocks, perhaps in mud flows, which were interpreted to be remnants of walls, decking, support beams, and ribs. Also present are boulders of metal oxide concentrations derived from ophiolites south of the area. The only limestone layer in the site is a wedge that outcrops at its midpoint (fig. 4, C-D). Later these clastic sedimentary layers became fractured into a nearly rectangular joint system, which occurs on top of the formation surface in semi-parallel aligned ribbons along iron concentrations (fig. 2, A) and which, in a side view, produces nearly vertical columns (fig. 4, J). These columns have been subjected to differential erosion and weathering to form what has been interpreted as casts of former ribs or gunnels. The volcanic mass of basalt that forms a wall on the far side of the formation (fig. 4, A-B) is not ribs of petrified wood.

Remains from Noah's ark may some day be found in another location,⁴¹ but they are not at this site in eastern Turkey. Yet, there are websites and publications that still misinform readers that it is Noah's ark, despite the clear and overwhelming evidence to the contrary.⁴² ☆

Acknowledgments

I wish to thank David Fasold, although he is no longer alive, for his sincere efforts to find the truth. I also wish to thank Carol Hill for many good editorial suggestions and for encouraging me to publish this article. I thank Tim Helble for advice on the photos, Rudolf Pohl for locating Turkish ophiolite references, and David Liggett for assistance with arrows on images. Thanks are also due to Mehmet Salih Bayraktutan and Meral Kaya for information about the rocks in Turkey and two unidentified reviewers.

Notes

¹⁴"Discovered—Noah's Ark," a documentary of the research and field work of Ron Wyatt and associates which led to the official recognition by Turkish authorities of the actual remains of Noah's ark, video, Wyatt Archaeological Research, 1994.

²Ibid.; Ark Discovery International, "Revealing God's Treasure," DVD covers five major discoveries: Noah's Ark, Sodom and Gomorrah, Mount Sinai in Arabia, the Red Sea Crossing, and the Ark of the Covenant, 4 hours, 20 minutes, <http://www.arkdiscovery.com>.

³⁴"Discovered—Noah's Ark."

⁴Mary N. Wyatt, "For the Record," *Newsletter* 16 (September 1996), <http://wyattmuseum.com/for-the-record/2011-691>.

⁵⁴"Discovered—Noah's Ark."

⁶⁴"Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary," video, accessed May 19, 2016, <https://www.youtube.com/watch?v=uPRo7Q-7yQQ&list=WL&index>.

⁷⁴"Discovered—Noah's Ark"; "Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary."

⁸Ibid.

⁹Ibid.; Associates for Biblical Archaeology, "1985–6 Noah's Ark Field Studies 01," video, 6:11 minutes, [https://www.youtube.com/watch?v=ZR8LfnS3rE; UFOTV® The Disclosure Network, "The Noah's Ark Conspiracy," feature film, 53:11 minutes \(Jan. 31, 2013\), <https://www.youtube.com/watch?v=w9pAjv1WgNg>; Dennis Schelles, "Noah's Ark—Ron Wyatt's Story," video, 20:47 minutes, <https://vimeo.com/131454147>; "Noah's Ark Found—Jonathan Gray," video, 49:19 minutes, \[https://www.youtube.com/watch?time_continue=1223&v=dxMPPJXkUjI\]\(https://www.youtube.com/watch?time_continue=1223&v=dxMPPJXkUjI\).](https://www.youtube.com/watch?v=ZR8LfnS3rE; UFOTV® The Disclosure Network, 'The Noah's Ark Conspiracy,' feature film, 53:11 minutes (Jan. 31, 2013), https://www.youtube.com/watch?v=w9pAjv1WgNg; Dennis Schelles, 'Noah's Ark—Ron Wyatt's Story,' video, 20:47 minutes, https://vimeo.com/131454147; 'Noah's Ark Found—Jonathan Gray,' video, 49:19 minutes, https://www.youtube.com/watch?time_continue=1223&v=dxMPPJXkUjI)

¹⁰"Discovered—Noah's Ark"; "Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary"; Ark Discovery International, "We Believe ... This Is Noah's Ark!," http://www.arkdiscovery.com/noah's_ark.htm; B. M. Warmkessel, "Noah's Ark—Verification of Alien Contact," March 10, 2003, <http://www.barry.warmkessel.com/NOAH.html#8> and <http://www.barry.warmkessel.com/NOAH.html#9>; and R. Rives, "A Rivet Discovered," June 1991, Wyatt Archaeological Museum, <http://www.wyattmuseum.com/a-rivet-discovered/2011-107>.

¹¹Ark Discovery International, "Revealing God's Treasure: Noah's Ark Index of Pages," <http://www.arkdiscovery.com/noah-index.htm>.

Article

Noah's Ark near Dogubayazit, Turkey?

¹²"Discovered—Noah's Ark"; "Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary."

¹³"Discovered—Noah's Ark."

¹⁴"Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary"; Warmkessel, "Noah's Ark—Verification of Alien Contact."

¹⁵"Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary."

¹⁶J. Gray, "Noah's Ark Overview, Pt. II," http://www.arkdiscovery.com/noah's_ark.htm.

¹⁷"Discovered—Noah's Ark"; UFOTV® The Disclosure Network, "The Noah's Ark Conspiracy."

¹⁸"Discovered—Noah's Ark"; "Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary"; L. G. Collins and D. F. Fasold, "Bogus 'Noah's Ark' from Turkey Exposed as a Common Geologic Structure," *Journal of Geosciences Education* 44, no. 4 (1996): 439–44, <http://www.csun.edu/~vcgeo005/bogus.html>.

¹⁹"Discovered—Noah's Ark"; UFOTV® The Disclosure Network, "The Noah's Ark Conspiracy"; Warmkessel, "Noah's Ark—Verification of Alien Contact"; Ark Discovery International, "October 2000, Tour to Noah's Ark," <http://www.arkdiscovery.com/tour-anchor.htm>.

²⁰Gray, "Noah's Ark Overview, Pt. II."

²¹"Discovered—Noah's Ark"; Associates for Biblical Archaeology, "1985–6 Noah's Ark Field Studies 01."

²²"Discovered—Noah's Ark."

²³Wyatt, "For the Record."

²⁴"Discovered—Noah's Ark."

²⁵Ibid.

²⁶Ibid.

²⁷Rives, "A Rivet Discovered."

²⁸"Discovered—Noah's Ark"; "Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary"; "Noah's Ark found—Jonathan Gray"; Jonathan Gray, "Anchorstone International Presents the Biblical Discovery: Questions and Answers," <http://www.beforeus.com/NoahsArkQA.pdf>; "Noah's Ark Has Been Found! It's Not Just Some Fairy Tale!!," video, 33:26 minutes (August 19, 2012), <https://www.youtube.com/watch?v=iCyOVGBnNp8>.

²⁹"Discovered—Noah's Ark"; "Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary"; Associates for Biblical Archaeology, "1985–6 Noah's Ark Field Studies 01"; UFOTV® The Disclosure Network, "The Noah's Ark Conspiracy."

³⁰Ark Discovery International, "We Believe ... This Is Noah's Ark!"

³¹"Discovered—Noah's Ark"; Warmkessel, "Noah's Ark—Verification of Alien Contact."

³²"Discovered—Noah's Ark"; Wyatt, "For the Record."

³³"Noah's Ark Has Been Found! It's Not Just Some Fairy Tale!!"

³⁴"Discovered—Noah's Ark"; "Noah's Ark Found—The Original Noah's Ark Documentary—Ron Wyatt's Documentary."

³⁵David Fasold, *The Ark of Noah* (New York: Wynwood Press, 1988).

³⁶Associates for Biblical Archaeology, "1985–6 Noah's Ark Field Studies 01."

³⁷A. Yilmaz, H. Yilmaz, C. Kaya, and D. Boztuğ, "The Nature of the Crustal Structure of the Eastern Anatolian Plateau, Turkey," *Geodinamica Acta* 23, no. 4 (2010): 167–83; A. F. Afshar, "Geology of Tunceli-Bingöl Region of

Eastern Turkey," *Bulletin of the Mineral Research and Exploration Institute of Turkey* 65 (1965): 33–44.

³⁸"Discovered—Noah's Ark."

³⁹Warmkessel, "Noah's Ark—Verification of Alien Contact."

⁴⁰Gray, "Noah's Ark Overview, Pt. II"; Afshar, "Geology of Tunceli-Bingöl Region of Eastern Turkey"; J. R. Craig and D. J. Vaughan, "Ore Mineral Assemblages Occurring in Igneous Rocks and Vein Deposits," chap. 9 in *Ore Microscopy and Ore Petrography*, 2nd ed., (New York: John Wiley & Sons, 1994), 208–58, http://www.minsocam.org/msa/OpenAccess_publications/Craig_Vaughan/Craig_Vaughan_Chptr_09.pdf.

⁴¹C. A. Hill, "The Noachian Flood: Universal or Local?," *Perspectives on Science and Christian Faith* 54, no. 3 (2002): 170–83.

⁴²"Discovered—Noah's Ark"; Ark Discovery International, "Revealing God's Treasure."

ASA Members: Submit comments and questions on this article at www.asa3.org→FORUMS→PSCF DISCUSSION.



Looking for a Meaningful Christmas Present?

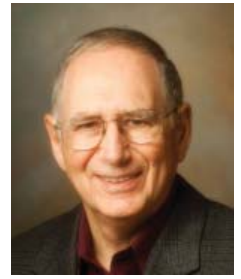
Gift ASA memberships and *PSCF* subscriptions are a great way to introduce someone to ASA and our journal. Giving a gift is easy: Go to our online store on our website, <http://network.asa3.org/store>, and click on our gift section.

Select and purchase the gift you wish to give. You will receive a downloadable page with a code that you can give to someone so that he or she can activate the gift membership or subscription.



PERSPECTIVES on Science and Christian Faith
JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

PERSPECTIVES on Science and Christian Faith
gifts for Libraries and Institutions
JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION



Robert D. Branson

Science, the Bible, and Human Anatomy

Robert D. Branson

Both young earth and old earth creationists maintain that their interpretations of Genesis 1–11 are scientifically valid because God inspired the account and God cannot lie. This article intends to test their basic presuppositions by examining how scientifically accurate the Bible is in describing human anatomy, specifically the kidneys and the heart. First, the Old Testament references to the kidneys are examined; then, those to the heart; and finally, the New Testament references to the heart, including statements of both Paul and Jesus. The results demonstrate that God inspired the writers of scripture to use the terms that were common to their wider cultures, even though they are not scientifically correct. Since God did not inspire the writers to write scientifically about the human body, this calls into question the assumption that the writer of the creation account was inspired to write scientifically about the rest of creation.

While young earth creationists (YEC) such as Ken Ham and old earth creationists (OEC) such as Hugh Ross continue to argue over the correct interpretation of the account of creation in Genesis 1–11, they have some fundamental points of agreement. (1) The account is historically correct because God inspired it. (2) God's Word is inerrant and thus true. (3) The scripture is scientifically accurate because every word has been inspired by God and God cannot lie (Heb. 6:18).¹ Both sides are continuing to produce literature arguing that their interpretation of Genesis 1–11 is correct and the other's is false, or at least problematic. Where the two approaches disagree is at the starting point.

Young earth creationists start with a specific interpretation of Genesis 1–11 that includes a recent creation of the universe (6,000 to 10,000 years ago) and the laying down of the geological column during the flood.² Scientific findings at odds with this position are either dismissed or reinterpreted.³ Old earth creationists accept that the Genesis account is inspired, but begin with the findings of science, for example, the earth was created 4.5 billion years ago, and then interpret the scrip-

tures according to scientific findings.⁴ Both use claims of science to help prove that their interpretations are correct. Science and history are thereby intertwined to validate their interpretations.⁵

A key question that challenges both positions is whether or not the biblical account, because it is inspired by God, must be scientifically accurate. For a test case, how scientifically accurate are the biblical claims about human anatomy, specifically the internal organs of the heart and kidneys?

Kidneys *kělāyôt*

Since the Hebrew word for kidneys (*kělāyôt*, always in the plural) is used in contexts that refer to humans only eleven times,⁶ we will examine it first. The function of the kidneys is to filter the blood and remove the wastes in the form of urine. The kidneys are never mentioned in the Bible with this function. Four major

Robert D. Branson, Emeritus Professor of Biblical Literature, Olivet Nazarene University, has a PhD from Boston University. He is the author of *Judges*, a commentary in the *New Beacon Bible Commentary* series, and serves as general editor of the forthcoming *Global Wesleyan Dictionary of Biblical Theology*.

Article

Science, the Bible, and Human Anatomy

versions (NIV [2011], NAB, TANAKH, and NRSV⁷) are reviewed to give a limited variety of translations for *kēlāyôt* (for complete listing, see appendix, p. 234).

The translations of *kēlāyôt* in Job 19:27 read “heart” (NIV, NRSV, TANAKH) or “inmost being” (NAB). In the other texts, *kēlāyôt* is most commonly translated “heart” or “mind.” However, the TANAKH three times uses “conscience” (Pss. 7:9[10], 16:7, 139:13). Kidneys and heart (*lēb*) appear together or in parallel six times (Pss. 7:9[10], 26:2, 73:21 (*lēbāb*); Jer. 11:20, 17:10, and 20:12). The versions are not themselves internally consistent translating *kēlāyôt* both as “mind” and “heart” and *lēb* also as “heart” and “mind.” Proverbs 23:16 is perhaps the most unusual in that the versions read that the “inmost being” (NIV, NAB), “soul” (NRSV), or “heart” (TANAKH) will “rejoice.”⁸

What conclusions can we draw from this brief survey? First, the versions never translate *kēlāyôt* literally. To do so would not make sense to a modern audience. They have to adjust their readings to make sense for a modern, scientific culture. Second, the Old Testament (OT) writers had no understanding of the function of the kidneys, and thus use the word *kēlāyôt* according to the context, with meanings other than the actual function of kidneys, and therefore nonscientifically.

Old Testament *lēb(āb)*

Next let’s look at *lēb(āb)*, which occurs 853 times in the OT.⁹ The human heart is the organ that pumps blood throughout the body by means of the circulatory system. The heart is never mentioned in the Bible with this function.

Hans Walter Wolff begins his discussion of *lēb* by citing the account of Nabal’s death in 1 Samuel 25:37–38: “His heart died within him: he became like a stone. About ten days later the LORD struck Nabal, and he died” (NRSV).

The modern reader finds this confusing. In the first sentence he thinks that when the heart stopped beating the man died, and *rigor mortis* set in. But then he learns that Nabal went on living for another ten days.¹⁰

The writer was not thinking in a modern medical manner. The functions attributed to the “heart” actually take place in the brain. And while the beat of

the heart is felt, there is no recognition that it is connected to the circulatory system or to the pulse.

Wolff continues by describing the acts of the heart, beginning with “the irrational levels of man.” A person’s mood or temperament arises in one’s heart (Prov. 23:17) and it is “the seat of certain states of feeling, such as joy and grief” (1 Sam. 1:8, 2:1; Prov. 15:13). Courage and fear are related to the status of the heart. Yahweh may strengthen one’s heart, that is, give courage (Ps. 27:14). Fear may overcome a person as the “heart ‘goes out’” (Gen. 42:28), it leaves him (Ps. 40:12) and drops down (1 Sam. 17:32).¹¹

A brief discussion of the desires and longings of the heart follows. A man is not to desire in his heart—that is, lust after—his neighbor’s wife (Prov. 6:25). “Just as the heart can ‘fall’ into despondency (1 Sam. 17:32), so it can also ‘rear up’ into arrogance” (Deut. 8:14; Hos. 13:6).¹²

Wolff notes that “in by far the greatest number of cases it is intellectual, rational functions that are ascribed to the heart—i.e., precisely what we ascribe to the head and, more exactly, to the brain; cf. 1 Sam. 25:37.” The heart is the place for understanding (*lāda’at*) and insight (*bīn*). Thinking (1 Sam. 27:1) and inner reflection (Gen. 17:17) take place in the heart.¹³

In a final section, Wolff describes how decisions of the will—the planning (Prov. 16:9), intentions (2 Sam. 7:3), and decision making (2 Sam. 7:27; Prov. 6:18)—all take place in the heart.

There are three other significant studies of *lēb(āb)* in addition to Wolff’s. Heinz-Josef Fabry’s work is the most thorough, surveying almost every occurrence of *lēb(āb)*.¹⁴ Andrew Bowling’s article is also informative as it supports both Wolff’s and Fabry’s conclusions.¹⁵ Alex Luc does suggest that “the words have a dominant metaphorical use in reference to the center of human psychical and spiritual life, to the entire inner life of a person.”¹⁶ Luc does not identify in what way the words are metaphoric. He does, however, describe the functions of the heart in a similar manner as the other authors.¹⁷ Thus, the four studies of the use of *lēb(āb)* or “heart” in the OT are consistent with each other. The heart is the source of emotion, intellectual and cognitive functions, and decision making. No mention is made of it pumping blood throughout the body.

New Testament *kardia*

Let us now turn to the usage of *kardia* (heart) which occurs 148 times in the New Testament (NT).¹⁸ A major source here is that of Friedrich Baumgärtel and Johannes Behm in the *Theological Dictionary of the New Testament*.¹⁹ The first section written by Baumgärtel reviews the use of *lēb(āb)* in the OT.²⁰ The rest of the article, written by Behm, includes the use of *kardia* by Greek writers, its appearance in the LXX (Septuagint), its occurrence in Hellenistic and Rabbinic Judaism, and finally its usage in the NT. Behm notes that “the heart is the centre of the inner life of man and the source or seat of all the forces and functions of the soul and spirit as attested in many different ways in the NT.”²¹ He then lists four categories of the heart’s function, each followed by an inclusive listing of texts. The four categories are the following:

- a. In the heart dwell feelings and emotions, desires and passions.
- b. The heart is the seat of understanding, the source of thought and reflections.
- c. The heart is the seat of the will, the source of resolves.
- d. Thus the heart is supremely the one centre in man to which God turns, in which the religious life is rooted, which determines moral conduct.²²

Another source is that of T. Sorg’s article on “Heart” in the *New International Dictionary of New Testament Theology*. After briefly reviewing the use of *kardia* in secular Greek, Sorg describes, again briefly, the OT uses of *lēb(āb)* in their literal and metaphorical senses, the latter meaning “the seat of man’s intellectual and spiritual life.”²³ Moving to the NT use of *kardia*, Sorg states that the heart is “the centre of physical life and man’s psychological make up.” The “powers” of the spirit, reason, and will “have their seat in the heart.”²⁴ The subsequent section of the article deals with the spiritual aspect of the use of *kardia*, how it is the center of spiritual life, its corruption by sin, and how God works to convert it to faith.²⁵ Sorg’s analysis is not that different from that of Behm, in that the heart is the center of the person where intellectual, emotional, and spiritual life is rooted. While the spiritual life may, in some sense, be metaphorical, the heart is still, in the literal sense, the center of the person’s emotional, intellectual, and decision making function.

Why Not “Brain”

In what sense can the Hebrew and Greek words for the heart and kidneys be seen simply as metaphors or figures of speech, not literal locations of the intellectual life of a person? Both YEC and OEC accept that the Bible does contain metaphors and figures of speech. They are not ultraliteralists, maintaining that every word must be taken literally. It is possible that these usages are metaphors, as they are often so used in cultures influenced by the Bible. The heart is often referred to as the seat of emotion and thinking. We commonly hear such expressions as, “I love you with all my heart,” or “What does your heart tell you?” It would be helpful, however, if the Bible gave the metaphor’s referent, but it does not. In over a thousand usages, there is not one instance in which the word for heart or kidneys refers to or describes their physical functions. While the Israelites were aware that the head did house an organ, there is no word in the Hebrew Bible for the brain.²⁶ This lack of knowledge of the function of the brain is in keeping with the other cultures in the Ancient Near East.²⁷

In Akkadian, the language used in Mesopotamia until the eighth century BC, there is a word for the brain, but in the literature there is no reference to its actual function.²⁸ The Egyptians were aware of the existence of the brain as early as the seventeenth century BC. It is mentioned in the sixth case of the “Edwin Smith Surgical Papyrus.”²⁹ However, its function was not known. During the embalming process, the lungs, intestines, stomach, and liver were preserved in canopic jars. The heart was placed back into the body to preserve it for judgment in the afterlife. The heart, being considered by the Egyptians to be the center of the person and seat of the emotions and intellect, was weighed against a feather representing the goddess of truth. The brain, however, was removed through the nose cavity and thrown away.³⁰

The Greek word for the head is *kephalē*; the word for the brain, *enkephalē*. This word does not appear in the NT. However, prior to and during the first century AD, there was a philosophical debate about the location in the body of its intellectual functions. Aristotelians and Stoics located them in the heart, whereas followers of Plato and some followers of Hippocrates located them in the brain.³¹ This debate was settled in the following century by the

Article

Science, the Bible, and Human Anatomy

experiments of Galen (AD 130–217). In his *De placitis Hippocratis et Platonis*, he refers to his vivisections (live dissections) of animals such as pigs and monkeys, an alternative chosen since dissection of human bodies was forbidden by law. His experiments, at times done in public, proved that it was the brain by means of the nervous system that controlled the body as well as being the source for intellectual activity.³² His “scientific” demonstrations ended the philosophical debate as they proved that the brain, not the heart, was the location of the mind.³³ His work, however, was accomplished in the century after Jesus’s life.

New Testament Writers: Cardiologists or Neurologists?

Troy Martin examines, in his article “Performing the Role of the Head: Man Is the Head of Woman,” the question of which party did Paul follow in locating the intellectual activity of the person, the cardiologists or neurologists? He cites five texts:

Romans 1:21, “For although they knew God, they did not honor him as God or gave thanks to him, but they became futile in their thinking and their senseless heart (καρδία) was darkened.”

1 Corinthians 2:9, “What no eye has seen, nor ear heard, nor the heart (καρδίαν) of a human conceived, what God has prepared for those who love him.”

1 Corinthians 4:5, “Therefore do not pronounce judgment before the time, before the Lord comes, who will bring to light the things now hidden in darkness and will disclose the purposes of the hearts (καρδιῶν).”

2 Corinthians 3:15, “Yes, to this day whenever Moses is read, a veil lies over their heart (καρδίαν).”

2 Corinthians 9:7, “Each one must do as he has determined in his heart (καρδία), not reluctantly or under compulsion, for God loves a cheerful giver.”

In each text, Paul identifies the heart as the location of thinking, purpose, lack of perception, decision making. Martin concludes, “These texts clearly place Paul on the side of the cardiologists.”³⁴

This same question may be asked about Jesus: was he on the side of the cardiologists or neurologists? In Matthew 15:18–19, Jesus says, “But the things which come out of the mouth come from the heart (*kardias*), and defile a man. For out of the

heart (*kardias*) come evil thoughts (such as) murder, adultery, sexual immorality, theft, false testimony, slander” (cf. Mark 7:20–21). Mark 11:23 records Jesus saying, “Truly I tell you, if anyone says to this mountain, ‘Rise up and throw yourself into the sea,’ and does not doubt in his heart (*kardia*) but believes that what he says will happen, it will be done for him” (cf. Matt. 21:21). In Luke 5:22, Jesus confronts the Pharisees by asking, “Why are you thinking these things in your hearts (*kardias*)?” (cf. Matt. 9:4; Mark 2:8).³⁵ Jesus’s statements reflect OT usage which views the heart as the place where mental functions take place. These texts clearly place Jesus on the side of the cardiologist.

It is at this point that we touch upon one of Christianity’s greatest mysteries. How could the one who is truly God have become also truly human? We know that Jesus was not only limited to time and space, having a human body, but was also limited in knowledge, that is, he was not omniscient. He did not know who had touched his garments to be healed (Mark 5:30–32; Luke 8:45–46), nor did he know the time of the coming of the Son of Man (Matt. 24:36; Mark 13:32).³⁶ Jesus became incarnate as a first-century Jew who spoke Aramaic (Mark 5:41) and Hebrew (Luke 4:17–19), possibly also Greek (Matt. 8:5–7), functioned as a rabbi, and accepted that culture’s understanding of the function of the human body.

Conclusions

The ramifications of this study are significant. First, it has been demonstrated that the writers of both the OT and NT attributed the intellectual functions of the brain to the heart. God did not, by means of inspiration, correct their understanding of the human anatomy; rather, he adapted his message of redemption to the common, though often mistaken, understandings of the ancient cultures. Thus, even though the scriptures are inspired by God, they are not therefore necessarily scientifically accurate.

Second, the Bible’s references to the kidneys and the heart are not scientifically accurate. This does not necessarily mean that the Bible does not inerantly address all matters of faith and practice. Nor does it mean that God lies. It does mean that God accommodates his message of salvation to the ability of humans to understand. Cultural factors such as language, view of the physical world, and political

practices are not overridden or corrected. While some statements may be scientifically and/or historically accurate, God's purpose is to reveal inerrantly his work of redemption and his will for how his people are to live: namely, by faith and practice.

Third, Jesus's references to the heart reflect a first-century understanding of its functions. This indicates that there was a real incarnation of Jesus as a first-century Jew. This does not mean that Jesus was not also truly God, for he walked on water, healed the sick, opened the eyes of the blind, and resuscitated the dead. The church has always rejected the extremes of Ebionism and Docetism, while confessing that Jesus was truly God and truly human.³⁷ By extension, we should also understand that Jesus's references to Moses³⁸ and to Adam and Eve³⁹ were in keeping with the accepted Jewish historical and literary traditions of that day, not divine statements asserting historical and/or literary facts.

Fourth, since the Bible is not scientifically accurate in its statements concerning the human body, it calls into question whether the account of creation should be understood as scientifically accurate. One could posit that God, having created the universe, inspired a scientifically and historically accurate account of creation while not supplying a scientific description of the human body. However, this leaves us with

two different levels of inspiration: one scientifically accurate, the other reflecting a culture which based its understanding of the creation, including the human anatomy, on common observation—inaccurate though it may have been. Further, why would God inspire an account of creation that contained information that would, millennia later, be discovered to be scientifically accurate, yet leave no clues to the scientifically understood function of human anatomy?

In the light of this study, the better choice appears to be that God utilized the cultural understandings of the people as a means of communicating his message of salvation. As the writers utilized the common concepts of the body, so the writer of the creation account made use of the cultures of the ancient Near East as a vehicle for a clear theological statement that there is only one God and that this one God is the Creator of all that exists.⁴⁰ This would mean that interpretations of both the young earth and old earth creationists are faulty for they impose on the biblical text modern concepts not available to either the writers or the target audience of God's revelation. The methods God used in creating the universe and its history are to be found by scientific inquiry, not by imposing on the texts of scripture interpretations inconsistent with its contextual settings. ☆

Now the Bereans were of more noble character than the Thessalonians, for they received the message with great eagerness and examined the Scriptures every day to see if what Paul said was true.

Acts 17:11, NIV

Appendix: Kidneys (*kělēyôt*)

(Translations of *kělēyôt* are in italics)

Job 19:27, kidneys

NIV: How my *heart* yearns within me!
NAB: my *inmost being* is consumed with longing.
TANAKH: My *heart* pines within me.
NRSV: My *heart* faints within me!

Psalms 7:9 [10], hearts and kidneys

NIV: who probes minds and *hearts*.
NAB v. 10: who tries hearts and *minds*.
TANAKH v. 10: he who probes the mind and
conscience ...
NRSV: you who test the minds and *hearts*,

Psalms 16:7, kidneys

NIV: *heart* instructs me
NAB: *heart* exhorts me
TANAKH: *conscience* admonishes me
NRSV: *heart* instructs me

Psalms 26:2, kidneys and heart

NIV: examine my *heart* and mind;
NAB: search my *heart* and mind
TANAKH: test my *heart* and mind
NRSV: test my *heart* and mind

Psalms 73:21, heart and kidneys

NIV: When my heart was grieved
And my *spirit* embittered,
NAB: Since my heart was embittered
And my *soul* deeply wounded,
TANAKH: My mind was stripped of its reason,
My *feelings* were numbed.
NRSV: When my soul was embittered,
When I was pricked in *heart*,

Psalms 139:13, kidneys

NIV: For you created my *inmost being*;
NAB: You formed my *inmost being*;
TANAKH: It was you who created my *conscience*;
NRSV: For it was you who formed my *inmost parts*;

Proverbs 23:16, kidneys (heart in v. 17, but not parallel)

NIV: my *inmost being* will rejoice
NAB: And my *inmost being* will exult,
TANAKH: I shall rejoice with all my *heart*
NRSV: My *soul* will rejoice

Jeremiah 11:20, kidneys and heart

NIV: test the *heart* and mind,
NAB: searcher of *mind* and heart,
TANAKH: Who test the *thoughts* and the mind,
NRSV: who try the *heart* and mind,

Jeremiah 12:2, kidneys

NIV: but far from their *hearts*.
NAB: but far from their *inmost thoughts*.
TANAKH: But far from their *thoughts*.
NRSV: yet far from their *hearts*.

Jeremiah 17:10, hearts and kidneys

NIV: I the LORD search the heart and examine the
mind,
NAB: I, the LORD, alone probe the mind and test
the *heart*,
TANAKH: I the LORD probe the heart, Search the
mind—
NRSV: I the LORD test the mind and search the
heart,

Jeremiah 20:12, kidneys and heart

NIV: and probe the *heart* and mind,
NAB: who probe *mind* and heart,
TANAKH: who examine the *heart* and the mind,
NRSV: you see the *heart* and mind;

Notes

¹Ken Ham states, "In the original autographs, every word and letter in the Bible is there because God put it there." See "Could God Really Have Created Everything in Six Days," chap. 8 in *The New Answers Book 1*, ed. Ken Ham (Green Forest, AR: Master Books, 2006), Kindle edition, loc. 2110. Hugh Ross views "Genesis 1–11 as the inerrant, inspired Word of God" in *Navigating Genesis: A Scientist's Journey through 1–11* (Covina, CA: Reasons to Believe, 2014), Kindle edition, loc. 12, 3666. Ross accepts that the Bible is "verbally inspired" and that "God is truthful and does not lie in word or deed (see Num. 23:19; Ps. 119:160; Isa 45:18–19 ... Heb. 6:18 ...)" in *More Than a Theory: Revealing a Testable Model for Creation* (Grand Rapids, MI: Baker Books, 2009), 72–73.

The theological basis of both positions is that of the nineteenth-century Princeton Seminary theologians who maintained that inspiration guaranteed absolute inerrancy and infallibility of scripture in everything it asserts, not just for those statements that pertain to faith and practice. See Charles Hodge, *Systematic Theology*, 3 vols. (New York: Scribner's Sons, 1889), 1:163. See also my article "Creationism and Science: The Continuing War," *Biblical Research* 57 (2012): 53–56.

²The basic work for this position is still that of John C. Whitcomb and Henry M. Morris, *The Genesis Flood* (Phillipsburg, NJ: Presbyterian and Reformed Publishing, 1961). See also Ken Ham and Tim Lovett, "Was There Really a Noah's Ark and Flood?" in *The New Answers Book 1*, particularly loc. 2666.

³See Randy Isaac, "Assessing the RATE Project," *Perspectives on Science and Christian Faith* 59, no. 2 (2007): 143–46, a review of Larry Vardiman, Andrew A. Snelling, and Eugene F. Chaffin, eds., *Radioisotopes and the Age of the Earth*, vol. 2 (Waco, TX: Institute for Creation Research, 2005).

⁴See Ross, *Navigating Genesis*, loc. 788–99, where Ross redefines the Hebrew words *zera'* ("seed" becomes "the embryos of any plant species"), *'ēś* ("tree" becomes "any large plant containing woody fiber"), and *pēri* ("fruit" becomes "the food and/or embryos produced by any living thing") to fit "plant species scientists have identified as the earliest land vegetation."

⁵Ken Ham and Jason Lisle state that "the Bible's historical account has been confirmed by archaeology, biology, geology, and astronomy." See *The New Answers Book 1*, chap. 1, loc. 357. Ross also maintains that Genesis 1–11 is scientifically and historically accurate, in *Navigating Genesis*, loc. 65, 110.

⁶Job 19:27; Pss. 7:9 [10], 16:7, 26:2, 73:21, 139:13; Prov. 23:16; Jer. 11:20, 12:2, 17:10, 20:12. Animal kidneys are mentioned fifteen times, usually in the context of sacrifice, and once as wheat.

⁷These four translations were chosen as they represent a broad spectrum of religious points of view: (1) *The Holy Bible, New International Version* (Grand Rapids, MI: Zondervan, 2011), Evangelical Protestant; (2) *New American Bible: Catholic Study Bible* (New York: Oxford University Press, 1990), Catholic; (3) *TANAKH: The Holy Scriptures: The New JPS Translation according to the Traditional Hebrew Text: Jewish Study Bible* (New York: Oxford University Press, 1999), Jewish; and (4) *New Revised Standard Version Bible: HarperCollins Study Bible* (New York: HarperCollins, 1989), National Council of Churches.

⁸As a 74-year-old male with an enlarged prostate, I do not want to consider what it might mean that my kidneys rejoice.

⁹H. J. Fabry, "*lēb lēbāb*," *Theological Dictionary of the Old Testament*, vol. 7, ed. G. Johannes Botterweck, Helmer Ringgren, and Heinz-Josef Fabry, and trans. David E. Green (Grand Rapids, MI: William B. Eerdmans, 1995), 399.

¹⁰Hans Walter Wolff, *Anthropology of the Old Testament*, trans. Margaret Kohl (Philadelphia, PA: Fortress Press, 1974), 40–41.

¹¹*Ibid.*, 44–45.

¹²*Ibid.*, 45–46.

¹³*Ibid.*, 46–51.

¹⁴Fabry, "*lēb lēbāb*," *Theological Dictionary of the Old Testament*, vol. 7, 399–437. Fabry does add another section on the religious and ethical function of the heart, including its functioning as the conscience, and the seat of vices and virtues, p. 426. Wolff incorporated these functions throughout his discussion.

¹⁵Andrew Bowling, "*lēb*," *Theological Wordbook of the Old Testament*, vol. 1, ed. R. Laird Harris, Gleason L. Archer Jr., and Bruce K. Waltke (Chicago, IL: Moody Press, 1980), 466–67.

¹⁶Alex T. Luc, "*lēb*," *New International Dictionary of Old Testament Theology and Exegesis*, vol. 2, ed. Willem A. VanGemeren (Grand Rapids, MI: Zondervan, 1997), 749.

¹⁷*Ibid.*, 749–54.

¹⁸T. Sorg, "*kardia*," *New International Dictionary of New Testament Theology*, vol. 2, ed. Colin Brown (Grand Rapids, MI: Zondervan, 1986), 182.

¹⁹Friedrich Baumgärtel and Johannes Behm, "*kardia*," *Theological Dictionary of the New Testament*, vol. 3, ed. and trans. Geoffrey W. Bromiley (Grand Rapids, MI: Wm. B. Eerdmans, 1965), 605–13.

²⁰*Ibid.*, 606–607.

²¹*Ibid.*, 612.

²²These categories with their supporting lists of texts can be found in *ibid.*, 612–13.

²³Sorg, *New International Dictionary of New Testament Theology*, 180–81.

²⁴*Ibid.*, 182.

²⁵*Ibid.*, 182–83.

²⁶"The heart is mentioned frequently as the seat of emotion and intellect, and the functions now ascribed to the brain were then thought to emanate from the heart. No word for brain is mentioned; the word *mo'ah* in Job refers to marrowbone." See "In the Bible: Anatomical Knowledge," *Encyclopedia Judaica: Medicine, Jewish Virtual Library: Everything You Need to Know from Anti-Semitism to Zionism*, accessed December 9, 2015, http://www.jewishvirtuallibrary.org/jsourc/judaica/ejud_0002_0013_0_13493.html.

²⁷*Ibid.* "The Hebrews [Israelites] were doubtlessly influenced in their medical concepts and practices by the surrounding nations, particularly by Egypt, where medical knowledge was highly developed."

²⁸Private communication (October 24, 2015) by JoAnn Scurlock, an independent scholar and author of *Writings from the Ancient World: Sourcebook for Ancient Mesopotamian Medicine* (Atlanta, GA: SBL Press, 2014).

Article

Science, the Bible, and Human Anatomy

²⁹Robert H. Wilkins, "Neurosurgical Classic-XVII: Edwin Smith Surgical Papyrus," Cyber Museum of Neurosurgery, accessed October 27, 2015, <http://www.neurosurgery.org/cybermuseum/pre20th/epapyrus.html>.

³⁰"Weighing of the Heart," accessed June 10, 2016, http://www.carlos.emory.edu/RAMESSES/3_weighheart.html.

³¹Troy W. Martin, "Performing the Role of the Head: Man Is the Head of Woman," *Biblical Research* 57 (2012): 75–77.

³²Claudius Galenus, *On the Doctrines of Hippocrates and Plato*, 3 vols., trans. and com. Phillip De Lacy (Berlin: Akademie-Verlag, 1980), 2:VI 3.4, 3.5, 3.9; 2:VII 1.4, 1.19, 3.2, 3.4, 5.13; 2:VIII 1.4, 1.18, 1.22, 8.11.

³³One might suggest that since the NT refers to the "mind," the writers knew that it was the brain, not the heart that was the center for mental activity. Two words, *dianoia* and *nous*, in the NT are translated "mind." However, the mind is an abstract concept referring to thinking, decision making, attitude, psychological state. The question is, where do these functions take place? It is common in western culture to attribute them to the brain, but in the OT and NT times, they were considered the function of the heart.

³⁴Martin, "Performing," 78–79. The translations are those of Martin.

³⁵Similar statements of Jesus can be found in Matt. 5:28, 9:4, 13:19; Mark 4:15, 11:23; Luke 6:45, 12:45, 16:15, 24:38.

³⁶If Morris's statement, "if Jesus is the infallible and omniscient Creator—and he is" referred to the ascended Lord (Rev. 5:9–13), he would be correct. However, the context of the statement is that of the incarnate Jesus who according to his own words was not omniscient. As such, his statement tends more toward Docetism than Orthodoxy. Henry M. Morris, *Scientific Creationism* (Green Forest, AR: Master Books, 1985), 251.

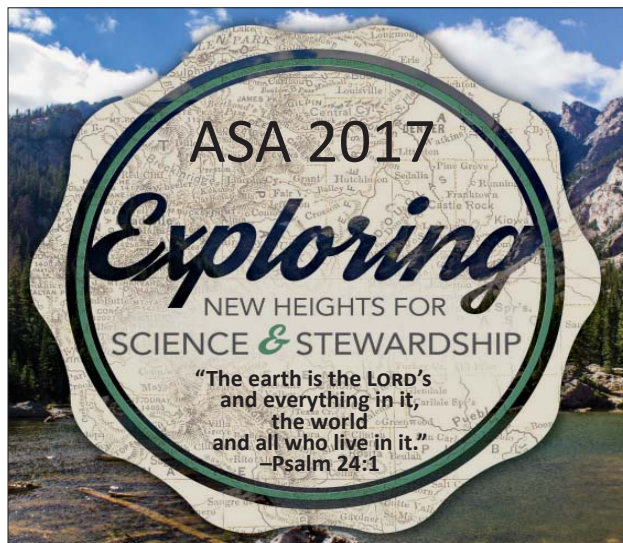
³⁷The early church struggled to explain how Jesus could be both truly God and truly human. A number of orthodox theologians attempted an explanation only to have their work rejected. Apollinaris of Laodicea (d. 390) was orthodox in his understanding of the consubstantial nature of Jesus with the Father and with his humanity. However, his concept "that Christ's nous is *atrerptos*, 'immutable' was rejected for he would not be fully human and thus could not 'earn the salvation of mankind.'" See Harold J. Brown, *Heresies: The Image of Christ in the Mirror of Heresy and Orthodoxy from the Apostles to the Present* (Garden City, NY: Doubleday, 1984), 164–65.

³⁸Matt. 8:4, 19:7–8; Mark 1:44, 7:10, 10:3, 12:26; Luke 5:14, 24:27, 44; John 3:14, 5:45–46, 6:32, 7:19, 22, 23.

³⁹Fazale Rana with Hugh Ross, *Who Was Adam?* (Colorado Springs, CO: NavPress, 2005), 44.

⁴⁰Two excellent books which work with the ANE cultures to interpret Genesis 1 are Johnny V. Miller and John M. Soden, *In the Beginning ... We Misunderstood: Interpreting Genesis 1 in Its Original Context* (Grand Rapids, MI: Kregel, 2012); and John H. Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate* (Downers Grove, IL: InterVarsity Press, 2009). For a fuller discussion of both the cultural background and modern scientific findings, there is the work of Denis O. Lamoureux, *Evolutionary Creation: A Christian Approach to Evolution* (Eugene, OR: Wipf and Stock, 2008).

ASA Members: Submit comments and questions on this article at www.asa3.org→FORUMS→PSCF DISCUSSION.



COLORADO SCHOOL OF MINES
GOLDEN, CO

JULY 28–31, 2017

"Come early, stay late!"

Pre-Meeting Friday Activities

- All-day Denver Front Range Geology Tour
- All-day Rocky Mountain National Park Tour
- Possible morning hikes in the foothills
- Morning trip to the National Renewable Energy Laboratory (NREL)
- Afternoon workshop on Energy: Basics and the Cutting Edge presented by Brent Nelson, Senior Scientist at the NREL
- Afternoon Coors Brewery Tour

Post-Meeting Monday Activity

- Afternoon Climate Change Tour Package: a 90-min. tour of the National Center for Atmospheric Research, Boulder, followed by a 30-min tour of the National Ice Core Laboratory, Lakewood

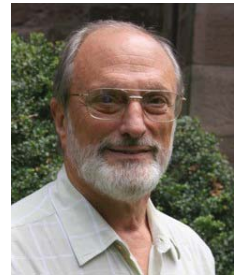
Bring your family!

Make your camping reservations now!

Check www.asa3.org for suggested family activities and local campgrounds.

Reading Genesis

Roy Clouser



Roy Clouser

In the March 1991 edition of this journal, I published an article titled "Genesis on the Origin of the Human Race." In that piece, I took the position that Genesis sees humans as essentially religious beings, and I went on to argue that this means that the origin of the human race is identical with the origin of religious consciousness in creatures. I still think that is correct. However, in that same article, I also took the position that the Adam of Genesis 2 was the first religious being on Earth, and was therefore the first human and the ancestor of all other humans. In short, I was still under the Augustinian spell of seeing Genesis 2 as a second creation story, contrary to an important rabbinical tradition I have discovered since then.

The following article presents the reasons why I am now forced to rescind my earlier position. In what follows, I will show why the Hebrew text does not present Adam and Eve as either the first humans or the ancestors of all humans, and that the New Testament actually denies both those claims. Neither can I any longer agree with Augustine's view that Genesis presents Adam and Eve as created sinless so that their fall from grace is the origin of sin in the world. That runs counter to a longstanding rabbinical tradition as well as to the Eastern Orthodox Christian understanding. It is owing to Augustine's great influence, I believe, that we tend to read such claims into Genesis, and are blinded to some crucial parts of the New Testament that could correct them.

The purpose of this article is to show why attempting to read early Genesis as supplying any scientific information whatever is wildly at odds with Genesis's place and role in the Jewish canon, and with the way New Testament writers used and understood it. The interpretation that takes the view that Genesis does, indeed, supply scientific information, I will call the "fundamentalist" view. Fundamentalists are a minority among Bible scholars and theologians, but form a larger and very vocal segment of Christian laity, especially in Britain and North America. In contrast to fundamentalism, the most widely held view of Genesis among scholars is the one called "concordism." Concordism opposes fundamentalism by holding that Genesis does not supply scientific information, but does take Genesis to make assertions that need to be harmonized with science. The canonical view I will defend here disagrees with both the fundamentalist and

concordist views, but in what follows, it is the fundamentalist position that I will focus on for two reasons: first, because it does the most mischief, and second, because if my case against fundamentalism succeeds, the concordist position goes away along with it.

The fundamentalist view of Genesis is one that a number of naturalists have also been delighted to endorse, since it makes the scriptures accepted by Jews, Christians, and Muslims, as inspired by God to be at odds with science.¹ So it should be noted that not only do the vast majority of Christian scholars disagree with the fundamentalist reading of Genesis, but the clergy and leaders of most major Christian denominations also say that they find no inconsistency

Roy Clouser, PhD (University of Pennsylvania) is Emeritus Professor of Philosophy and Religion at the College of New Jersey. He is the author of *The Myth of Religious Neutrality*, as well as *Knowing with the Heart*.

Article

Reading Genesis

between Genesis and the results of contemporary science.² I must say, however, that if these clergy and scholars have good reasons for thinking there is no such conflict, they have done an extremely poor job of communicating those reasons to the lay members of their churches. The average lay worshipper knows only that whenever naturalists can get a voice in the popular media, they proclaim that science has disproven what Genesis teaches and so conclude that the scriptures teach falsehood. Since the average layperson is utterly unprepared to meet this challenge, I hope to show here how that can be remedied.

One final word before launching my canoe into this (un)Pacific Ocean: Augustine prefaced his commentary on early Genesis with the remark that the only interpretations he was sure were wrong, were ones that said “only my view can be right.” I second that sentiment. What follows is but one Christian’s take on the subject, offered in the hope that it may help others who are struggling with the same issues. Therefore, what is most important is not whether my readers find every interpretation I propose to be correct in every detail. Rather, it is whether exposing the false assumptions behind the fundamentalist agenda can help clear the way for understanding Genesis on its own terms and with respect to its own purposes.

The Fundamentalist/Naturalist Agenda

The naturalist view, that the Bible offers antiquated and disreputable science, gives scripture too much credit and too little credit at the same time. It gives it too much credit by regarding it as offering hypotheses—theories—long before theory making had been invented. As far as we know, theories were first invented by Thales of Miletus who was born around 625 BC. That is perhaps 700 years after the time of Moses, and brilliant as Moses may have been, it seems a bit far-fetched to attribute the invention of theories to him.³ Moreover, given the way theories caught on and replaced myth making after Thales invented them, it seems equally unlikely that had Moses really invented theory making, it would then have been abandoned as a mode of explanation and needed to be re-invented by Thales. Instead of offering hypotheses, the writers of Genesis use the ordinary language of their time and place when they speak about the cosmos. For example, both in Genesis and other writings, biblical writers use such terminology as “the heavens,” “the earth,” and “the

water under the earth” to speak of their world. But that does not show that they had a *theory* about the cosmos. For them, those were commonsense ways of speaking that were straightforward descriptions of what they saw around them every day: the sky was above them, the earth was beneath their feet, and both the sea and well water lay below ground level. Is that a three-tiered view of the world? Surely so. Is it a hypothesis? Surely not. It is the same sort of commonsense language we still use when we speak of sunrise and sunset.

At the same time, however, viewing Genesis as a theory gives it far too little credit. Trying to see it as offering hypotheses to answer scientific questions about the cosmos misses what it presents itself as being: a brief sketch of God’s redemptive activity in relation to humans that had preceded the covenant with Moses. So, the first fault with the fundamentalist agenda is that instead of reading Genesis 1–12 as part of the covenant with Moses—the part that attaches it to previous covenant editions—they regard it as also providing a scientific account of the origin of the universe and of humans. In what follows, I will be arguing that such a view has no basis in the text of Genesis or in the place of Genesis in the Jewish canon. Rather than supplying natural history, this prologue sketches the beginnings of redemptive history.

“Fundamentalism” is, of course, a term that is used in different ways. Some Christians use it simply to mean belief in the gospel or a reaffirmation of the central teachings of the gospel. Thus, I need to make clear that this is not how I am using it. Here the term will be used to pick out a very distinctive mindset and program for interpreting scripture, both of which I find to be at odds with the contents of the scriptures themselves. The core of what is distinctive about the fundamentalist mindset is best characterized as a combination of one central assumption and two accompanying subordinate assumptions. The central assumption is this: since the scriptures are inspired by God, they (and any theology taken to be the right explanation of them) must therefore deliver inerrant information about any subject matter they mention or touch on, even peripherally.⁴ This makes the scriptures a virtual encyclopedia of infallible information on any subject, including the subjects studied by such sciences as astronomy, geology, paleontology, physics, and biology. I call this the “encyclopedic

assumption." The subordinate assumptions to the encyclopedic assumption are the following: (1) the default understanding of the events involved in God's covenant dealings with humans should be to see them as having the widest possible impact on both the natural and human world, and (2) we may freely postulate miracles to defend both the encyclopedic view of scripture and the assumption that the covenant-events it records are to be taken as having the widest possible impact—even where no miracles are indicated by the text.

A clear example of the encyclopedic assumption can be found in the work of Henry Morris. Rather than seeking to understand the message of Genesis on its own terms, Morris tells how he approached the scripture with the encyclopedic assumption and therefore insisted on "finding" the information he was interested in. Morris says,

But there was still the problem of the age of the earth ... if this could be settled anywhere it would have to be in scripture ... It seemed impossible that God would have left so important a matter ... unsettled in his Word. Surely God has the answer in his Word!⁵

This adds an additional error to the encyclopedic assumption: to take for granted that the right approach to scripture is to expect God to tell us what *we* want to know, rather than to seek to understand what *God* wants to tell us. Moreover, this mistake not only lacks humility, but it is false to the texts. It is false to them because it ignores the way the scriptures repeatedly present themselves as the record of God's redemptive dealings with humanity. This is the reason why early Genesis cannot be taken as a stand-alone essay. Rather, as a prologue supplying background for the covenant with Moses, it is part and parcel of that covenant so that both its intent and content are redemptive through and through. It does not purport to be an encyclopedia of nonredemptive information.

Likewise, the first corollary to the encyclopedic assumption is also mistaken. For example, fundamentalists take the flood from which Noah was delivered to have covered the entire planet, and the judgment of God against those who tried to build a tower at Babel as the origin of all languages. That sort of leaping to ascribe the most grandiose imaginable scope to covenant events is completely unwarranted. Often events that were of enormous importance to

God's covenant people and to God's plan of salvation seemed utterly insignificant to the vast majority of humans at the time they occurred. We need only recall the birth of Christ to see this point. The only people besides Joseph and Mary who even knew of the miraculous birth were one lone priest on duty at the Temple, a few unnamed shepherds on the night shift outside Bethlehem, and an undisclosed number of wise men.⁶ God's actions in the world can be of enormous covenantal importance without (at first) causing a ripple in the prevailing culture or disturbing, in the least, the superpowers of the day.

The second corollary—the practice of inventing miracles to defend an encyclopedic interpretation—results in a tendency to replace God's providential sustenance of creation with his specific actions in the cosmos, especially those actions that include miracles. This is an interpretive disaster because once the difference between providence and miracle is blurred, the result is that virtually every event in creation becomes partly miraculous. For example, whereas you or I would look out the window and say, "It has started to rain," a prophet might phrase the same information as "The Lord is sending rain upon the earth." The prophet's words remind us that it is by God's providence that the cosmos is ordered such that its natural forces have coincided to produce rain. God still sustains and controls those forces, of course, but they, under his plan, are the proximate cause of the rain. By contrast, there are fundamentalists who understand such a prophetic remark to require that any description of the meteorological conditions that bring about rain must be incomplete unless God is brought into the explanation. Instead of God being the creator who brought the cosmos into existence and who sustains all the laws and forces which cause rainfall, many fundamentalists want to find gaps in the creation order such that physics cannot adequately explain rainfall at all. The claim is that these gaps need to be filled by a direct action of God, although there is nothing in the outlook of biblical writers to suggest such a view.

On the proper Christian view as I see it, God's creativity has produced the natural order; he is the ultimate reason why there are such things as planets, water, wind, rain, and the laws guaranteeing their orderliness. But it is precisely the order of nature he created that explains rain in the sense that science seeks to explain it. An explanation of rain by physics

Article

Reading Genesis

does not include why there is a cosmos at all, or why the laws governing it are what they are, but is an explanation of how the relevant parts of the cosmos work to produce rain. Why there is a cosmos at all is an extra-scientific, distinctly *religious*, issue.

There are, of course, occasions on which God did (and still does) act directly in creation, and these include both his encounters with humans that are accompanied by miracles and those which are not. It is a huge mistake in the interpretation of nature, however, to see every natural event as requiring a special act of God, since it encourages the mistake of postulating miracles whenever they seem needed to support the encyclopedic assumption. This is not to deny that scripture says that the creation can somehow point to its creator. But contrary to many fundamentalist programs, scripture does not suggest that the universe witnesses to its creator by requiring that God be imported into explanations of how nature works. Nor is there the slightest hint in scripture to the effect that its teachings can suggest or confirm any scientific hypothesis.⁷ Instead, as I see it, the scriptural statements that creation witnesses to its creator are best understood to refer to the way nature *exhibits itself as dependent rather than self-existent in part or in whole*. So, viewed from this standpoint, the fact that creation witnesses to God is no excuse for confusing God's providence with the occasions on which he acts within creation to make himself known.

Likewise, there is not the slightest suggestion that the way creation witnesses to God is by providing premises from which God's existence can be inferred, or by having truths revealed in scripture provide (or confirm) the best theories for explaining natural events in creation. Such ideas are further spin-offs of the encyclopedic assumption and lead to the pernicious expectation that revealed religious teachings may be either provable by, or confirmed by, the sciences. According to the New Testament, the real grounds for belief in God is the experience of God, and that the most common type of such experience is that of seeing it to be self-evident that some cluster of revealed teachings is the truth about God from God. Therefore Paul tells the believers at Ephesus that they "see with the eyes of your mind" the truth of the gospel (Eph. 1:8). Thus, taking God to fill gaps in scientific explanation is as unbiblical an idea of how to defend revealed truth as the encyclopedic

assumption is a mistaken idea of how to interpret it. The two mistakes encourage one another, of course. Once scripture is viewed as giving truths for every science, and once the theories it is taken to supply or support are seen as the best possible scientific explanations, it is an easy (and nearly) irresistible step to regard such scientific "successes" as confirming the truth of scripture.

Those who indulge in the encyclopedic assumption see it as honoring scripture, and regard objections to their program such as the ones I have just made as lowering scripture's authoritative status. But I reply that it is just as dishonoring to God's Word to claim for it more than it claims for itself, as it would be to claim less. For this reason it is important to see from the outset why encyclopedism and its corollaries are mistaken when compared to the view of scripture taken by Bible writers themselves. In support of this point, consider what Paul wrote on this very subject to his protégé, Timothy:

and from childhood you have known the scriptures which are able to give you *the wisdom that leads to salvation* through faith which is in Christ Jesus. All scripture is inspired by God and is profitable for *teaching, for reproof, for correction, for training in righteousness*; (2 Tim. 3:15–16, NASB, emphasis mine)

How much clearer could it be? The inspiration of scripture is explicitly specified as attaching to truths that lead to the right relation to God—to salvation. That is what is declared to be inspired and reliable.⁸ To be sure, Paul does not explicitly *say* that scripture may contain inaccuracies on other matters. But his wording shows that he was unconcerned with leaving that as an open question—*something no fundamentalist could ever do!* Had Paul been working with the encyclopedic assumption, then once he had raised the subject of scripture's inspiration, he could not have failed to assert its encyclopedic inerrancy. But he did nothing of the sort. What is evinced by his statements is, on the contrary, a mindset that is a million miles from affirming anything like inerrancy-on-every-topic.⁹

The public media have long missed these basic assumptions of fundamentalism, and have instead described it as the "literal" or "overly literal" reading of scripture. This has led to some serious misjudgments of it. For while excessive literalism is at times true of fundamentalist's claims, the main thrust of

their claims does not always take scripture literally. Keep in mind that if a text is figurative, symbolic, metaphorical, anthropomorphic, or poetic, then its *prima facie* literal meaning is figurative, symbolic, metaphorical, anthropomorphic, or poetic. Similarly, whether a text is assumed to be a will, a contract, fiction, a grocery list, a court decision, or a scientific theory will also determine what we take to be its literal meaning. Clearly, then, it is the wish that scripture be an encyclopedia that drives the fundamentalist's literalism, and not the other way round.

The above explains why I said it is crucial at the outset to understand Genesis as a prologue to the covenant given to Moses. As such, the correct understanding of its literal meaning must be *canonical*: that is, its literal meaning is to be determined by *how it was to function as a religious authority within the community of believers to which it was revealed*. That its function was to be a *religious* authority is clear from the entire Jewish tradition and is reflected in the quote from Paul given above. So it is important to see that it is not over-literalism that is at the heart of the fundamentalist mistake, but a mistaken idea of what "literal" must mean in this case. Fundamentalists (and the naturalists who agree with them) take the literal meaning of Genesis to be what it would be were Genesis a modern science text arising from the background of western European culture rather than a text that may have sources over 3,000 years old, assumed a different cultural background from our own, and was written in languages and stylistic conventions that are completely foreign to us today.

The importance of this point is crucial. Think about how the meanings of many words can differ even within our own time, culture, and language. If I say, "I am mad about my flat" in the US, I will be understood to be angry about the failure of one of the tires on my car. But the exact same sentence in England would be understood to express my delight with my apartment. The point is that since the meanings of terms can vary greatly over time even within the same culture and language, we must be even more careful when reading a text that is in a foreign language, is from a remote time, and has a defunct culture supplying its background assumptions. This point should be obvious, so I will not belabor it: there is simply no excuse for reading Genesis as we would if it were a contemporary western European text. In short, there is a sense in which the fundamentalists'

claim to be taking the literal meaning of the text is correct, but it is the wrong sense. Their reading *would be* Genesis's literal meaning were it a modern western text. But since that is not what it is, its literal meaning must be what it meant for ancient Mesopotamians looking for religious guidance rather than for a modern reader preoccupied with scientific questions.

Some Corrective Principles of Interpretation¹⁰

Religious Focus

The first rule for interpreting scripture, then, is to recognize its *religious* focus. This is guaranteed by the fact that the scriptures contain a record of God's redemptive actions as they have been conveyed to humankind in the format of covenants. The Bible is the collection of books that claim to be an account of God's redemptive actions for rescuing the human race and the rest of the cosmos, and every part of that collection is to be seen as conveying something significant about that redemptive relationship. This point is part of the view I have been calling "canonical." It means that scripture's purpose is to be an authoritative guide for the religious life of the believing community to which it was revealed. At no point does it suddenly shift its purpose to that of providing a science handbook for insiders.

The Assumption of Ancient Common Sense

A second interpretive guideline is that biblical writers everywhere appear to assume what I will call a "commonsense background" for what they have to say. This means that the primary sense of their language is to be understood as what the everyday meaning of their words would have conveyed to people speaking that language, at that time, and in those circumstances. This is not to deny that, since it is God inspired, scripture can at times have an additional, deeper, spiritual meaning than its human authors were conscious of at the time of their writing. But it does require that any idea of such a deeper meaning can only be discerned and derived from its primary "commonsense" meaning.

In place of this, many fundamentalist writers seem to regard the proper meaning of a text as whatever they thought it meant the first time they read it. When such first impressions are then distorted by the influence of the subordinate assumption that everything

in Genesis should be taken as having the greatest imaginable scope, even an offhand commonsense remark can be mistaken for a scientific law. One example of this is the way some fundamentalists take the expression “the life of the flesh is in the blood” to be a scientific principle instead of a commonsense observation that animals which have blood cannot live without it. (Some fundamentalists have gone so far as to take this expression as a strict equivalence, and therefore insist that plants and insects are not alive on the grounds that nothing without blood can be a living thing!¹¹) Once again this is a mistaken view of what the literal meaning of scripture is, because the reading was undertaken with a mistaken view of the *type* of literature to be interpreted. Were those books modern works on science, then their literal meaning could be what the fundamentalist takes them to say; in that case they would, indeed, be at odds with the discoveries and theories of modern science. But since the books included in the Bible are not modern and do not address scientific questions, their literal meaning is not what the fundamentalist says it is.

Taking the text as providing a scientific account is a serious failing because it serves to pervert its religious focus and canonical function.¹² By contrast, medieval theologians such as Thomas Aquinas took scripture to be the revelation of super-nature rather than of nature, and the Protestant Reformers also steadfastly insisted on its religious focus. For example, in his commentary on Genesis, John Calvin insisted that scripture has been written from the commonsense viewpoint of the average person and is aimed at giving information about how to stand in right relation to God, not at conveying science:

For, to my mind, this is a certain principle, that nothing here [in Genesis] is treated but of the visible form of the world. He who would learn astronomy, and other recondite arts, let him go elsewhere. Here the Spirit of God would teach all men without exception ... [Genesis] is the book of the unlearned.¹³ (brackets mine)

A Canonical View of the Text

Taking seriously the inspiration of scripture requires, in my opinion, that we accept not only that the original authors of its books were guided by God’s Spirit, but that those who consequently edited and compiled them were also. This point has the imprimatur of God himself because it is the final form of

scripture that the Holy Spirit uses to bring humans to faith in him. For this reason, it is the full and final text that is to be considered the Word of God. From the canonical viewpoint, therefore, tracing out the sources of texts or trying to reconstruct how and when they were edited may be interesting projects, but they can never justify regarding any preliminary stage of scripture’s development as its “true” message in order to dismiss its final form. (This rule will prove crucial especially for the story of Adam and Eve found in Genesis 2:4ff.) But since there is not the room for a detailed defense of the canonical view in this article, I can only cite Brevard Child’s excellent summary of it:

The reason for insisting on the final form of scripture lies in the peculiar relationship between the text and people of God which is constitutive of the canon. The shape of the biblical text reflects a history of encounter between God and Israel ... the significance of the final form of the biblical text is that it alone bears witness to the full history of revelation ... By shaping Israel’s traditions into the form of a normative scripture the biblical idiom no longer functions for the community of faith as a free-floating metaphor, but as the divine imperative and promise to a historically conditioned people of God whose legacy the Christian Church confesses to share.¹⁴

Employing the New Testament to Understand the Old Testament

A long-standing Christian rule for interpreting scripture is that the Old Testament must be read in the light of the New Testament. This does not mean reading back into an Old Testament text additional information supplied by the New Testament. Rather, it means that newer revealed truth is to be used to gain a proper Christian interpretation of the redemptive themes of the Torah, Psalms, prophets, and other Old Testament writings. An example of the application of this principle concerns the Christian understanding of God as the Creator of time. Jewish scholars and commentators had arrived at the doctrine of creation *ex nihilo* before the rise of Christianity, but no Old Testament text explicitly stated that God created time. By contrast, the New Testament does explicitly say that God created the ages of time through Christ (Heb. 1:2), and that God’s plan (and thus God himself) is “before time of the ages” (1 Cor. 2:7; 2 Tim. 1:9; Titus 1:2).¹⁵ Christians are therefore *required* to take that doctrine

into account when interpreting the creation story in Genesis, so that God's transcendence of time cannot be ignored. We are also obligated, of course, to be guided by how New Testament writers understood early Genesis—a point that will turn out to be of crucial importance to understanding the story of Adam and Eve.

With these guidelines in mind, let's now look at Genesis's creation account *without* the encyclopedic assumption and its corollaries. Let's see what happens when we try to understand it guided by maintaining its religious focus, seeing it as being expressed in the language of ancient common sense, maintaining its canonical status, and as supplemented by the light of new revelation from the New Testament.

Genesis Chapter One

"And God said ..."

The first thing to notice is that the way in which the account goes about affirming that God created everything *cannot be anything other than anthropomorphic with respect to God*. There is much in the Jewish tradition that already recognized this point prior to the New Testament,¹⁶ and we have seen that the New Testament is explicit about God being the creator of time and space and everything "visible or invisible" (Col. 1:16). So when the text describes him as speaking, it *must be anthropomorphic* since God could not literally have spoken. Speaking requires lungs, lips, vocal chords, and a tongue, whose existence and activities require a physical body and air, which in turn require space and duration in time.¹⁷ Thus we must view the account as describing God *as though he were a human while being fully aware that he was not*.

For this reason alone, anyone wishing to insist that the text must be read as teaching that the universe was created in six twenty-four-hour days must face the following unanswerable questions: (1) Why take the days as literal in the midst of an account that is from the outset so thoroughly figurative? (2) What could justify the claim that we must switch back and forth between the anthropomorphism of God speaking and a literal understanding of the days of his creating? and (3) How can such switches avoid being wholly arbitrary? Notice that such switching would have to be made *within* each of the days and not just between the opening "Let there be light" and

the introduction of days as units of creation. Since each day includes some additional anthropomorphic act—God "separates" things; God "calls" something by a name; God "sees" that something is good, and so on—the anthropomorphisms are internal to each day. Theologically, it is easy to see why the text proceeds in this way. Since God is independent of time and space and is the creator of all the laws found in the cosmos, there can be no way for us to conceive or describe *how* he created, because nothing we can conceive can fail to involve time and law-order. Therefore it seems obvious—if we read without the encyclopedic assumption—that God is depicted as creating in six days and resting the seventh because the creation story is a prologue to the covenant of Moses which is going to command a six-day work week as a requirement of the Jewish people: "... for six days work may be done, but on the seventh day you shall have a holy day, a Sabbath of complete rest to the Lord ..." (Exod. 35:2).

The anthropomorphic character of the language in Genesis 1 is also reason to understand God's blessings and commands addressed to humans in verses 28–30 as expressions of his purposes for humanity rather than as speech actually directed to specific humans. It is only from Genesis 2:5 onward that God anthropomorphizes himself and, in a theophany, addresses actual speech to specific individuals named Adam and Eve.

The Days of Creation

The next point against an encyclopedic reading of the days of creation was raised by St. Augustine about 1,600 years ago. Augustine noticed that since the account has the sun, moon, and stars being created on the fourth day, the previous three days cannot be solar days.¹⁸ He then goes on to make the suggestion that the word "day" must have a figurative meaning and is an accommodation to our ordinary ways of thinking, needed because God's timeless creating is beyond literal description. Please bear in mind that the literal meaning of "day" is not incompatible with its also having a metaphorical meaning. In fact, unless the term's literal meaning was an ordinary workday, it could not function as a metaphor for the "work" of creation. (A metaphor is the calling of a thing by the name of something it is not, in order to call attention to how it is like the thing which it is not.) So unless the literal meaning of "day" was a 24-hour period of work and rest, it could not serve as

Article

Reading Genesis

a metaphor for God's timeless accomplishment of his purposes. Moreover, I find it impossible to suppose that the ancient authors and editors of Genesis could have failed to realize this themselves. Deliberately writing about "days" and asserting them to have occurred before the sun and moon existed shows that they intended "day" to mean more than merely twenty-four hours. They would also, at a minimum, have to have meant *God's* days: special episodes of creation that cannot be confined to time as humans experience it.¹⁹

So Augustine was right. But there is even more in favor of his view than the argument he gave. The additional evidence is the way the description of the creative days is structured. By "structured" I mean the way that the days are arranged. On day 1, God separates light from darkness; on day 2, he separates sea from atmosphere; and on day 3, he separates land from sea and creates plant life. On day 4, God creates the sun, moon, and stars; on day 5, God creates sea life and birds; and on day 6, he creates animals and humans. On day 7, he rests from his work. My argument is that this arrangement of the days counts against taking the days of creation only as solar days. They are arranged so that what God creates on the first three days are preconditions for—exist for the sake of—what he brings about on the next set of three days:²⁰

Day 1	Day 2	Day 3
light	sea	land
darkness	atmosphere	plants
Day 4	Day 5	Day 6
sun, moon, stars	sea life/birds	animals/humans

Surely the correspondence here is too obvious and too prominent a feature of the story to be an accident! The first group of three days tells of God creating the background conditions for what he wished to bring about in the second group (the day-day matchup is not perfect, but is still hard to miss). Arranged in this way, the *teleological* character of the order is plainly exhibited. The focus here is upon *purpose rather than time*, although it expresses God's purposes by means of a temporal week. It deliberately represents God as a workman laboring through a workweek and resting on the Sabbath so as to serve as a model for what the rest of the covenant of Moses is about to require of God's people. But the point of what happens

within God's workweek is teleological rather than chronological.

The days, then, are intended both literally and metaphorically at the same time. They are literal twenty-four-hour days insofar as they express the workweek Israel was to follow. But insofar as the days are applied to God's creating, they are an anthropomorphic expression of the "why" of creation (for communion with humans) rather than the "how" (a cosmological description). Genesis is unlike its contemporary mythological cosmologies in precisely this way. Whereas most of them attempted an account of *how* the cosmos came about, Genesis focuses on God's *purposes* from the outset.²¹ For this reason, construing the days strictly as twenty-four-hour days or as geological eras should both be seen as mistakes driven by the encyclopedic assumption. The time frame of a workweek serves the end of conveying God's purposes, not natural history.²² Moreover, the arrangement of creation-days not only sets the stage for God's purpose of fellowship with humans in the next chapter, but also fills out what was lacking in the cosmos as it first appeared. According to Genesis 1:2, the cosmos was at first "without form and void." The Hebrew word for "void" is one that is used for a desert and so connotes "void of life." To rectify these two deficiencies, in some of the days God gives the cosmos form, while in others God fills it with living beings.

Another objection to taking the meaning of the days of creation only as twenty-four-hour days, is that the New Testament does not do that. Genesis's account not only mentions six days of work but a seventh day of God's rest, and the New Testament explicitly says that day seven *is still going on* (Heb. 4:1–10).²³ This rules out that the days of Genesis 1 are to be thought of either as only twenty-four-hour days or as geological eras. Once again they are used as metaphorical (anthropomorphic) expressions of God's purposes in bringing about the cosmos, while the processes by which he accomplished those purposes are not in view. What is more, in this same section of Hebrews (4:3), there is also the remark that God's works were actually finished "from the foundations of the cosmos"—an expression that is used interchangeably in the New Testament with the expression "from before time of the ages."²⁴ That being so, it amounts to saying that although God's rest is represented as a day, his creative purposes, creative acts, and rest from

creating are all actually independent of time.²⁵ Nor is that all. Recall that the anthropomorphism of God as workman is made more specific when Genesis goes on to depict him as a particular sort of workman: one who forms the first humans from the “dust of the ground.” But in Romans 9:20–23, Paul specifically takes that to be metaphorical. In a clear allusion to Genesis, he *compares* God to a potter and humans to clay pots. For him they are *alike*, not identical.²⁶

God's Relationship with Humans: Adam and Eve

Covenant or Not a Covenant?

The first question to be tackled here is whether it is correct to see God's dealings with Adam and Eve, beginning in Genesis 2:7, as having a covenant structure. There are several objections to seeing their initial relation as a covenant, but the decisive one is the theological objection that everywhere else in scripture, covenants appear as remedial and redemptive, whereas the initial arrangement with Adam and Eve could not have been. Since Adam and Eve had not yet disobeyed, the objection goes, there was nothing to be remedied concerning their relation to God. To be sure, some of the elements of a covenant are present: God takes the initiative, God sets the terms of the arrangement, God issues commands and makes promises, and God threatens punishment should Adam or Eve disobey. But the key missing element that does, indeed, disqualify this first relationship as a covenant is that it is not redemptive. This has led one Old Testament scholar to propose the term “probationary” to describe what is at the heart of the initial relationship of humans to God, and this proposal has the added value of explaining why the term “covenant” is so notably absent.²⁷

After Adam and Eve failed their probation, however, a redemptive element is introduced into their relationship to God so that at that point (Gen. 3:15) it becomes at least quasi-covenantal. This element appears most clearly when God adds to his earlier promises the eschatological assurance that one of Adam and Eve's descendants will defeat the Tempter who had induced them to disobey and thus fail their probation. Besides, when the word covenant finally does appear (Gen. 6:18), it sounds more like a covenant renewal than like the initial appearance of that relationship. It sounds as though God is say-

ing to Noah, “Since my covenant did not work out with Adam and Eve, I will now make it with you.” Perhaps the reason the term “covenant” is avoided in Genesis 3 is that the element of redemption introduced there is so overshadowed by the imposition of God's judgment upon human disobedience.

A final piece of evidence in favor of this point is found in Hosea 6:7. There the prophet quotes God concerning the faithless of Hosea's day: “But like Adam they have transgressed the covenant; there they have dealt treacherously with me” (so the ESV, RSV, NIV, and New American Standard versions). If that translation of this verse is correct, then in fact there is confirmation elsewhere in scripture that Adam's (later) relations to God had morphed into a covenant. There are, however, two objections that have been raised against this translation. The first is that outside of Genesis 2–5, “Adam” is most often used in the Old Testament to mean “humanity in general.” Against this objection, there is the point that if it referred to humans generally, the term would have to refer to Gentiles as well as to the people of Israel. But “Adam” could not possibly include Gentiles in Hosea's remark, since Gentiles never had a covenant with God that they could transgress.

The second objection to the translation is that because the word “there” occurs in verse 7, “Adam” may be a place name rather than the name of the man who disobeyed God in Genesis 3.²⁸ Against this possibility, however, there is the weight of the LXX (Septuagint) translation which takes the word “there” to refer to the area of “Gilead” mentioned in the next verse. Since the seventy Rabbis did not think “Adam” was a place name, it remains at least highly plausible that Hosea 6:7 does, indeed, refer to the Adam of Genesis and to his transgression of God's “covenant” — where that term stands for God's commands rather than for a full-blown covenant relation (Paul also speaks of it as God's “law” in Romans 5).²⁹ This second objection to the translation is, therefore, at best inconclusive, and the weight of argument seems to favor the translation as it appears in the versions cited above.

What the Text Says

The differences of interpretation that result from rejecting the encyclopedic program of interpretation are of even greater significance when we proceed to what the text has to say about God's first encounter with humans. I take this new topic to commence

Article

Reading Genesis

with Genesis 2:4, so that the previous topic, the birth announcement of the universe, actually ends with 2:3. That is, when Genesis 2:4 says, “This is the generation of the heavens and earth when they were created, in the day the Lord made earth and heaven,” it serves as a superscription for the account that follows, thereby connecting the coming focus on humans to the general creation account of Genesis 1:1–2:3.³⁰ Because these are two accounts with different focal points and not two accounts of the same events, it is mistaken to read 2:7 (“the Lord God had formed man of the dust of the ground and breathed into his nostrils the breath-of-life ...”) as a more detailed description of 1:27 (“God created man in his own image ... male and female he created them”). We will return to this point in detail later, but before tackling it, we need to notice two more things that have been introduced by Genesis 1 that can serve as background for the discussion to follow: the first is about God; the second, about humans.

In each case, the nature of the two parties to the probation is conveyed by means of a “making” story.³¹ The Creator-God is the cosmic potter who unilaterally proclaims his communion with humans; humans are his clay vessels formed to be his image bearers and live in fellowship with him. Because God has created humans for communion with himself, his nature is also shown to include that he is caring of humans. Human nature is also then further elucidated in Genesis 2:7 ff. Though humans are in the image of God, they are nevertheless still made of “the dust of the earth”—an expression that always signifies mortality in the Old Testament.³² In this way, Genesis denies that humans are bits of divinity stuffed into bodies as, say, some ancient Greeks thought. Rather, says Genesis, we are by nature totally dependent on God the way an image depends upon what it reflects, and—contrary to Augustine—we are naturally subject to death since the very stuff we are made of renders us mortal. At the same time, however, God’s purposes for humans include his glorious provision for them to overcome death. So long as humans continue to stand in proper relation to God, God will see to it that they do not die. Everlasting life is offered as a promissory gift precisely because it is not part of human nature. All this helps us to see a crucially important point, namely, Genesis’s (implicit) idea of the defining characteristic of what it means to be human.

The definition of “human” is central to all discussions of human origins since no discussion of the topic can avoid some idea as to what counts as a human. Is a human a featherless biped? A two-legged creature that walks upright and uses tools? A rational animal? An animal that makes tools? That cooks food? That uses language? Makes art? That has a sense of humor? That has a sense of right and wrong? All of these definitions (and more) have been defended in the past, and are inadequate compared with the definition we can frame on the basis of Genesis’s view of humans. For although Genesis never offers a formal definition of “human” as such, it clearly depicts humans as having been created for a relation of love (*hesed*) and communion with God—in other words, it treats humans as essentially *religious beings*. Humans are creatures who have what Calvin called an innate *sensus divinitatis* (sense of divinity). They can ask and understand answers to the question: What is the divine reality upon which all things (including we ourselves) depend?³³ Furthermore, Genesis and the rest of the scriptures speak of humans as beings who inevitably have some such belief, whether it is belief in the right divinity or in a false one (e.g., Romans 1). In the light of this view of human nature, we may conclude that the origin of humans on Earth is identical with the appearance of mortal beings who are in the image of God and who have an innate capacity for religious belief.³⁴ In Genesis’s view, there are no human beings until the appearance of beings with the capacity for religious belief.

The proposal that the “making” stories in Genesis should be understood to convey the nature of the Creator and of Adam, together with the point about humans as essentially religious beings, can also be applied to the making story about Eve’s having been made from a rib of Adam. The symbolism clearly implies that her nature is the same as Adam’s, but also conveys that her humanity, in some way, depends on his. This, however, would mean her *completed* humanity as it is fulfilled via their relationship with God. Since the story tells us that Adam received the terms of that relationship from God but does not say the same about Eve, it strongly suggests that she received it from Adam (if it were not told to her by God, who else could it have been?). In that case, Eve’s completed humanity came to her via Adam. It is important to notice that when Paul refers to this in 1 Timothy 2:13, he does not say that Adam was “created” first, as many translations render it. Instead

of using “created” (*ktizo*) as he often does, Paul uses “formed” (*plasso*) which often means intellectually or spiritually shaped. That fits perfectly with the view I am now advocating and with Paul’s main point in 1 Timothy. Since Eve had not received the conditions of her probation directly from God, she was the more easily deceived, and since Adam did have them directly from God, he was the more culpable—which perhaps explains why Paul says that it is *Adam’s* sin that left the human race subject to death.

Clearly, then, Genesis’s conception of what it means to be human is not merely a *biological* classification. Paul Tillich has captured this point nicely:

The famous struggle between the theory of evolution and the theology of some Christian groups was not a struggle between science and faith, but a struggle between a science whose faith deprived man of his humanity and a faith whose expression was distorted by biblical literalism ... A theory of evolution which interprets man’s descent from older forms of life in a way that removes the infinite, qualitative difference between man and animal is faith not science.³⁵

With this as background, we are now prepared to tackle the all-important key text on which so many issues depend, namely, the statement that God “breathed into Adam the breath of life and he became a living being” (Gen. 2:7). This is the crucial text for the fundamentalist/nonfundamentalist controversy. For if verse 7 is a literal description of an act by which God formed humans, the fundamentalists would be right in rejecting not only evolutionary theory but any and every scientific account of human origins. *For if Genesis 2:7 is a description of precisely how humans first appeared on Earth, then humans had no natural origin whatsoever.* So is what we have in Genesis 2:7 a literal description of an act performed by God by which the first human being appeared on Earth? Is it a more detailed description of the general statement that God created humans, as that was given in Genesis 1:27? My answers to these questions are yes, it is a description of an act of God, but no, it is not the act by which God initiated the human race on Earth.

The first point to be made here is one that I alluded to earlier. It is the way the Hebrew grammar governs the use of the term “generations” in Genesis 2:4: “These are the generations of the heavens and the earth when they were created ...” It is certain from

the Hebrew syntax that this “generations of” formula (which is repeated ten times in Genesis) is required to be a superscription to what follows, not a reference back to what preceded it. This strongly implies that this is the place where the chapter break should have gone, and that we are being introduced to a new story.³⁶ Taking this point seriously means that we should not expect that what follows in relation to Adam and Eve will be a description of *how* God brought about the origin of humans as was stated in Genesis 1:27. Neither should we expect that the conditions described in Genesis 2:5 onward about plant life and rain, or about God’s transforming a desert-landscape into a garden (Eden), refer back to the conditions (“without form and void”) that were original to creation.

Moreover, the text not only discourages the expectation of a repeated creation story, but from Genesis 2:5 onward, goes on to relate its own story in a way that shows it definitely was not intended to be a more detailed description of the statements in Genesis 1 about the creation of humans. One reason is that if Genesis 2:4 onward is taken as a second creation story, it is blatantly inconsistent with the story in Genesis 1 concerning the order in which trees, birds, animals, and humans were created. In Genesis 1:11–12, trees are created before Adam, whereas in Genesis 2:4–9, they would be formed after him if this were a second creation story. Likewise, birds and animals are created before Adam in Genesis 1:20–27, whereas in Genesis 2:19, they come after Adam. The same is true of the creation of Eve. In Genesis 1:27, God creates humans both male and female together, whereas in Genesis 2, God forms the woman after the man. Such obvious inconsistencies could not have failed to be noticed by the writers/editors of these two accounts; this is strong evidence that they did not intend them both as creation accounts.

What I find to be most helpful at this point is a long-standing rabbinical tradition concerning how to understand Genesis 2:7ff., a tradition that has been inexplicably missing from any recent Christian discussions I know of. The tradition concerns the meaning of the term translated as “breath of life.” The word there is not what we would have expected if the subject being discussed were the beginning of Adam’s metabolic respiration. Were Adam’s biological life the topic here, we would have expected “spirit” (*ruach*) or “soul” (*nephesh*). Instead the term

Article

Reading Genesis

used is “*neshamah*,” which is not only used for human breath but, when used of God, also signifies divine inspiration.³⁷ In other words, it signifies God’s own saving breath, speech, word, or Spirit, not Adam’s. This tradition is endorsed by none other than the distinguished scholar, Rabbi Joseph Soloveitchik, who cites the great medieval commentator on the Talmud, Nachmanides (d. 1270), in support of it: “He [God] breathed into his [Adam’s] nostrils the breath of life [which was] God’s own breath” (brackets mine). Soloveitchik then goes on to speak of the Adam of Genesis 1 as the whole of humanity created in the image of God, while the Adam of Genesis 2 is the individual Adam of redemption.³⁸

In short, we do not have two creation accounts, one in Genesis 1 and another in Genesis 2. What we have is one creation account followed by another account of the beginning of redemption.

This understanding of the expression “breath of life” is further confirmed by how *neshamah* is used in the rest of the Old Testament.³⁹ There are, therefore, good reasons for rejecting the reading of Genesis 2:7 as though it were a description of an act by which God formed humans.⁴⁰ Rather, the statement that “God made man of the dust of the earth” must be read as parallel to the statement, “Henry Ford made the model T out of steel.” It is a statement of the material God used, not of how he formed it into a human. And the importance of mentioning the material is that it signifies that humans were created mortal from their beginning. By contrast, God’s putting his own Spirit into Adam is what enabled him to be bound to God in a relation that made possible an escape from death and thus to be a “living soul” in the fullest sense. Here we may recall Christ’s saying in John 10:10 that he came so that we might have “life and have it more abundantly.” The fullest sense of life is not merely to be carrying on metabolic and mental functions, but to live in communion with God and have his promise that the communion will be everlasting. It is what Paul calls “the real life” in 1 Timothy 6:19.⁴¹

This understanding of the expression “breath of life” is confirmed by how it is used elsewhere in the Old Testament.⁴² It is never used of animals; in every case, it employs a pun on the multiple meanings of the term: breath, Spirit, and speech. One of the places outside Genesis where it occurs is in Job 33:4–6. There one of Job’s friends, Elihu, remarks

that “the Spirit of God has made me, and the breath (*neshemah*) of God gives me life ... *Behold I belong to God like you ...*” Notice that while God’s own Spirit is said to be his creator, Elihu’s having God’s breath (Spirit, speech) means that he, like Job, stands in proper relation to God: he “belongs to God.”⁴³ A bit later the same speaker follows that remark with this one: “If he [God] should gather to himself his Spirit and his breath, all flesh would perish together and man would return to the dust” (Job 34:14–15). Unless this is interpreted pantheistically to mean that God is himself the life in humans, it has to have the cluster-meaning of the life-giving Spirit/breath/word of God’s self-revelation. It means that without God’s gracious promise and the gift of God’s Spirit, there would be no hope of escaping death. By contrast, possessing God’s Spirit/speech/promise makes a person a “living soul” in the fullest sense, namely, being someone who is in proper relation to God and so has the promise of a life that will ultimately escape death altogether.

Finally, it is significant that the New Testament supports this understanding by the way it, too, repeatedly takes “Spirit” or “breath” of life to mean access to the Spirit and the word of God. Its focus, too, is religious, not merely biological. So, in John 6:63, Jesus says to his disciples,

... it is the Spirit that gives life; the flesh profits nothing. *The words which I have spoken to you are Spirit and life.* (emphasis mine)

Moreover, this same point is re-enforced by Jesus’s action recorded in John 20:22 in a striking way:

And when he said this, he breathed on them and said: receive the Holy Spirit.

This is a deliberate re-enactment of God’s initiating his relation to Adam in Genesis 2:7.

Jesus’s action thus clarifies the meaning of Moses’s comment in Deuteronomy (which Jesus quoted in his contest with Satan): “Man does not live by bread alone but by every word of God.” In short, biological life is included in the religious meaning of life, but biotic life can be everlasting only if it meets the religious conditions set by God. This is the same point that is reflected in the Nicene Creed in which the Holy Spirit is called “the Lord, the giver of life.”

Given all this, I propose that Genesis 2:7 should be understood as follows:

And the Lord God [who had already] formed the man from the dust of the earth [now] breathed into his face [His own] life-giving Spirit, and the man became a living [redeemed] soul.⁴⁴ (brackets mine)

It therefore harks back to the original creation of humans in chapter 1, but does not repeat it. It mentions God's having formed humans in order to make clear that the generic Adam of Genesis 1—where "Adam" means humanity—had been created mortal by nature (the dust of the earth). This is for the sake of contrasting human nature as created with the promise of everlasting life through receiving God's Spirit. The fact that it brings up the formation of Adam again can mislead the unwary reader into thinking this is a continuation of the creation account of chapter 1. But the point of the repetition is that it stipulates exactly the information needed to establish the contrast between human nature as it was created and what human nature may become via the divine promise. In short, while chapter 1 is the birth announcement of the universe and the human race, chapter 2 is the announcement of God's purposes for humans. These purposes are shown by the terms of their probation in chapter 2, and are developed in chapter 3 with the start of their redemption.

What the Text Does Not Say

We should now also notice that there are a number of things that Genesis 2:4 onward *does not* say, but which people often read into it.

It does not explicitly say that Adam and Eve were holy or innocent before their fall from grace; it is simply silent on their pre-Fall nature or condition. I realize that there is a long theological tradition from Augustine that insists humans were created "good, just, and holy," which is the inference he drew from God's having declared the whole creation "good" in Genesis 1.⁴⁵ We will return to this point when we deal with what Paul tells us about Adam's fall in Romans 5. Meanwhile, I ask that you at least consider the possibility that Augustine's inference was not correct, and that his great influence on this point has had the deleterious effect of blinding generations of scholars and commentators to all that Paul has to say about Adam's fall in Romans 5.

Neither does the text say that all humans descended from Adam and Eve.⁴⁶ The closest it comes to anything like that is Adam's remark that Eve is "the

mother of all living" (Gen. 3:20). But since Eve was not the mother of anyone at that point, the meaning of that expression should also be taken as referring to what God had just said about a future male descendant of Eve's who will crush the head of Satan. She confirms this interpretation by her remark upon the birth of Cain: "I have gotten a male child from the Lord" (Gen. 4:1). Apparently she was rushing things a bit and thought Cain was the promised covenant hero who would rectify their relationship with God. (By the way, the Hebrew text says that "*he*"—the descendant—will crush the head of Satan, not "*she*"—the descendant's mother—will, as the Douay-Confraternity translation has it.) So the meaning of "mother of all living" is that Eve will be the mother (ancestor) of the one who will restore the promise of everlasting life to all people by defeating the Tempter who had beguiled them through a snake.⁴⁷

The text does not even say that Adam and Eve were the first humans, although it can give that impression by the rapid way it goes from "God created humans in his own image, in the image of God created he them, male and female he created them" in chapter 1, to "the LORD God formed man (Adam) of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul" in chapter 2. But we have just seen good reasons for taking Genesis 2:7 as the start of a new story, a story of redemption, and not as a continuation of the creation story. Moreover, there is yet another striking feature of the story that stands against regarding Adam and Eve as the first humans, namely, that when Cain is banished by God for the murder of his brother, he expresses the fear that "everyone who finds me will kill me" (3:14). Then, after God assures him of protection, Cain moves to "the land of Nod," marries there, and has a family. These parts of the story count heavily against Adam and Eve being thought of as either the first humans or the ancestors of all humans, *especially because of the way the reference to other people is dropped so casually into the story without any perceived need to explain them*. Had the writer(s) and editor(s) of the text thought for a moment that Cain was one of only four people on Earth, they surely would have offered some explanation of his life following his banishment.

Nor is that all. An additional factor that counts against Adam and Eve being viewed as the first humans are the clues Genesis gives as to the approximate time

Article

Reading Genesis

when they lived, clues that come in the form of comments about the occupations of their descendants. Their son Abel, for example, is a shepherd while his brother Cain is a farmer. If Adam's sons are engaged in farming and animal husbandry, that means they could not have lived much earlier than 10,000 years ago since we know that is (roughly) when farming and husbandry arose. In short, the hints for dating these stories point to a time much more recent than that of the first appearance of humans on Earth. Even using Genesis's own view of humans as religious beings, there is evidence that there have been beings on Earth who were religious, and thus fully human, for more than 10,000 years.⁴⁸ So what are we to make of all this?

Fortunately there is help from the New Testament.

Adam in the New Testament

In Romans 5:12–19, Paul draws both a parallel and a contrast between the probationary failure of Adam and the covenantal success of Christ. He speaks of Adam's sin against God's commands and says that because of that "sin entered the world, and death through sin, and so death prevailed upon all humans inasmuch as all sinned" (v. 12). After this remark, however, Paul offers a startling side comment (v. 13): "...for before the law, sin was already in the world but was not imputed, for sin is not imputed when there is no law."

Now at first we might expect that by "the law" Paul was referring to the covenant with Moses that included the law we call the Ten Commandments. He was, after all, an orthodox Rabbi who knew the Torah inside and out, and often when he uses "law," it is short for "Torah." But what he is saying here makes no sense if what he has in mind is the law of Moses. Was there really no sin (in its primary religious sense⁴⁹) imputed to humans by God prior to the law of Moses? Surely that was not the case. God had already called Noah, Abraham, and others to abandon the false gods of their time and place. He had even brought about a great flood as punishment for the sin of returning to false gods, and the plagues upon Egypt were clearly intended to expose the Egyptian gods as fictions. But the great flood and the plagues upon Egypt both preceded the giving of the law at Sinai. *So clearly sin had been imputed to humans prior to the law given to Moses.* Paul's next words show that he did, indeed, have something different in mind from the law of Moses: "Nevertheless

death reigned from Adam to Moses, *even over those who had not sinned in the likeness of Adam ...*" (v. 4). The "law" that Paul was speaking of, then, was God's commands to Adam. It is Adam who was the first lawbreaker by his violation of the conditions of probation God had placed upon their relationship. Indeed, Paul may well have had in mind Hosea 6:7 when he penned that line. There, in one of only two references to Adam in the Old Testament outside Genesis, God says of his unfaithful people: "But like Adam they have transgressed the covenant ..."

The implications of this are startling but hard to deny. In Paul's view, there had been other humans who were ancestors and/or contemporaries of Adam but whose worship of false gods was not held against them. *Adam and Eve are therefore not the first humans, in Paul's view, but the first humans called to stand in proper relation to God.*⁵⁰ They are the first people in what was to become a covenant genealogy, the history of which is then sketched from Adam to Noah, from Noah to Abraham, and from Abraham to the people of Israel who were being called to be God's partners by this latest edition of the covenant, the covenant with Moses. So whereas Genesis 1 says that the entire cosmos was called into being by God, the message of chapter 2 is that God began the process which ended in his establishing covenants with humans by which they (and the cosmos) would be redeemed. Canonically speaking, chapter 2 onward was to function within the religious life of the people of Israel by connecting them to both a pre-covenantal and a covenantal-redemptive history that had begun thousands of years before them, by making them the religious descendants of those earlier covenant peoples and the new inheritors of God's redemptive plan.

Therefore, God's imparting his Spirit of life to Adam is described in language that echoes the original creation of humans: entering into relationship with God is the religious start for the human race that parallels its natural start. It is thus the transformation of the capacity for religious belief that was already in human nature due to their having been created in God's image. That capacity is converted in Genesis 2:7 from its defective condition by bringing it into relation to the true Creator, by whose Spirit death can be overcome and everlasting life attained.⁵¹ The election of Adam and Eve was necessary precisely because their contemporaries (along with the ancestors of those contemporaries) were

not already in right relation to God. I think that the reason this point has been missed by so many Bible commentators is the great influence of Augustine. Augustine took the assertions in chapter 1 about the creation being “good” to include that, from the outset, humans were religiously and ethically upright before God. As a result, many of the commentators who were influenced by him were blinded to what Paul says in Romans 5:13, 14.

Now there are, in fact, powerful objections to Augustine’s view in addition to the fact that Paul contradicts it. The first is that once the point is established that the original creation story is focused on conveying an order of purpose expressed as a time sequence, the most natural reading would be to understand the word “good” as also having a teleological meaning. In that case, it is equivalent in meaning to “accomplished God’s purposes.” The account speaks in such a way as to convey that no competing powers prevented God from accomplishing his purposes, nor were there any limitations to his accomplishing them owing to the materials he had to work with. Rather, everything turned out exactly as he had intended. In that sense, it is repeatedly declared to be “good” and the whole of it “very good” when he had finished. Notice that this is a Jewish idea of “good” as distinguished from a Greek idea. The Platonistic notion is that something is good if it conforms to an eternal and uncreated absolute standard. It is therefore a “perfection”: the maximal instance of a property that makes something better to have it than not.⁵² The Jewish idea is that something is good if it is complete and approved by God.⁵³

A second objection is derived from our knowledge of what the world was like when it was first brought into existence by God. It was, for many millions of years, a violent place filled with events that, from the human point of view, could only be described as the most appalling natural disasters. And once it became inhabited by living creatures it was, in Tennyson’s immortal phrase, “red in tooth and claw.” Clearly, that is what God had intended or it would not have been what happened.⁵⁴ But it is not anything that we would be inclined to call “good,” if that term is taken to mean “ideal” or even if it only means “user-friendly to humans.” Still less was it anything that would induce us to think of it as filled with moral goodness and religious rectitude. Yet, that is exactly how Augustine took it. Instead of seeing “good” as

synonymous with “having accomplished God’s purposes whatever they were,” he took it to mean that each thing created was brought into existence in a condition as close as possible to the ideal (perfect “form”) for that type of thing. Thus, once again we see him as guilty of IUI (interpreting under the influence). That is to say, interpreting under the influence of a doctrine of God that identified God with Platonic perfections. Since he takes it that God is the being with all and only perfections, he further infers that whatever God created was as close to perfection as a creature can be, a (nearly) ideal example of its type. It is that set of assumptions that guided his misunderstanding of the term “good,” and led to the conclusion that humans must have first appeared in the world with a nature that was religiously righteous and ethically blameless in relation to God—which is *precisely what Paul denies in Romans 5*.

A possible objection to the interpretation that I am proposing is that it requires not only that there were humans who believed in false gods prior to Adam and Eve, but also that death was a fact prior to their fall from grace. The objection is that such a view of death seems to be contradicted by what was already quoted: “through one man sin entered the world and death through sin so that death passed upon all humans, for all have sinned ...” (Rom. 5:12). Does that not sound as though there had been no death prior to Adam?

First, let’s be clear that in speaking of death in Romans 5, Paul has in mind only *human* death. He makes that explicit when he says “so death continued to rule from Adam to Moses even over those who had not sinned the way Adam did” (v. 14). So this has nothing to do with an allegedly idyllic time during which no animals or plants died, and to suppose that it does is, once again, to read the account as natural history rather than as redemptive history. (Indeed, had there been no such thing as death prior to Adam, he could not have understood the threat of death as the punishment for disobedience.) Genesis surely does describe Eden as a unique place: it was not like the rest of the world with respect to predation and death. Eden was special because it was the “garden of God,” a place in which humans were under God’s all-encompassing protection. Rather than telling us of a *time* when there were no predators or weeds, Genesis tells us of a *place* where humans were shielded from such things; shielded in a specific, limited environment of special protection.⁵⁵

Article

Reading Genesis

Second, what should control our reading of this passage is what is paramount from a redemptive point of view, namely, that God's gracious word to Adam and Eve was offered as the way for all humans to escape death. This requires us to recognize that what is implicit here is a distinction between death seen as a punishment for sin, and death seen as a natural phenomenon. It means that although death was already a reality prior to God's offer of his Spirit and his promise as the means by which Adam and Eve (and all the rest of humankind) could escape it, it was not yet a *sentence* deserved because of disobedience. Because Adam's failure resulted in his being sentenced to (remain subject to) death, that same sentence is passed upon all humans because they do the same thing. So when Paul says that because of Adam's failure "sin entered the world and death by sin," that has to be an elliptical expression for the *sentence* of death passing upon all humans. Paul himself confirms exactly that in verse 18 when he refers to Adam's transgression as bringing *condemnation* upon all humans. To what were all condemned? The answer can only be to remain subject to death.⁵⁶

Finally, Paul clearly intends that there is to be a strict parallel between what he says about sin and what he says about death. Since he first says that sin entered the world with Adam's transgression but then adds that sin was already in the world, the same must be taken to be true of death. Prior to the Fall, belief in false gods was not counted against those who had not received revelation from God, so their death was not a judgment from God. With the initiation of his communion with humans, God invests the natural phenomenon of death with probationary significance: it becomes a curse for disobedience.

That a pre-existing natural phenomenon can be sacramentally invested with religious import and thus signify either a blessing or a curse, is a recurring theme in Genesis. For example, the natural fruit of the tree of knowledge acquired sacramental significance by being the means of Adam and Eve's probation; and the fruit of the tree of life became the sacramental assurance of everlasting life because God had bound himself to it as the means for conveying that promise. Nothing else could explain why Adam and Eve had to be barred from that tree after their disobedience (Gen. 3:22). In neither case are these fruits presented as having intrinsic magical powers, but are instead to be understood as analogous to all the other sacraments the scriptures mention: they are

concrete things or actions to which God has bound himself by promises.

The same point also holds true for the reference to weeds in the curse put on the earth, and the increase of childbirth pain in the curse put upon Eve. The implication is not that there were no such things prior to the Fall (childbirth pain would have had to exist already for it to be "increased"), but that under God's special protection in Eden, they would not have been as onerous. After the fall from grace, they become reminders of the religious unfaithfulness that has left humans unprotected from them. Thus it is the earth of *Eden* that is then cursed, because it was what had been previously protected. The same can be said of the curse put upon work (again, work is not the curse, work *is* cursed). Work is natural to humans and, absent sin, is one of the great blessings of life as well as a necessity. But now work, too, will come under the curse for disobedience; it will be part of the struggle for life that humans will lose, and they will "return to the earth" as a just sentence. Similarly, after the flood of Noah, the natural phenomenon of a rainbow was made to be a sacrament of God's covenantal promise that he would never again destroy all the disobedient by a great flood. Paul therefore speaks of death as the punishment for disobedience to God precisely because unending life was the promised reward for obedience to God. In this way, the religious significance of the account remains intact without requiring the utterly implausible hypothesis that there was no such thing as death prior to the Fall. Death as a natural phenomenon surely already existed within the plant and animal biospheres prior to humans, and it seems abundantly clear that Paul did not think the pre-Adamite people he was referring to were still alive when he wrote.

Throughout this discussion, I have been accepting the strong implication both in Genesis and Romans that had Adam and Eve come through their probation successfully, their success would have somehow been passed to all humans. Had they been obedient to God, death would not have become a sentence they deserved, and the entire human race would have escaped death by being brought into proper relation to God.⁵⁷ But because of Adam's failure, humans were left in their mortal condition and "death continued to rule ... even over those who had not sinned the way Adam did." The parallel to this is, of course, that Christ succeeded in precisely the way

Adam had failed: "For as by one man's disobedience many were made sinners, so by the obedience of one man shall many be made righteous" (Rom. 5:19).⁵⁸

This is a momentous shift in understanding the role of Adam and Eve in salvation history. So, if this one line in Romans 5:13 were the only place where the New Testament referred to humans prior to Adam and Eve, we might well hesitate to overturn the traditional Augustinian view. But it is not the only place Paul refers to people whom God did not hold accountable for their sin because they lived before God revealed his law. Speaking to the Zeus worshippers at Lystra, Paul says of God that he "in the generations past allowed all the nations to go their own way" (Acts 14:16), and in his speech before the Epicurean and Stoic philosophers in Athens, he again refers to an era in which the worship of false gods was not held against humans, saying that "the times of this ignorance God overlooked, but now declares to all humans everywhere to repent" (Acts 17:30). Clearly these remarks are not about Paul's pagan contemporaries, since he did not view them as ones whose ignorance God had been overlooking. In his view, his hearers were not immune from having their sin imputed to them, but rather were being called upon to repent of their false gods as well as their evil deeds. The only people he ever describes as not held guilty for their sin are Adam's contemporaries and ancestors.

Summary Thus Far

With this guidance from the New Testament, we are now confirmed in distinguishing the general creation account in the first chapter of Genesis from the focus on the probation of humans and the beginnings of their redemption in the second chapter. This difference is easy to miss from Genesis alone,⁵⁹ so it is even more significant that (at least some of) the rabbinical tradition did not miss it. From the standpoint of the New Testament, then, the story of the earliest contact God made with humans can be paraphrased as follows:

At some point in human history, God initiated a loving relationship with two individuals he elected to live in communion with him. He set aside a garden of special protection as the setting for his revelation to them of his gracious life-giving word, and breathed into Adam his Spirit of Life thus binding Adam to himself in love. God's breath

(gracious word) and Spirit are both conveyed to Adam in this act of communion. The parallels and puns that abound here are deliberate. Just as God's Spirit/breath hovered over the newly existent universe and gave order to it by his breath/word/speech in Genesis 1, so his same breath/word/command is that which gives Adam the promise of never-ending life in the sense of providing a way of escape from the natural phenomenon of death that pervaded the world.

This makes the saying of Moses, which Jesus repeated in his (successful!) contest with Satan, literally true: humans do not live by bread alone but by the word (breath, Spirit) of God. For sure, we depend on sunlight, food, water, and shelter to live. These, however, are all penultimate conditions, as they too depend on God. The promise of God's redemptive covenant is that as long as humans stand in proper relation to God, God will preserve their lives. But, as Genesis tells us, the first humans to receive this promise failed to love and obey God. The human race was therefore not only left in its condition of sin so that death prevailed, but it was now also under the judgment of deserving that fate. Yet, Paul goes on, in time all of that was overturned by the new Adam, Jesus Christ: "As in Adam all die, so in Christ shall all be made alive" (1 Cor. 15:22).

Only this understanding makes sense of Paul's view that Adam truly represents us all. Adam did what each one of us would have done in his place, *and this is shown by the fact that we all, in fact, do the exact same thing every day*. He committed the "original sin" by being the first to disobey God's word (law), God's gracious offer of communal-love. Moreover, he fell from grace for the same reason we do, namely, out of a failure to love God. Since we all recommit that same sin, we all merit that same judgment. It is this point that is so perfectly captured by the prayer of confession in *The Book of Common Prayer*: "We confess that we have sinned against you in thought, word and deed by what we have done and by what we have left undone. We have not loved you with our whole heart, we have not loved our neighbors as ourselves."⁶⁰ Thus we share Adam's natural inclination not to love God with all our heart, soul, mind, and strength and our neighbor as ourselves. Every one of us has the same innately sinful disposition of heart by which we too trespass against those two great commandments: this is the same as sharing Adam's nature.

Guided thus by Paul, I find that this reading of the Genesis story leaves the major traditional Christian doctrines intact—although with a new slant on their understanding. The new slant does not, however, require any change in the grand arc of the biblical narrative. That arc still remains: Creation, Fall, Redemption, and Resurrection. The difference is that Adam and Eve's fall from grace is not a fall from a sinless state and so is not also an account of the origin of sin because, as Paul puts it, "sin was already in the world." Rather, it is a fall from the grace of God offered in his first relationship to humans who were already sinful in the sense of having false gods.⁶¹ Moreover, the failure of these first receivers of God's grace and love to be faithful to him is still maintained by this interpretation as explaining the need for the other redemptive covenants God instituted with Noah, Abraham, and Moses. It also explains why those later covenants were aimed at restoring humans to their lost fellowship with God and thus to the lost promise of everlasting life. The requirements of those later covenants also went unfulfilled, however, until their actual fulfillment by Jesus the Messiah, the righteous Israelite, who fulfilled Israel's covenantal mission and thereby crushed the head of Satan the serpent (Gen. 3:16, Rev. 12:9).

Despite its rejection of parts of Augustine's interpretation, the view just presented retains all the rest of the traditional understanding of the relation between Adam and Christ. Adam failed his probation as the first human who was given the opportunity to secure an escape from death for all people. He failed by succumbing to the temptation to disobey God. Christ faced the same tempter but emerged triumphant (Matt. 4:1–11). So Adam is still to be seen as the first religious head of the human race, while Christ is the "second Adam" who succeeded where the first Adam had failed. Christ is thus the new religious head of the race because his sinless obedience fulfilled God's covenant and his sacrificial death took the punishment deserved by the rest of humanity. By so doing, he opened the way of escape from death for all people. Moreover, just as Christ's headship of humanity does not depend on anyone being his descendant, neither should Adam's (failed) headship be seen as dependent on his being the ancestor of all other humans. Once again, no doctrine actually derived from scripture is lost by accepting this reading of Genesis.

Noah's Flood

The great influence of the encyclopedic assumption and its corollaries is also at work in the way the flood story has been understood.⁶² This is especially obvious in the King James Version of the Bible, whose translators rendered several Hebrew terms so as to encourage the impression that the scope of the flood had global dimensions. They did this in opposition to Calvin's sage advice, quoted earlier, which would have us understand Genesis's reference to "all the earth" as all the land that those who recorded the flood could see, and likewise for the statement that the water covered the highest "mountains." Once again, that would mean the highest mountains the author(s) could observe (not the Himalayas!). What is reflected here is the way the translators were under the spell of the assumption that covenantal events be understood as having the greatest possible scope. Without that assumption, the text tells us only that the flood covered all the land and the highest mountains the author(s) could see (in the foothills) of Ararat. In short, rather than taking the language here in the most exaggerated sense possible, the text should be seen as commonsense talk which amounts to saying, "This was just the worst flood ever!"⁶³

The assumption that miracles may be freely postulated is also at work here, and has led some fundamentalists to propose that the story records a flood that extended over the entire planet and covered the highest mountains on planet Earth. The subsequent disappearance of all that water is then made to be a miracle.⁶⁴ The same thing happens with the account of the farmer, Noah, saving his livestock. Instead of understanding this to mean that what went into his ark were all the animals he would need to restart his farm ("all the animals on the (his) land"), we are given the absurd interpretation that he rescued *every animal on the planet!* But if you read the account without the encyclopedic assumption and its subordinates, and if you substitute "land" wherever the translation has "earth" (they are the same word in Hebrew), it will leave you with a very different impression from that conveyed by translators in the grip of the encyclopedic assumption.⁶⁵

To be fair, we need to acknowledge that an additional factor in what led the translators to favor expansive translations was the stated purpose of the flood: it was to be God's judgment upon sin. They assumed that to do that, the flood would have to have covered

the entire planet in order to wipe out all humans. But that supposition was based upon their having missed the meaning of the expression “the breath of life” in Genesis 2. They misunderstood it to refer to the air a living human breathes—to metabolic respiration—rather than to the redemptive indwelling of the Spirit of God. Thus they mistakenly assumed that the entire human race was being judged by the flood, rather than its being a judgment *only upon the people who had received God’s word and then abandoned it for false gods*.

This interpretation also makes better sense of the way Genesis specifies the cause of that fall away from God as inter-marriage with unbelievers.⁶⁶ It says that the apostasy from revealed truth came about because the “sons of God” (those who knew God’s word) married the “daughters of men” who were from people who worshipped false gods. That this is the right interpretation is established by the way the text describes the objects of God’s anger: “all in whose nostrils was the breath of the Spirit of life” (Gen. 7:22). Notice that not only is the term “*neshamah*” used here in the same way as it was in Genesis 2:7, but the expression is deliberately phrased in the same way: the breath of life is said to be “in the nostrils” of those with whom God is angry.⁶⁷ Since the expression is intended to have the same sense as it did in Genesis 2:7, it does not refer to everyone living but to *those humans who had received the Spirit (life-giving breath and word) of God but who had become faithless and disobedient to his covenant by reverting to the worship of false gods*.⁶⁸

This is not to suggest that animals did not also die on “all the (Noah’s) land”; Genesis 7:21–23 makes clear that they did. Nor am I suggesting that no one outside those involved in the apostasy could have drowned as collateral damage (we simply do not know). But the point of the flood was to begin a new covenant people, a line that would make possible another start for the entire human race to acquire the right relation to God. The death of animals is incidental in the story, and is mentioned only to explain why they also had to be taken into the ark. So when Genesis 7:15 refers to those who went into the ark “by twos of all flesh in which was the breath of life,” it is not referring to the animals (since not all of them went in by twos) but has as its antecedent the subject of the sentence in v. 13, namely, Noah and his sons and their wives. Likewise when v. 22 reports that “all in whom was the breath of life died,” that refers back

to the last subject mentioned, namely, “mankind” in v. 21; it means all of humankind who knew of God’s covenant but were unfaithful to it.⁶⁹

What God is depicted as dealing with here is the fact that except for Noah and his family, all those who knew of his covenant had become devoted to false gods. *God’s judgment on them is that they will now lose their lives since they were the ones to whom it had been revealed that their lives depended upon maintaining a proper relationship with him*. It is also the reason why after warning Noah of the impending flood as punishment (Gen. 6:17–18), God immediately speaks of establishing his covenant with him. Noah is to be the next Adam. It is from Noah’s descendants, specifically from Shem, that the new line of covenantal people is to be established (Gen. 9:26–27). Therefore, from that point on, Genesis traces that covenant line from Shem to one particular S(h)emite, Abraham, and from Abraham to Isaac, to Jacob, and then to Moses. As such, it is a covenant-genealogy constructed so as to be parallel to the genealogies of the king lists that were so important in ancient Mesopotamia.⁷⁰

Conclusions

1. By reading Genesis as canon, and guided by the principles of religious focus, ancient common sense, and the light of the New Testament’s teaching, nothing is lost of Christian theology that was truly biblically based to begin with. What is completely lost, however, is the unwarranted program of trying to read Genesis as though it were either a good or a bad scientific account of the origins of the universe or humans. Also lost is the hermeneutical program that assumes Genesis needs to be harmonized with the sciences that investigate those origins.

This position is not, however, a version of the NOMA view of the *general* relation between religion and science—the view for which Stephen J. Gould was famous.⁷¹ Genesis’s history of redemption may not overlap with the sciences but from that fact it does not follow that no religious belief whatever impinges on the sciences in any way. I hold that there is a point of convergence between religion and science at the deeper level of the way divinity beliefs set limits for theories and guide the interpretation of their postulates rather than supplying their postulates. (I explained this in some detail in my article in the

Article

Reading Genesis

March 2006 edition of this journal titled "Prospects for Theistic Science.")

2. It is understandable why so many thinkers in the early history of modern science found it tempting to look in scripture for hints concerning information to which they had no access: the early stages of the cosmos, the origin of life forms, the age of the earth, the origin of humans, and so on. Many theologians—and founders of modern science—looked for hints about such information in scripture, since that information appeared impossible to get any other way. But understandable as their wishful thinking may have been, it never was the right way to deal with Genesis. It was wrong because it overlooked the interpretive significance of its being part of the covenant with Moses. It lost sight of the canonical purpose for which it had been revealed to humans: to make it possible for humans to lead their lives in faithfulness to God, not to satisfy their curiosity about the cosmos.

In fact, a similar failing is still true of many readers who now come to Genesis long after the rise of modern science has discovered much of the information that was once thought to be forever inaccessible. It is just because of the success of those sciences, that as soon as we read that God "created the heavens and the earth," our minds almost irresistibly shift gears to the discoveries of cosmology, astronomy, physics, and biology. This can encourage seeing Genesis as though it is either in accord with those sciences or has a different *scientific* account, whereas both those options are false.

3. Finally, please notice that the position defended here is based solely on a strict reading of the text of Genesis as canon, upon the way an important rabbinical tradition understood it, and upon the way Paul speaks of it in Romans 5. It neither assumes in advance any particular theory about the text or its editors, nor is it driven by the discoveries and theories of the natural sciences.

4. Therefore, it is high time Christians buried the encyclopedic assumption and its subordinates once and for all. Not just because they give aid and comfort to naturalists, but because they are false to the text, the language, the stylistic conventions, the structure, and—most of all—the canonical purpose of Genesis. ☆

Acknowledgment

Finally, I want to thank Marvin Wilson, Professor of Biblical Studies at Gordon College, for checking my renderings of the Hebrew text.

Notes

¹Richard Dawkins, for example. In the debate between Dawkins and Francis Collins sponsored by *TIME* magazine, Dawkins asserted that there is contradiction between Genesis and science:

TIME: "Professor Dawkins, you think Darwin's theory of evolution does more than simply contradict the Genesis story."

DAWKINS: "Yes ..."

See Dan Cray, "God vs. Science, Richard Dawkins and Francis Collins interviewed by D. Cray," *Interdisciplinary Encyclopedia of Religion and Science*, 2006, <http://inters.org/Dawkins-Collins-Cray-Science>.

In another interview for Revelation TV, <http://creation.com/media-search?q=Richard%20Dawkins>, Dawkins is even clearer. In response to Howard Condon's question, Dawkins says, "Evangelicals have it right when they see Christianity as incompatible with evolution."

²The report of the Pew Research Center for Religion in Public Life (Feb. 3, 2014) lists Roman Catholic, Episcopal, Presbyterian, United Methodist, Lutheran, and United Church of Christ as denominations affirming that there is no difficulty for theology in accepting the findings of modern science, including evolutionary biology. The Southern Baptist Convention and Missouri Synod Lutherans were the only major Christian denominations to say that there is genuine conflict between theology and evolutionary theory.

³This is not to suggest that Moses himself wrote all of Genesis as we now have it, though there is an important tradition ascribing a good bit of it to him. In *Introduction to the Old Testament as Scripture* (Philadelphia, PA: Augsburg-Fortress Press, 2011), Brevard S. Childs says:

The claim of Mosaic authorship ... was obviously not a historical judgment in the modern sense, but a measuring of the truth of a growing corpus of law by the tradition long experienced as authoritative ... The claim of Mosaic authorship therefore functioned theologically ... to establish the continuity of faith of successive generations with that once delivered to Moses at Sinai ... When correctly interpreted, the Mosaic authorship of the Pentateuch is an important theological affirmation which is part of the canonical witness. (pp. 134–35)

Think also of Jesus's endorsement of this point: "the scribes and the Pharisees sit in the seat of Moses; therefore do all that they tell you ..." (Matt. 23:2–3).

⁴In *Christian Apologetics*, 2nd ed. (Philadelphia, PA: Presbyterian & Reformed Publishing, 2003), C. Van Til says,

The Bible is thought of [by us] to be authoritative on everything of which it speaks. Moreover, it speaks of everything ... either directly or by implication ... It gives us a philosophy of history ... It is only if you reject the Bible as the word of God that you can separate the so-called religious and moral instruction of the Bible from what it says about the physical universe. (pp. 19–20)

⁵Henry Morris, *History of Modern Creationism* (San Diego, CA: Master Books, 1984), 96. I find it puzzling and amazing that of all the things someone might want God to tell

us, Morris wants to know the age of the planet. Surely the causes and cures for diseases would rank ahead of that!

⁶See Kenneth Bailey, "The Manger and the Inn," *Theological Review of the Near East School of Theology* 2, no. 2 (Nov. 1979), reproduced at <http://www.biblearchaeology.org/post/2008/11/08/The-Manger-and-the-Inn.aspx#Article>.

⁷Please notice that this point does not deny that Christians should reject theories that are *prima facie* and irredeemably inconsistent with teachings derived from scripture, for example, the hypothesis that humans are not morally responsible for what they do. There surely are theories that are directly ruled out by biblical teaching, even if none are directly ruled in.

⁸This is, in fact, the official Roman Catholic position given in "Dogmatic Constitution on Divine Revelation *Dei Verbum* Solemnly Promulgated by His Holiness Pope Paul VI on November 18, 1965," http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat_ii_const_19651118_dei-verbum_en.html:

Therefore since everything asserted by the inspired authors or sacred writers must be held to be asserted by the Holy Spirit, it follows that the books of Scripture must be acknowledged as teaching solidly, faithfully, and without error the truth that God wanted put into sacred writings (5) *for the sake of salvation*. (chapter 3, section 11, emphasis mine)

⁹It is patently apparent that the scriptures we have are anything but inerrant, and many Bible commentators have acknowledged that fact. An example of a commentator acknowledging discrepancies concerning the order of events in the life of Christ, is Calvin: "It is well known that the Evangelists were not sufficiently careful with their time sequences nor even bothered with the details of what was done or said" (*Commentary* on Luke 8:19 and Dan. 7:12). This was, he said, because the Bible's writers had not always written "in a such a way as to preserve the exact order of events, but rather to bring everything together so as to place before us a kind of mirror or screen on which the most useful things ... could be known" (*Commentary* on Matt. 4:5).

The reply that it is the original documents that were inerrant rather than the copies we possess, only makes things worse. It requires postulating copy errors where there is no evidence for them, and entails that the only texts we will ever have (the imperfect copies) are not really God's word since they are not inerrant.

¹⁰Needless to say, the rules that follow are "rules of thumb" and are not intended to solve more technical hermeneutical issues.

¹¹"The Bible never refers to plants as living. They may 'grow,' or 'flourish,' but they do not live. Neither do they die ... since they are not 'alive' [because] 'the life of the flesh is in the blood.'" John Morris, "Are Plants Alive?," Institute for Creation Research, <http://www.icr.org/article/are-plants-alive>, the last paragraph.

¹²This issue overlaps with what was at stake in the conflict between Cardinal Bellarmine and Galileo. The Cardinal said an inerrantist view of scripture was required because of "who it is that is speaking" (God). See M. Finocchiaro, *The Galileo Affair: A Documentary History* (Berkeley, CA: University of California Press, 1989), 67–69. In opposition to that, Galileo replied, "The Bible tells us how to go to heaven and not how the heavens go" — virtually the same position Calvin had already taken (see the next note).

¹³Calvin, *Commentaries on the First Book of Moses*, 1.79–80. In commenting on Genesis 1:16, Calvin says:

Moses makes two great luminaries; but astronomers prove ... that Saturn is greater than the moon. Here lies the difference; Moses wrote in a popular style things which ... all ordinary persons ... are able to understand ... Moses, therefore ... adapts his discourse to common usage.

Despite these insightful remarks, Calvin and other reformers remained largely under Augustine's influence and so read much of the account as natural history.

¹⁴Childs, *Introduction to the Old Testament as Scripture*, 75–77.

¹⁵This is not to suggest that no Christian thinker has ever denied that God created — and therefore transcends — time, although the vast majority of theologians have affirmed it. I have critiqued one such denial, Nicholas Wolterstorff, "God Everlasting," in *Contemporary Philosophy of Religion*, ed. Steven M. Cahn and David Shatz (Oxford: Oxford University Press, 1982). My reply, "Is God Eternal?" is in *The Rationality of Theism*, ed. Adolfo García de la Sienra (Amsterdam: Rodopi, 2009), 273–300.

¹⁶Abraham Joshua Heschel, *The Earth Is the Lord's & The Sabbath* (New York: Harper Torchbooks, 1951), explains that "... there was no single word to describe what is called in Indogermanic languages 'world' or 'universe' ... When biblical writers intended to refer to all creation, they spoke of 'heaven and earth' or 'earth and heaven'" (p. 111).

¹⁷These same points were made by St. Basil around AD 370 in his *Hexameron*. Basil points out that God could not have spoken as humans do, and that God's creating was actually outside time (J. Pelikan, *Christianity and Classical Culture: The Metamorphosis of Natural Theology in the Christian Encounter with Hellenism* [New Haven, CT: Yale University Press, 1992], 117, 252). Of course, once God had brought time, space, and matter into existence and had brought about creatures capable of using and understanding speech, he could literally speak to them — as he did to Adam and Eve, Abraham, and Moses. Such speech could have been made in a number of ways: by his using an angel to speak for him (Exod. 3:2, 4), or by directly causing speech sounds to be heard (Exod. 20:22). He could also communicate by illocutionary acts, by deputizing humans to speak for him, and more. See N. Wolterstorff, *Divine Discourse: Philosophical Reflections on the Claim That God Speaks* (Cambridge, UK: Cambridge University Press, 1995).

¹⁸Augustine, *Two Books on Genesis against the Manichees*; and *On the Literal Interpretation of Genesis: An Unfinished Book*, trans. Roland J. Teske, SJ (Washington, DC: Catholic University of America Press, 2001), says in AD 393,

How could there be days before there was time, if time began with the course of the lights, which scripture says were made on the fourth day? Or was this arrangement set forth according to what human frailty is used to and by the law of conveying exalted things to the humble in a humble fashion? (p. 149)

¹⁹There appear to be some important misunderstandings on the part of some writers over the relation between the literal meaning of a term and its being taken metaphorically. For a term to function as a metaphor, we must both start with and retain its literal meaning, adding to it a metaphorical use. If I call a wheat field a "sea of wheat," unless "sea" retains its literal meaning of "a large expanse of water," its ability to function as a metaphor would be lost. So, too, unless the term "day" continued to mean an ordinary workday, it could not serve as a metaphor for the

Article

Reading Genesis

creative acts of God that were outside time altogether. My point is that insisting on the literal meaning of a term does nothing to show it is not also used metaphorically.

²⁰As far as I know, the correspondence between the two groups of three days was first elucidated in English by N. H. Ridderbos, *Is There a Conflict between Genesis 1 and Natural Science?* (Grand Rapids, MI: Eerdmans, 1957). Ridderbos notes, however, that viewing the days as some sort of literary framework is a view that has precedent in Philo of Alexandria, Origen, and Augustine. See also the discussion of it by M. Kline, "The Framework View," in *The Genesis Debate: Three Views on the Days of Creation*, ed. D. Hagopian (Mission Viejo, CA: Crux Press, 2001), 217–304.

²¹Nahum M. Sarna in *Understanding Genesis: The Heritage of Biblical Israel* (New York: Schocken, 1966) says,

The religion of Israel is essentially non-mythological, there being no suggestion of any theo-biography. [The Genesis narrative] has no notion of the birth of God and no biography of God. It does not even begin with a statement about the existence of God ... To the Bible the existence of God is as self-evident as life itself ... For the first time in history, therefore, we have a totally new conception of cosmogony and one, strangely enough, that in its literary form has not hesitated to make use of some of the symbols of its ideologically incompatible predecessor." (pp. 9, 10, 13)

See also the comments of Henri Blocher, *In the Beginning* (Leicester, UK: Inter-Varsity Press, 1984), 60–61.

²²In *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate* (Downers Grove, IL: InterVarsity Press, 2009), John Walton contends that Genesis 1 is not a creation story at all but depicts an inauguration ceremony by which the already existing cosmos becomes God's temple (pp. 87–88). He may well be right about the temple imagery; Meredith Kline had suggested that interpretation in *Images of the Spirit* (Eugene, OR: Wipf and Stock, 1999), 36–37, first published in 1980. But a number of Old Testament writers certainly seem to take Genesis 1 as a creation account: Ps. 33:6; Proverbs 8; Isa. 42:5; Jer. 10:12; for example. The same is true of New Testament writers: John 1:3; Rom. 4:17; Eph. 3:9; Col. 1:16–17. In the view of W. Pannenberg, *Systematic Theology*, vol. 2, trans. G. Bromiley (Grand Rapids, MI: Eerdmans, 1991), 52–59, and of G. Von Rad, *Genesis: A Commentary* (London: SCM, 1963), what is depicted is God giving laws for his kingdom. Interestingly, Kline takes the setting of Genesis 1 to be both temple and kingdom (*Images of the Spirit*, 114, n. 56).

²³In "The Seven Days of Creation," *Calvin Theological Journal* 46 (2011): 101–27, James Skillen argues that this is the way to understand all seven of the days. Each new day is layered upon the previous days because each is to be understood by the content it introduces. The days of creation are therefore to be seen as added to one another as we do when we speak of the day of the railroad, the day of the airplane, and the day of the computer.

²⁴Compare what 1 Cor. 2:7; 2 Tim. 1:9; Titus 1:2; and Jude 1:25 say is "before time of the ages" with what John 17:24; Eph. 1:4; Heb. 9:26; 1 Pet. 1:20; and Rev. 13:8, 17:8 say is "from (or before) the foundation of the world." It is clear that the extension of the two expressions is the same, strongly suggesting that their meaning is too.

²⁵Henri Blocher, in *In the Beginning: The Opening Chapters of Genesis* (Leicester, UK: Inter-Varsity Press, 1984): 56–59, gives a helpful appraisal of the relation of Hebrews 4 to Genesis 1.

²⁶In fact, the term in Genesis usually translated as "dust" of the earth refers to a clod of overturned earth, while Paul makes the metaphor more specific by speaking of a potter working with clay. In doing so, he follows the example of Isaiah 64:8. For the meaning of the expression "dust of the earth," see Ziony Zevit, *What Really Happened in the Garden of Eden?* (New Haven, CT: Yale University Press, 2013), 80–84.

²⁷Geerhardus Vos, *Biblical Theology* (Carlisle, PA: Banner of Truth Trust, n.d.), 27–33.

²⁸Peter Enns takes this view in *The Evolution of Adam: What the Bible Does and Doesn't Say about Human Origins* (Grand Rapids, MI: Brazos Press, 2012), 83.

²⁹Although the LXX attaches the "there" to Gilead, thereby supporting my view, it goes against my view when it translates "Adam" as "anthropos": "... they are as a man transgressing a covenant." I disagree with this for the reason that the comparison Hosea is making would then be lost. He would be saying that the faithless of Israel are "like a man transgressing a covenant" when, in fact, they are men who are transgressing the covenant. What would be the point of saying that? But comparing them with the Adam of Genesis 2 would be a poignant criticism.

³⁰Childs, *Introduction to the Old Testament as Scripture*, 145–46.

³¹My view that the "making" stories of Adam and of Eve are intended to convey their nature rather than to give a literal description of the events by which they came into contact with God, has its background in the position of Childs, *Introduction to the Old Testament as Scripture*:

No part of Genesis can be called "history" in the narrow, modern usage of the term because of the tangential relationship to objective reality, even though ... historical elements are evidenced throughout ... Conversely, there is no Old Testament myth in exact analogy to ancient Near Eastern mythology. The Genesis material is unique because of an understanding of reality which has subordinated common mythopoetic tradition to a theology of absolute divine sovereignty. (p. 158)

³²For example, Job 14:19, 17:16; Pss. 22:15 and 29, 30:9, 40:25, 103:14, 104:29; Eccles. 3:20, 12:7; Isa. 26:19; and Dan. 12:2.

³³I have argued elsewhere that the core meaning of "divine" across all known religions is the following: the self-existent reality on which all that is not self-existent depends. This is shared by all known religions although their descriptions of the divine reality differ sharply. See Roy A. Clouser, *The Myth of Religious Neutrality: An Essay on the Hidden Role of Religious Belief in Theories*, rev. ed. (Notre Dame, IN: University of Notre Dame Press, 2005).

³⁴Every answer to the question of the basic nature of humans is tied to the religious issue of what humans ultimately depend on. To put this point in the language of Genesis: every idea of human nature sees humans as "in the image of" whatever its advocates believe to be divine (where "divine" means "the self-existent Origin of all else")—whether or not they are conscious of doing so.

³⁵Paul Tillich, *Dynamics of Faith* (New York: Harper and Row, 1957), 83.

³⁶Childs, *Introduction to the Old Testament as Scripture*, 145–46. Keep in mind that the original Hebrew text had no verse or chapter divisions at all. My point about where the chapter break should be is confirmed by the way the Jewish Friday evening home liturgy ends the reading at Gen. 2:3 and does not include v. 4. See the *Daily Prayer Book*, ed. Philip Birnbaum (New York: Hebrew Publishing Company, 1949), 273. The same break also appears in the

text as chanted in the annual and triennial cycles of the recitation of the Torah. See J. H. Hertz, *The Pentateuch and Haftorahs*, 2nd ed. (London: Soncino, 1969), 6.

³⁷So, for example, Josh. 11:11, 14 uses *neshamah* for the breath that is naturally in humans. By contrast, Isa. 2:22 uses it where the point of the context is that God's people—who have been given his Spirit and word—will not be exempt from God's judgment if they are "proud and lofty" and have made for themselves "idols of silver and idols of gold."

³⁸Joseph B. Soloveitchik, *The Lonely Man of Faith* (New York: Doubleday, 2006), 22.

³⁹The KJV also puts the expression "breath of life" into Genesis 1:30, but that is pure interpolation as *neshamah* does not occur there at all. Other places where it does occur include Deut. 20:16; Ps. 150:6; Prov. 20:27; Isa. 2:22, 30:33; Dan. 5:23, 10:17; Josh. 10:40, 11:11, 11:14.

⁴⁰Some translations (e.g., the updated New American Standard) start Genesis 2:7 with "Then," but that word is not in the Hebrew text. Moreover, Hebrew verbs have no definite tenses, so the addition of "Then" introduces a specific interpretation rather than translation, an interpretation that deliberately makes this sound like a second creation account.

⁴¹The NAS renders this "life indeed." It is Alfred Marshall who translated it "the real life" in *The Interlinear Greek-English New Testament* (London: Samuel Bagster and Sons, 1958), 833.

⁴²The KJV also uses the expression "breath of life" in Genesis 1:30, but nothing equivalent to those words (nor *neshamah*) is in the Hebrew text at all.

⁴³The LXX renders verse 4: "The Divine Spirit is that which formed me and the breath of the Almighty that which teaches me." Although this does not take the text to say "I belong to God like you," it still recognizes that the reference in both cases is to the Spirit of God, not to the breath of respiration in a human.

⁴⁴The part of the paraphrase that takes humans to have already been created is supported by the LXX since it translates "formed" in the aorist to indicate an action completed in the past.

⁴⁵It is significant that the LXX renders the Hebrew term for "good" (*tov*) as "*kalos*" in Greek, the word used to wish someone a good day. It does not use "*agathos*" which means good in the sense of virtuous, but Augustine nevertheless took it to mean that Adam and Eve were originally wholly virtuous.

⁴⁶My point here is contradicted by some translations of Acts 7:26. For example, the New American Standard, the NIV, the Contemporary English Version, and the Confraternity all have "He [God] made from one *man* every nation of mankind to live on all the face of the earth ..." But the word "man" is not in the Greek text. It is an interpretive insertion by translators that makes it sound as though Paul explicitly said that all humans descended from one person. Older translations, such as the KJV, that inserted "blood" instead of "man" seem to me to have been on the right track. In context, Paul is speaking of what humans have in common as creatures of God. Therefore, if "blood" is used in the sense of "nature," it should be the preferred reading. Similarly, Jesus's comment when asked about divorce (Matt. 19:8) could seem to go against my point here. Jesus says that marriage was between one man and one woman "from the beginning." But again, in context, he is referring to what God's law was for the first

people to be in proper relation to God, not for the first of all humans. And he was contrasting how God's law for them differed from the law as given to Moses. The "beginning," therefore, refers to the start of God revealing his law to his people, not the beginning of the cosmos or of the human race.

⁴⁷That it was Satan who was speaking through an animal is confirmed by Rev. 20:2.

⁴⁸Altars have been discovered which have been dated as 14,000 years old (*Science News* 120, no. 23 [Dec. 5, 1981]: 357), and more recently a temple has been discovered at Gobekli Tepi in southern Turkey that is now dated as at least 11,600 years old (*National Geographic* [June 2011]).

⁴⁹That it was religious rather than moral wrong-doing that Paul had in mind is shown by the way he makes the same point in Acts 17:3 and Rom. 1:18–25 and specifically states that he is speaking of the worship of false gods. Keep in mind here that Paul never uses "law" to mean anything other than revelation from God. It never has the sense of "natural law" that was prominent in Greek or Roman stoicism. See J. D. G. Dunn, *Commentary on Romans* (Dallas, TX: Word Books, 1988).

⁵⁰The Romans 5 reference to sin, and therefore to other humans before and contemporary with Adam, was explained as a reference to angels by Augustine, and by others under his influence (e.g., Martin Luther and Matthew Henry). This, however, is wildly implausible since it would require that (1) angels believed in false gods despite being in the presence of (even though in rebellion against) the true God, that (2) their false belief was for a time overlooked because it preceded God's revelation to them, and that (3) they now remain subject to death owing to Adam's probationary failure—all patent absurdities. That it is actually a reference to humans other than Adam and Eve was noticed by Isaac Peyrere in *Men Before Adam* (London: 1656), and in the nineteenth century by Van Amringe who also concluded that Adam was the first in a line of believers who acquired the proper relation to God, rather than that he was the first human, in *An Investigation of the Theories of the Natural History of Man by Lawrence, Prichard, and Others: Founded upon Animal Analogies; and an Outline of a New Natural History of Man: Founded upon History, Anatomy, Physiology and Human Analogies* (New York: Baker & Scribner, 1848), 52–62. More recently the same position was held by John Stott in *Understanding the Bible* (Sydney, Australia: Scripture Union Publishing, 1984), 49. For a fuller treatment of this point, see Richard James Fischer, *Historical Genesis: From Adam to Abraham* (New York: University Press of America, 2008).

⁵¹In his splendid devotional work *The Lonely Man of Faith*, Soloveitchik cites the Talmud (*Berakot*, 61a and *Ketuvot*, 8a) to the effect that the Fall of Adam was not the origin of sin, but that from their creation humans had an "evil intent" as well as a "good intent" (pp. 10–11).

⁵²For example, the highest possible good, power, and knowledge would all be perfections. Plantinga calls them "great-making" properties. Alvin Plantinga, *God, Freedom, and Evil* (New York: Harper & Row, 1974), 98.

⁵³This is not to suggest that God's approval of kindness and condemnation of murder are arbitrary; rather, it is that nothing is good *merely* because God says so. But then neither are good actions good because they instantiate self-existent values over which God has no control. Rather, God's commands *reveal* the norms of love and jus-

Article

Reading Genesis

tice that he had already called into existence and built into creation.

⁵⁴Ps. 104:21: "The young lions roar after their prey and seek their food from God."

⁵⁵In confirmation of this understanding, compare what has just been pointed out about Eden with what is said later to Abraham about the "Promised Land" being a place of God's special protection. Then recall the language used still later by Joshua in his report to the elders of Israel who were afraid to attack the formidable enemies who stood between them and that land: "They have *lost their protection* but the Lord is with us" (Num. 14:9). Moreover, the angel who drove Adam and Eve from the first place of special protection after their disobedience, then appears to Joshua in order to lead the people into the new place of special protection, the new Eden of the Promised Land (Josh. 5:13–15). Whereas in the original Eden faithfulness would have extricated humans even from death, in the Promised Land it would guarantee that God's people would "dwell secure" and "prosper." The New Testament continues this same line of thought when it speaks of the New Jerusalem, the final Kingdom of God, as the restoration of Eden because the tree of life will be there (Rev. 22:2). The idea of a place of God's special protection is a theme running all through redemptive history.

⁵⁶Thomas Aquinas makes a similar point: "Death is natural considering our material status, but penal considering how we lost the divine endowment of deathlessness" (*Summa Theologicae*, 2a–2ae. clxiv. I, ad 1). On my view, I would replace "endowment" with "redemptive gift."

⁵⁷The biblical view that humans are not naturally immortal and that everlasting life is a gift from God, was recognized by thinkers before Augustine, such as Theophilus of Antioch (d. 185). See his *Ad Autolykus* in *The Ante-Nicene Fathers*, vol. 2, ed. A. Roberts and J. Donaldson (Grand Rapids, MI: Eerdmans, 1989), 91. After Augustine, this idea tends to be replaced by the platonic idea of an immortal soul.

⁵⁸In his "Adam and Eve: An Evangelical Impasse?—A Review Essay" (*Christian Scholar's Review* 45, no. 2 [2016]: 179), Hans Madueme reports and rejects the interpretation of N. T. Wright that Adam and Eve were not the first humans or the ancestors of all humans, but were the first to be elected for a special relationship to God. He quotes Wright this way: "What Genesis is telling us is that God chose one pair from the rest of early hominids for a special, strange, and demanding vocation." Madueme then dismisses Wright's proposal as "implausible" for the reason that "there is no biblical evidence of Adam failing in his vocation on behalf of co- and pre-Adamites." But we have now seen why Adam's fall from grace was exactly the failure by which he left his fellow humans subject to evil and death. My position in this article therefore agrees with Wright except that I see no need to suppose Adam and Eve were "hominids" or that they lived any more than (roughly) 10,000+ years ago.

⁵⁹I think this explains why many intertestamental Jewish commentators as well as most early Christian commentators took Adam and Eve to be the first humans and the ancestors of all humans.

⁶⁰This has been part of the general confession in *The Book of Common Prayer* since the 1552 edition.

⁶¹It is significant that Adam's probationary failure is not seen as the origin of sin by either Jewish theology or Eastern Orthodox Christianity. See Joseph Telushkin,

Jewish Literacy: The Most Important Things to Know about the Jewish Religion, Its People, and Its History (New York: William Morrow & Co., 1991), 27–29. On Orthodox theology, see Alison Bennett, "Original and Ancestral Sin: A Brief Comparison" in the online journal *Orthodoxy and Heterodoxy* (Aug. 16, 2013). The idea that by Adam's fall all humans became sinful by inheriting the guilt of his failure, is Augustine's view—a view he largely based on Romans 5:12. But the Latin translation of that text which Augustine used was faulty! It read "... death spread to all men in whom (Adam) all men sinned." But the Greek says: "... death spread to all men *because* all sinned." See Paul Blowers's entry "Original Sin," in the *Encyclopedia of Early Christianity*, 2nd edition, ed. Everett Ferguson (New York: Garland Publications, 1997), 839–40.

⁶²Since there is not the space to introduce the great life spans ascribed to the Patriarchs in early Genesis as a separate topic, I will simply mention here that many fundamentalists appeal to these life spans to bolster their contention that the laws of nature were radically different at the time of the events of early Genesis. This is a faulty inference as it is well documented that there was a widespread custom of honoring important people in ancient Mesopotamia by assigning them an age that was symbolic of their character or accomplishments rather than reporting their actual chronological age. For example, one such inscription in the list of Sumerian kings reports that King Eridu Alulim reigned for 28,800 years. See Thorkild Jacobsen, *The Sumerian King List* (Chicago, IL: University of Chicago Press, 1939), 71. See Carol Hill's excellent article, "Making Sense of the Numbers of Genesis," in *Perspectives on Science and Christian Faith* 55, no. 4 (2003): 239–51, and Childs's *Introduction to the Old Testament as Scripture*, 152–53.

⁶³Of course, the Hebrew text may also contain exaggeration as is common in ordinary language that describes a disaster. Here again Calvin offers a useful observation about such language: "... for we know that Moses and the prophets ordinarily speak in a popular style suited to the lowest apprehension. It would be absurd, then, to reduce what they say to the rules of [science]." See *Commentaries on the First Book of Moses*, vol. 5 (Grand Rapids, MI: Eerdmans, 1949), 305.

⁶⁴Other fundamentalists postulate natural causes rather than miracles to explain enough water to cover the planet, as well as natural causes for its subsequent disappearance. But these hypotheses are so outrageous and at odds with all geological evidence, as to be preposterous. For example, *The Hovind Theory* (Pensacola, FL: Creation Science Evangelism, 2002), DVD.

⁶⁵For clear evidence that there has never been a flood that covered the entire planet, see Paul Seely, "The GISP2 Ice Core: Ultimate Proof That Noah's Flood Was Not Global," *Perspectives on Science and Christian Faith* 55, no. 4 (2003): 252–60. Seely reports that the yearly ice layers in a Greenland glacier have been counted to 110,000 layers and show no flood layer.

⁶⁶This is a recurring theme in the Old Testament (Deut. 7:3; Josh. 23:12, 13; Ezek. 9:1–4; and Neh. 13:23–25), and is repeated in the New Testament (2 Cor. 6:14).

⁶⁷Rom. 1:18–32 reads like a Midrash on Gen. 2:4–9:29, since Paul specifies that the people he is speaking of in Romans are "those who hold the truth in unrighteousness." He is commenting on the apostasy that occurred between Adam and Noah whereby those who had been told the

truth by “God himself” reverted to the worship of the creature “rather than the Creator.”

⁶⁸In the story of Noah, two other words are also used to describe those judged by the flood, so that the objects of God’s judgment are also referred to as those who are a “spirit” or a “life.” These are therefore short-cut ways of referring to those people since Gen. 6:17, 7:15, and 7:22 specify just which spirits or lives were ended or spared. So, for example, the expression “all mankind” in 7:21, should not lead us to think all humans were wiped out, as it is immediately qualified by *neshamah* in v 22: “all in whose nostrils was the breath of the Spirit of life.”

⁶⁹Peter’s comment that the flood destroyed “the world” (2 Peter 3:6) cannot be used to establish a universal flood. The Greek word translated “world” is “cosmos” and cannot be a literal statement of the extent of the flood, as no flood upon Earth could possibly inundate the sun, moon, and stars. Rather the meaning of “world” must be the same as that found in the previous chapter (2:5) where Peter speaks of the flood destroying the “cosmos of the ungodly.”

⁷⁰This is also the way to understand Jesus’s genealogy given in Luke 3. It is a covenant-genealogy that ends by calling Jesus “the son of God,” where that expression draws from Gen. 6:2 but—in a double entendre—adds to it the gospel’s sense of his sonship. In *Introduction to the Old Testament as Scripture*, Childs points out that

genealogy in its various forms emerges as an independent and highly significant literary form of antiquity. It performed an important function of legitimating royal dynasties ... Nevertheless, the major function of the genealogy in Genesis seems to differ from its analogue. Genesis pointed out ... the line of the chosen family. This is predominantly a theological function ... which uses the old traditions not primarily for political legitimation but for religious affirmation. (pp. 152–53)

⁷¹The NOMA view holds that religion and science are so different as to be isolated from one another, so that each can be an authority in its own domain but not in the other. Thus there can be no inconsistency between them.

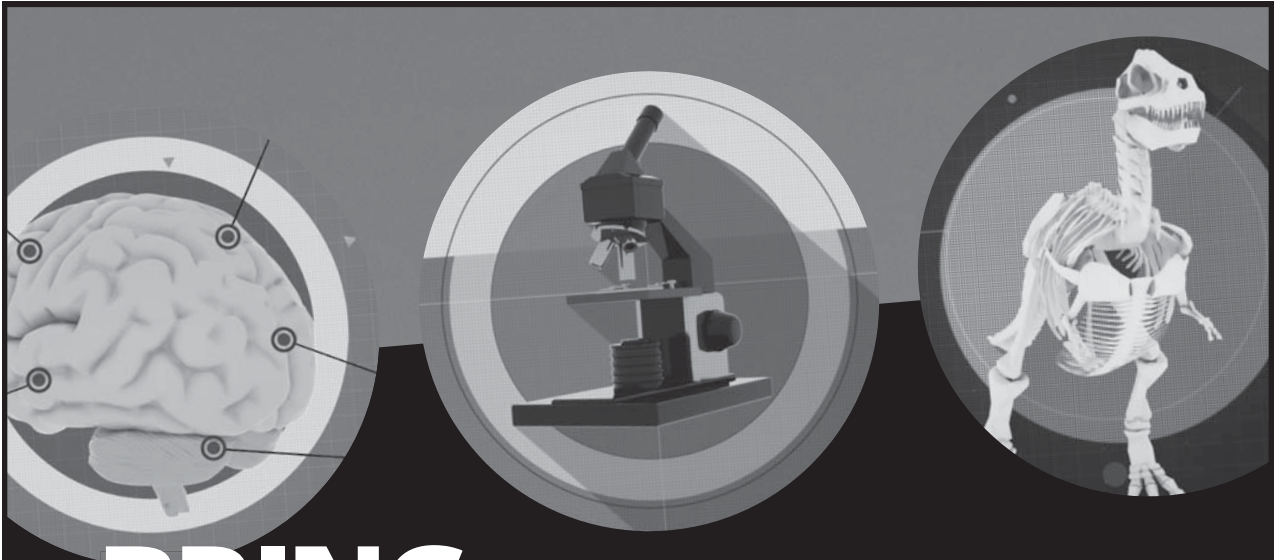
ASA Members: Submit comments and questions on this article at www.asa3.org→FORUMS→PSCF DISCUSSION.

CALL FOR ABSTRACTS



Abstract Submission Details:
www.asa3.org

Abstract Submission Deadline:
February 15, 2017



BRING WORLD-CLASS SCIENCE INTO YOUR CLASSROOM

with a compelling video series from AAAS

"What scientists do best when interfacing with religious communities is talk about their science and enable a conversation about the implications of that science. This video series does just that."

Jennifer Wiseman, director of AAAS Dialogue on Science, Ethics, and Religion

The American Association for the Advancement of Science (AAAS), in collaboration with Fourth Line Films, has produced an exciting new video series to spark classroom discussion of forefront science topics:

- Historical Perspectives on Science and Religion
- Biological Evolution
- Neuroscience and the Mind
- Methods and Limits of Science
- Human Uniqueness
- Space Exploration

WATCH THE VIDEOS AT SCIENCEFORSEMINARIES.ORG





David T. Barnard

Something Unintended: One Experience of Science and Vocation

David T. Barnard

I am not aware of a single person (though perhaps there are some) who went to graduate school intending to become a university administrator—department head, dean, director, vice-president or president—yet clearly a good number of those who first become faculty members do eventually move into administration.

I moved toward administrative roles apparently serendipitously after studying computer science. In my first few years as a faculty member, I became a member of a Senate committee at Queen's University that was charged with assessing institutional needs and making a recommendation to the Senate and the administration about the acquisition of a new computing system. This was several decades ago, at a time when shared mainframes (most frequently uniprocessors) still dominated computing environments. The machines that were chosen were invariably compromises among competing interests on campus. The work involved was interesting, exciting, long and hard, so that all involved for the duration of this project developed a mutual respect.

As a result of this work, when the then director of computing decided to leave the university, he stopped me on the street and told me that he would be recommending me for the role! This certainly came as a surprise as I was a junior member of faculty and had no such thing in mind. But as I grew to see how interesting that role could be at that point in the evolution of academic computing, I eagerly responded and was successful in getting the position.

Since then I have also served as head of my academic department at Queen's, as an associate to vice-principals (at Queen's, vice-presidents elsewhere), as vice-president (administration) and president at Regina, as COO of a software company, and latterly as president at the University of Manitoba. Along the way, I have been privileged to have board positions in a number of university sector organizations, in community organizations, and in business and public sector boards.

At one point some years ago, I asked a colleague to take on an administrative role. After thinking about it, he told me that his career had been formed not by the things he had applied to do (many of which he did not get), but by the things that he had been asked to do. They turned out to be very fulfilling, so he agreed to do what I was asking. That is largely true of my own career as well—it has not at any stage really been something that I had planned, but the choices have been responsive to circumstances.

The beautiful story of Abraham sending a servant to find a wife for his son Isaac from among his distant relations is found in the biblical book of Genesis. When the servant meets Rebekah by a well he says, in the words of the King James Bible, "Blessed be the LORD God of my master

David T. Barnard earned a PhD in computer science at the University of Toronto, as well as a Diploma in Christian Studies from Regent College of the University of British Columbia, and a LLM from York University. His vocation has spanned from professor of computing and information science at Queen's University to, currently, president of the University of Manitoba.

Communication

Something Unintended: One Experience of Science and Vocation

Abraham, who hath not left destitute my master of his mercy and his truth: I being in the way, the LORD led me to the house of my master's brethren" (Gen. 24:27). Or in a more modern translation, the New English Bible, the last clause is rendered "for I have been guided by the LORD to the house of my master's kinsman."

My father loved the fragment "I being in the way, the LORD led me." I remember him telling my brothers and me when I was very young that this is a pattern that the faithful often observe: it can be difficult to know in advance, or even as events transpire, what God might want or intend, but that after the fact, in retrospect, God's acts can be perceived. This can give us comfort when we are experiencing difficulty or stress in our lives, that the divine presence in (and possibly shaping of) life's experiences can eventually be perceived.

Like most bits of wisdom, this needs to be balanced with other truth, namely, that one can—at least to some extent—shape one's life intentionally. In fact, large parts of the Bible give explicit directions to believers about how to live so as to please God and achieve a rich and full life. In other words, we can shape our lives prospectively to good effect, and our lives are not always apparently random sequences of circumstances until meaning becomes clear after the fact.

Let me set this in context with a poem. The American poet David Citino has written a number of poems in the voice of a fictitious Catholic nun, Sister Mary Appassionata. Here are a few lines from "Sister Mary Appassionata Responds to Questions from the Floor."¹

Q.
Can God make a stone so heavy
He can't lift it?

A.
Yes and no.

Q.
If God knows the future
how can anyone have free will?

A.
I'm not at liberty to say.

Q.
What's an eternity?

A.
We haven't the time
to go into that.

Q.
Why did God make us?

A.
Looking and hearing,
tasting and smelling, touching
to wonder. To do what we're
born for, love, to question.

I love the audacity of the first few answers, and then the contrast with the depth of response—of wisdom, really—in the last. We are here to experience the richness of life and to ask the deep questions about meaning.

Here are several things I now perceive about my life. Some of them may be general truths that are also part of your experience, while others may be more specific to mine.

First, my life has been a journey from small theological spaces into increasingly larger ones. I grew up in a very small church, some distance from the mainstream of Christian thought, although I did not know it at the time. I have moved into larger appreciations of my faith and, as a result, to being less confident in stating what I know as theological certainty than when I was younger. I have sometimes misstepped or consciously chosen badly along the way.

Second, I have also journeyed from small intellectual spaces into increasingly larger ones. My father loved to read, but had little education, and so had largely acquired his interests on his own or through the churches he attended in different places during his life. I learned the love of reading and learning from him, though he might be uncomfortable with some of the ideas that seem quite acceptable to me. Along the way, I have added formal study in theology and law to my computer science background.

Third, I have experienced a life I could not have aspired to, because I did not know that it existed. The thrills of computer science as a discipline, of the threefold work of the university (learning, discovery, and engagement in the community), of working on

boards in both the public and private sectors—these have all been wonderful to experience, although they came as surprises rather than as something I had anticipated from childhood.

My final observation is that leading has been a particularly important concept for me—I have been concerned about divine leading in my life, and about my own leadership responsibilities.

I conceive of my leadership job description as comprising these five points: (1) set the tone (namely, how we treat people), (2) work with others to set the direction, (3) employ good people, (4) supply them with the resources they need, and (5) keep yourself and other obstacles out of their way.

I also know that our weaknesses are often our strengths taken to an extreme, and I realize that my characteristic weakness as a leader can be assuming too much and stepping back too far as I attempt to stay out of the way. At times I need a better balance between delegating and holding myself accountable.

When I was about to leave the presidency at the University of Regina, I asked the Irish poet Micheal O'Siadhail to write a poem for me to use at the farewell dinner in June of 2005. We talked at some length about my thoughts on the responsibilities of being a leader, and he then produced a poem titled "Leading," part of which I want to share with you.²

2

Hands-on

Headway of a vessel in rhythm;
Let the sea roar and all that fills it,
Still to tune and trim

And believe a crew's feedback
That feeds forward, a kinship of feeling
When to harden or slack,

Trusting nothing can overwhelm,
Wonder of moving in phase and yet
A lone hand at the helm.

3

Handover

To give it all and still the wisdom to know
How things nurtured steer from inside.
To praise and let go,

A stage well run, to call it then a day
And time a perfect handing over.
At the crux of a relay

One peaks as another hits his stride.
A baton slid from hand to hand.
Glory of standing aside.

The excitement of working with others, receiving a "crew's feedback" in the imagery of the poet, and then eventually knowing when the time has come to end one's service in a particular role and experiencing the "glory of standing aside"—these are good experiences that each of us can have in many contexts, and that I have been privileged to have in unexpected ways. ☆

Notes

¹David Citino, *The Book of Appassionata: The Collected Poems* (Columbus, OH: Ohio State University Press, 1998).

²The complete poem later appeared in the collection *Tongues* in 2010, but is most easily available in Micheal O'Siadhail, *Collected Poems* (Highgreen, Tarsset, Northumberland: Bloodaxe Books, 2013).

ASA Members: Submit comments and questions on this communication at www.asa3.org→FORUMS→PSCF DISCUSSION.

Annual Fund Campaign

Help us keep the conversation going.

Please send your tax deductible donation to:

American Scientific Affiliation
218 Boston Street, Suite 208
Topsfield, MA 01983

Book Reviews



ENVIRONMENT

LAUDATO SI': On Care for Our Common Home
by Pope Francis. Huntington, IN: Our Sunday Visitor Publishing Division, 2015. 176 pages. Paperback; \$12.95. ISBN: 9781612783864.

During the summer of 2016, the world's attention was riveted on Rio de Janeiro, Brazil, host of the Olympics. Summer of 2016 also marked a year after the release of Pope Francis's encyclical, *Laudato Si': On Care for Our Common Home*, named after a song of St. Francis of Assisi. This book forced the world to talk about Christian belief and its intersection with poverty and environmental degradation.

The timing of the encyclical was purposeful and effective. It was released at the end of the UN's Millennium Development Goals of 2000–2015 and before the Paris, France, climate talks in December 2015. The Millennium Development Goals were an ambitious attempt to alleviate dire poverty. Most of these goals have not been achieved completely, but important strides have been made. Millions of people gained access to sewage treatment, clean drinking water, health care, and schooling. Humans have benefitted from power plants, medicines, and increased crop yields. However, the goal of achieving environmental sustainability has not been met. Ocean pollution, soil loss, biodiversity loss, and climate change worsened over the same period. In the midst of this dilemma, Pope Francis released *Laudato Si'* and brought the voice of religious authority to the current environmental crisis.

Laudato Si' contains an introduction and six chapters (with numbered paragraphs). While an encyclical is a Roman Catholic theological document, this one is addressed to "all people of good will." The first chapter overviews the state of the world, lamenting environmental changes such as water scarcity and pollution woes, and observes that "our home is beginning to look more and more like an immense pile of filth" (p. 19). Francis also depicts a number of social changes such as "rapidification" (the increasing pace of life), social breakdown, waste, and immense gaps between rich and poor. Chapter two covers a Christian theology of stewardship, referring to several biblical passages which show that sin has disrupted human relationships with God, our neighbors, and the earth. However, God's ownership of all of creation and the commandments to "till and keep" the garden (p. 49) mean that humans have a responsibility to care for the earth.

Subsequent chapters relate the human roots of the ecological crisis, ecology and the common good, and a call to action for all. First, Francis describes the downside of rapid technological progress. Technology itself represents creativity and has remedied countless evils (p. 70). Unfortunately, the book states, "we cannot claim to have a sound ethics, a culture and spirituality genuinely capable of setting limits and teaching clear-minded self-restraint" (p. 72). Francis denounces a "technocratic paradigm" based on the "lie that there is an infinite supply of the earth's goods ..." (p. 73).

Much of the book is about connections. Environmental problems cannot be studied scientifically without also understanding economic and social factors; this means that we must have "integral ecology." He explains, "We are faced not with two separate crises, one environmental and the other social, but rather one complex crisis which is both social and environmental" (p. 94). To solve these problems, we need internal changes and social changes. It will take a radical shift in mindset and international and national commitments to fight such large-scale problems as climate change and poverty.

Finally, Francis calls for a simpler, less commercial life. "Disinterested concern for others, and the rejection of every form of self-centeredness and self-absorption are essential if we truly wish to care for our brothers and sisters and the natural environment" (p. 136). Throughout the book, Francis invokes a rich contemplative tradition, stating, "Christian spirituality proposes a growth marked by moderation and the capacity to be happy with little" (p. 144).

Laudato Si' was released to worldwide acclaim. It built on the tradition of a Christian stewardship ethic developed by others, such as Loren Wilkerson, Calvin B. DeWitt, Francis Schaeffer, Popes John XXIII, Paul VI, John Paul II, and Benedict XVI. Nonetheless, the encyclical was a step forward. Scientists, religious leaders, and environmentalists all praised the work. The Dalai Lama, the Archbishop of Canterbury, and the Conference of Catholic Bishops hailed it as historic. An editor lauded it in the scientific journal *Nature*. There were numerous articles in the mainstream press.

The encyclical is a powerful text. As the head of the Roman Catholic Church, Pope Francis leads a church of 1.2 billion and has an opportunity to change the world. By writing to the whole globe, but speaking from within the Roman Catholic social teaching, Pope Francis represents a prophetic voice for profound

change in the way we view others and nature. The book describes the way humans approach wealth as radically wrong. Some passages sound much like the Sermon on the Mount (Matthew 5–7), with its calls to care for all creation; to honor the weak, poor, and powerless as much as the powerful and rich; and to be joyful and grateful while choosing a slower, less consumptive life. In addition, the encyclical accurately represents the current scientific consensus. Several scientific groups and individuals have made supporting statements, in part because Pope Francis invited scientists to the Vatican and included them in discussions during the writing process. This book also has the capacity to affect international agreements. The timing of its release, before the December 2015 Paris climate talks, was critical in attracting attention from the press and thus encouraging widespread discussion.

In spite of these strengths, there are a number of weaknesses. The encyclical is full of generalizations but gives few specific details. How many species are going extinct? When and where are people most viewed as objects? How, specifically, will we make the radical changes Francis suggests, if individuals are sinful and institutions are driven by short-term gains? Francis makes some suggestions, but they are not well spelled out. Furthermore, the encyclical does not discuss population growth as a contributor to any environmental issues. While this was unsurprising given the Roman Catholic Church's position on birth control, it was a glaring omission. Many of the major criticisms of the encyclical came from those in the fields of politics and economics. For example, the encyclical dismisses cap-and-trade systems, which proved successful with sulfur emissions, but it gives no clear alternatives for economically and politically viable mechanisms to lower carbon emissions.

Laudato Si' reminds us that the current state of affairs in which brutal poverty and overconsumption co-occur is damaging to both humans and the rest of creation. The specifics of solutions to the need for both development and environmental protection are left to the international community, as we attempt our next global undertaking with the new Sustainable Development Goals of 2015–2030. By then we will have had three more Olympics, and hopefully they will be held in a world that is more moral, better cared for, and more sustainable. I recommend the book, both to individual readers and to groups that will find the included discussion questions helpful as a guide to conversation.

Reviewed by Dorothy Boorse, Professor of Biology, Gordon College, Wenham, MA 01984.



THE END OF SEX AND THE FUTURE OF HUMAN REPRODUCTION by Henry T. Greely. Cambridge, MA: Harvard University Press, 2016. 381 pages. Hardcover; \$35.00. ISBN: 0674728963.

With a title that is sure to catch a reader's eye, this book draws us in to think of a world in which sexual intercourse will no longer serve a role in reproduction. In this book, Stanford University law professor Henry Greely examines a putative world in which sperm and egg cells could be made from skin cells to produce embryos that would be genetically screened before given a chance to develop fully. In his writing, Greely coins the term "easy preimplantation genetic diagnosis" (EPGD) and predicts that this will be a standard tool used in producing offspring in the relatively near future.

Based on our current knowledge of genetics and stem cells, and the rate at which we have acquired such knowledge, Greely outlines what is needed with regard to scientific advancements and predicts that a world as portrayed in the movie *Gattaca* or read about in *Brave New World* is merely twenty to forty years away. He describes a future in which children can be born from parents who never existed, gay and lesbian couples can have biological offspring together, disease-causing mutations could be wiped out in a generation, individuals could have offspring with themselves, and parents could discard embryos based on the lack of desired traits.

In predicting this future world, Greely writes so that the topic is accessible to a broad audience. He begins by giving "a nonscientist guide" to readers so they can understand the scientific foundation that will allow EPGD to become a reality. He then discusses what will be needed by way of scientific advancement to make EPGD an affordable reality. As one digests the advancements that will be needed, one begins to see the benefits and complications of such a world. In the third part of his book, Greely walks the reader through several implications for society of genetically screening embryos in order to select for certain traits.

I find it interesting that the author begins his book by discrediting his authority. He admits that he "last took a biology course at the age of fifteen" and concedes that his book "gives a nonscientist a guide," as he is a lawyer not a scientist.

Book Reviews

The first six chapters of the book make an attempt to give the reader an overview of the pertinent science relating to genetically diagnosing embryos. There were only a couple of times I cringed as I read through those early chapters. There were several errors/over-simplifications, and I was disappointed that the author touches only briefly on epigenetics (a mere page and a half). However, the first part of the book is not intended for scientists, and it does provide an interesting example of how someone with little to no scientific background can work toward an understanding of the field. The author does a nice job of explaining scientific concepts in a manner that nonscientists will likely be able to grasp.

Greely provides many examples of scientific advancements in the past and relevant legal cases with regard to human rights. In doing so, Greely gives his audience the tools to begin to wrestle with some of the important questions. Have the scientific and legal communities really examined the trajectory we are on? Do we want to live in a world in which we have parents genetically selecting which offspring should be given a chance at life? How do we educate those without a scientific background so they can make informed decisions when it comes to utilizing genetic diagnosis? What future injustices are we setting up? Who gets to say what traits are allowable, and which ones should be selected against? Can we, and should we, implement regulations of such a technology? Whom do we permit to enforce laws?

Ideally, the book will motivate Christian readers to think about where we want to go with the plausible scientific advances now on the horizon. We need to participate in ongoing discussions pertaining to genetic testing and stem-cell-related advances. However, we need to be aware not only of the subject matter but also of our audience. For example, the author points out that he is unwilling to engage in conversations with people who cite biblical references to argue that utilizing genetics to select embryos and choosing genetic traits for offspring is wrong. Greely clearly states that he is a consequentialist when it comes to ethical dilemmas and expresses that it is “surprisingly difficult” to find religious positions pertaining to EPGD, claiming he could not readily find a central authority figure who addresses the technologies on the horizon. As Christians, this should give us pause. Hopefully, we will contemplate and discuss what role Christians will/should play in answering these questions. Ideally, we can all participate in this discussion in a respectful and informed manner.

Choosing to have a child is a major decision many wrestle with. Imagine now a world in which we

have to wrestle with what traits we want that child to have. In *The End of Sex and the Future of Human Reproduction*, Greely calls us to learn as much as we can before this technology fully exists, so that we can be equipped to make informed decisions.

Reviewed by Elizabeth Y. Heeg, Associate Professor of Biology, Northwestern College, Orange City, IA 51041.



GEOLOGY

THE GRAND CANYON, MONUMENT TO AN ANCIENT EARTH: Can Noah's Flood Explain the Grand Canyon? by Carol Hill, Gregg Davidson, Tim Helble, and Wayne Ranney, eds. Grand Rapids, MI: Kregel Publications, 2016. 240 pages. Hardcover; \$26.99. ISBN: 9780825444210.

At last! We now have a scientifically credible, readable book about the Grand Canyon geology geared to nongeologists: *The Grand Canyon, Monument to an Ancient Earth: Can Noah's Flood Explain the Grand Canyon?* The answer given to the question posed by the title is a resounding “NO, IT CAN'T!” Although not stated in so many words, the authors were clearly motivated by a fervent desire to drive “flood geology” into extinction. I join the authors in hoping that they succeed.

This eagerly anticipated book has long been gestating, but the wait has been worth it. The full story behind *The Grand Canyon* was told in the June 2016 issue of *Perspectives on Science and Christian Faith* by Carol Hill, the instigator and driving force behind the book. A Christian geologist who specializes in cave geology and hydrology, Hill is the author of *Cave Minerals* and has published several technical articles on aspects of the Grand Canyon geology. She assembled a first-rate team of eleven contributors, at least eight of whom are Christians. Hill, Stephen Moshier, and Gregg Davidson did the lion's share of the writing, but every one of the eleven wrote at least one chapter and helped to shape the entire manuscript. The team of authors includes three hydrologists, a carbonate sedimentologist, an aqueous geochemist, two paleontologists, a structural geologist, a planetary scientist, a petroleum geologist, and a botanist, thus providing a wide range of professional expertise necessary for a competent discussion of virtually all aspects of the Grand Canyon geology. The contributors represent the American Association of Petroleum Geologists, five major universities (New Mexico, Mississippi, Tulsa, Northern Arizona, and Akron), two Christian colleges (Wheaton and Calvin), and two federal agencies (National Weather Service and

Los Alamos National Laboratory). At least one is also an independent geological consultant.

The authors were joined by photographer Bronze Black and graphic designer Susan Coman, both of whom did superlative work.

The Grand Canyon accomplishes many objectives. Readers are treated to a feast of palatable scientific information about the Grand Canyon. Many visitors to the canyon will want to acquire this book if for no other reason than to understand the geology that is exposed in the walls of the canyon as well as the history of the canyon itself. For others, the volume can serve as an elementary geology text. Readers who lack geological training receive a solid education in basic geologic principles that are applicable anywhere. These principles are routinely applied by field geologists around the world in their efforts to reconstruct the history of the rocks which they are investigating. Finally, the writers have provided an avalanche of evidence to refute the pseudo-science of flood geology. These ends have been achieved with clarity, vigor, and precision, but also in an irenic spirit that respects those whose fallacious views are vigorously challenged. One finds no epithets hurled at those who subscribe to flood geology.

This book consists of five parts. Part One sets the stage by providing an overview of the basic principles of flood geology and its relation to the Grand Canyon, along with a review of biblical texts invoked to support flood geology. The beginning section includes a helpful tabular comparison of flood geology and modern geology. Part One also contrasts the time frames of flood geology and modern geology. An outstanding feature is a two-page (pp. 42–43) set of color illustrations that depict the successive steps involved in the historical development of the local geology.

Part Two, a superb presentation in eight chapters on “How Geology Works,” provides the meat and potatoes of the book. Here the reader is treated to a sizeable chunk of Geology 101 at its finest. Given that the canyon walls consist predominantly of sandstone, shale, limestone, and conglomerate, Part Two focuses primarily on the nature and formation of sedimentary rocks. Distinctive structures of these rocks, such as ripple marks, mud cracks, and cross bedding, are discussed. The reader is shown how to apply modern sedimentary processes and features to the interpretation of ancient sedimentary rocks. The text is accompanied by gorgeous photographs of the features under discussion, along with clear maps and diagrams, all in color. The authors also explain how to determine the relative time relationships among

spatially associated rock bodies by means of the principles of superposition, cross-cutting relationships, original horizontality, lateral continuity, and faunal succession. The geologic timescale is described. The determination and reliability of the ages of (mostly) igneous rocks are due to the various methods of radiometric dating.

An extremely important section in Part Two is chapter 10 (Missing Time), which deals with gaps in the rock record, gaps that flood geology tends to gloss over in light of its stress on the catastrophic activity of a yearlong deluge. The authors describe the characteristics of unconformities, which are discontinuities in a pile of sedimentary rocks that have resulted from temporary nondeposition of sediment, erosion of previously deposited sediment, changes in the rate of sedimentation, changes in the composition of sediment being deposited, or combinations of those factors. The reader learns how to recognize the presence of unconformities features in rock exposures. Adherents of flood geology and young earth creationists contend that the sediment layers were deposited almost uninterrupted during the deluge, such that virtually the entire stack of sediments in the Grand Canyon remained essentially unconsolidated throughout the period of deposition. These contentions are readily refuted. This chapter is enhanced by photographs of unconformities and an impressive table (p. 100) that identifies and describes nineteen unconformities that have been detected in the walls of the Grand Canyon. Each one of the erosional episodes is indicated by the presence of an unconformity affected sedimentary material, which had already been consolidated into rock before subsequent layers of sediment were deposited.

Part Two concludes with a summary of the theory of plate tectonics and a lesson on how to extract historical information from the exceedingly common fractures, faults, and folds that are indicative of episodes of rock deformation.

Part Three turns to the study of fossil remains of the Grand Canyon, addressed in three chapters: fossil animals (fauna) of the Grand Canyon and the Grand Staircase to the north; fossil plants (flora) of the region; and trace fossils, which are features found on the surfaces of sedimentary rock layers, such as burrows and footprints, trails, and tail drag marks. Part Three includes excellent photographs of *in situ* fossils. Two informative tables summarize the characteristic animal and plant fossils that occur in the rock formations of each time period of the geologic column from Proterozoic (Early Proterozoic) to Cenozoic (Neogene). Stress is also laid on the significance of the animal and plant fossils that are not

Book Reviews

found in the Grand Canyon rocks, fossils that one might reasonably predict should be there if flood geology were valid.

An important aspect of Part Three is a discussion that debunks the claim made by some flood geology advocates that the rocks must be very recent because modern pollen has been found at the Grand Canyon. It is pointed out that any pollen found in the Grand Canyon was not extracted from the rocks themselves but derived solely from local plants currently growing in the canyon.

Part Four discusses the pros and cons of various processes by which the canyon may have been excavated and considers the age of the canyon. This section includes a brief look at modern life forms currently living in the canyon and a discussion of the implications of extinct animal fossils found in caves within the canyon for theories of canyon formation.

Although the entire text incorporates a running refutation of aspects of flood geology in the light of modern geological findings, the concluding Part Five lays out an overview of the geological history of the Grand Canyon area by summarizing the evidence drawn from the rocks exposed in the canyon. Here the reader is escorted on a step-by-step, river-to-rim, upward journey from the crystalline rocks exposed at the bottom of the canyon to the Kaibab Formation that occurs at the rim. The final chapter drives home the point that the totality of geological evidence found in the Grand Canyon unequivocally supports a complex, vastly ancient history involving the long-continued operation of depositional and erosional processes in shallow marine, deltaic, fluvial (river), lacustrine (lake), and eolian environments. The evidence bears no relation to Noah's or any other great flood.

The text of *The Grand Canyon* is a nutritious and tasty intellectual feast, but the to-die-for dessert is provided by spectacular color illustrations that greatly enhance the impact of the book. Approximately 250 maps, idealized cross sections, block diagrams, tables, and gorgeous photographs of the canyon taken from every perspective imaginable accompany the text. A compilation of references and general reading for further enlightenment rounds out the book.

Every pastor, every theologian and seminary student, every science professor and science student in a Christian college, every school board member, principal, science teacher, student, and parent connected with a Christian school, and every parent who homeschooled a child should read this book cover to cover. They should study the diagrams, tables, and photo-

graphs. After reading the book, they should place it on the coffee table as a permanent fixture. Then, as soon as possible, they should visit the Grand Canyon with their families and look for features explained in the book for themselves.

Congratulations are due to Kregel Publications for publishing this magnificent book and offering it at such a reasonable price.

Reviewed by Davis A. Young, Professor of Geology, Emeritus, Calvin College, Grand Rapids, MI 49546.



ORIGINS

DARWIN IN THE TWENTY-FIRST CENTURY: Nature, Humanity, and God by Phillip R. Sloan, Gerald McKenny, and Kathleen Eggleston, eds. Notre Dame, IN: University of Notre Dame Press, 2015. xviii+461 pages. Paperback; \$49.00. ISBN: 0268041474.

The title under review derives from one of the major academic conferences commemorating the 150th anniversary of the publication of Darwin's *On the Origin of Species* (November 24, 1859) and the bicentennial of Darwin's birth on February 12, 1809. Cosponsored by the John J. Reilly Center for Science, Technology, and Values at Notre Dame, and the Science, Theology, and the Ontological Quest project within the Vatican Pontifical Council for Culture, it brought together well over twenty interdisciplinarians to explore the heritage of evolutionary theory and its implications for human, social, and religious concerns in November 2009. The volume is intended both as a product of the events that transpired and as an advancement toward maturity of the field in the twenty-first century.

The focus of this volume is on present and future developments within evolutionary science and its impact on the humanities, rather than a strict historical commemoration of achievements. While based on the conference at Notre Dame, it does not include all the papers presented there, and has a distinctly Roman Catholic orientation (as might be surmised). The division of this collection of essays into the three areas of nature, humanity, and God reflects not only the conference itself, but also the major areas that evolutionary theory impacts: natural philosophy, humanity's place in the cosmos, evolutionary ethics, and the relation between scientific and theological explanations of human origins. What follows are selective highlights that seem particularly important.

A particularly strong chapter within the first section on nature is Scott F. Gilbert's "Evolution

through Developmental Change: How Alterations in Development Cause Evolutionary Changes in Anatomy.” Therein, Gilbert relates how the Modern Synthesis explains natural selection at both the species and populations levels exceptionally well. However, this situation changed in the mid-1970s when two major advances contributed to a more complex evolutionary theory that could explain both micro- and macroevolution, namely DNA sequencing and developmental genetics (p. 38). Gilbert claims that the classical modes of evolutionary developmental biology (i.e., heterotypy, heterochrony, heterometry, and heterotopy) supplement and extend the Modern Synthesis, but symbiotic and epigenetic contributions could be more revolutionary (p. 53).

In chapter five, “Accident, Adaptation, and Teleology in Aristotle and Darwinism,” David J. Depew contrasts how Aristotle perceived teleology, as consisting of a duality of both natural and intentional aspects, with how the Victorian Englishman restricted teleology to merely its intentional aspect. Depew contends that biological evolution exhibits natural teleology, but not intentional teleology (p. 127).

Gennaro Auletta, Ivan Colagè, and Pablo D’Ambrosio coauthor the sixth chapter, “The Game of Life Implies Both Teleonomy and Teleology,” arguing that both teleonomy and teleology are valid explanatory mechanisms in biology. In the essay, they make a notable distinction between teleonomy, which may be ascribed to all biological processes that imply forms of co-adaptation but not built-in goals, and teleology, which concerns processes that have goals which are built-in and necessarily nested in the constitution of an organism (p. 146).

Chapter eight, by Robert J. Richards, is entitled “Darwin’s Evolutionary Ethics: The Empirical and Normative Justifications,” and argues that Darwin employed a community-type selection to explain those human social behaviors and instincts that were costly to self but were advantageous to kin and the wider community (p. 189). To this, it is claimed, Darwin added that the fundamental altruistic impulse is augmented by two processes: praise/blame, and the promise of reciprocity (p. 190).

In “Questioning the Zoological Gaze: Darwinian Epistemology and Anthropology,” Philip R. Sloan develops a philosophical anthropology that returns to the phenomenological tradition, and draws upon the tradition of continental philosophical anthropology. More specifically, Sloan argues that we must break with a line in philosophical reflection predominant within Anglo-Americans that assumes reflections on human beings must necessarily begin

with the natural sciences, and avers instead that it is apropos to begin from the experience of ourselves as existentially existent and self-reflective beings (p. 250).

Chapter eleven entitled “Evolution and the Catholic Faith,” written by John O’Callaghan, begins the section on God. Frankly, this essay is out of place when viewed from the perspective of the rest of the volume, and the transition is unnecessarily abrupt. O’Callaghan posits a very conservative position within the Roman Catholic tradition. The volume would have been better positioned by placing William E. Carroll’s chapter twelve, “After Darwin, Aquinas: A Universe Created and Evolving,” first in this section. Carroll states that the challenges posed by evolutionary biology do not so much demand a new theism, but rather a re-appropriation of insights gleaned from Aquinas, especially regarding the doctrines of creation, God’s transcendence, and providence. Interestingly, Carroll stipulates that we have no need of positing a kenotic theology, as many do in the contemporary environment, in contradistinction to what a later author in the book does (Życiński, chapter thirteen). I take issue with Carroll’s position on this, and posit instead that rather than seeing divine kenosis as a self-limitation, we should view it as a divine self-offering (which *kenou* connotes in the Greek). Viewed as such, one can picture kenosis as a divine pouring of self into the very constituent matter that composed the early, chaotic universe.

The title closes with two contributions, looking at past and future prospects. In “Imagining a World without Darwin,” Peter J. Bowler sets up a counterfactual scenario that reconstructs history as if Darwin’s theory had not been proposed in 1859. He contends that an evolutionary movement would most likely still have emerged in the 1860s, but exploiting a non-Darwinian mechanism, and suggests that although natural selection would have eventually been discovered, the theory would not have been a major component of the debate until early in the twentieth century (pp. 385, 388). Finally, in the concluding chapter entitled “What Future for Darwinism?,” Jean Gayon proposes that Gould’s (2002) distinction between extension, replacement, and expansion, provides a useful basis from which to gauge the future of Darwinism. “Expansion” means that the same principles remain central to the theory, but they have been reformulated in a way to give a truly different aspect to the entire edifice. Gayon contends that we observe this “expansion” of a theoretical framework in the generalization of the concept of “descent with modification” to infra-organismic levels, and the addition of new principles in the source of variation—lateral gene transfer and symbiosis (p. 413).

Book Reviews

All in all, this title is an adequate exploration of the heritage of evolutionary theory and its implications for human, social, and religious concerns from a Roman Catholic perspective. The essays potently assess the continuing relevance of Darwin's work from the perspectives of biological science, history, philosophy, and theology. I recommend this book for those who are involved in the ever-proceeding science and theology dialogue.

Reviewed by Bradford McCall, Department of Theology, Regent University, Virginia Beach, VA 23464.

HOW I CHANGED MY MIND ABOUT EVOLUTION: Evangelicals Reflect on Faith and Science by Kathryn Applegate and J. B. Stump, eds. Downers Grove, IL: InterVarsity Press, 2016. 196 pages. Paperback; \$16.00. ISBN: 0830852905.

Stories are powerful. When we tell them and when we hear them, we learn about ourselves and how to make sense of the world around us. *How I Changed My Mind About Evolution: Evangelicals Reflect on Faith and Science* is a collection of twenty-five personal essays written by well-respected scientists, theologians, and pastors describing the story of their journeys toward accepting the theory of evolution as the best explanation for the origins of life, and how they reconciled this belief with their Christian faith while remaining faithful to scripture. The short essays in this collection are indeed powerful. They are honest and contain thoughtful reflections in and through which we can see ourselves, the world around us, and our own journeys. As I read the essays, what stood out to me most were the common themes that emerged. These themes, evident in most of the essays, can serve as lessons or guides for readers on their own journeys.

Not surprisingly, most authors begin their essay with a description of the conflict they experienced between science and faith. Sometimes the conflict was occasioned by their church or denomination; sometimes the conflict existed because of assumptions they made as they learned Bible stories throughout childhood. The authors often described their journey to reconcile or integrate faith and science around the issue of evolution as “risky,” but they commonly identified their love of science and learning, curiosity about the world, and a desire for wholeness—for engaging God with their heart and mind—as motivating factors for seeking reconciliation and integration. The integrative work described by the authors was not easy. They read books, earned doctoral degrees, studied scripture, and prayed. It took time and energy. Significantly, most authors expressed their reliance on evidence, both accurate

scientific evidence and biblical interpretation done with care and thoughtfulness. Their journeys reflect postures of critical thinking, asking difficult questions, and not settling for simplistic answers. They tolerated neither bad science nor bad hermeneutics, and they maintained the centrality of the authority of the Bible as they worked. Over and over, the authors articulate the need for humility and openness when examining both the scientific evidence and the relevant scripture passages. They were open to the possibility that they might, in the light of evidence, need to readjust their beliefs and assumptions. While many expressed this journey as one they felt might be a risk, they also expressed confidence in God's faithfulness in guiding them to the truth. The assurance that “all truth is God's truth” echoed throughout the essays found in this book.

Unfortunately, many authors attest to experiences of hurt and disillusionment in the church when they began to examine the scientific evidence and carefully consider the biblical text. When searching beyond the simple answers many of their churches gave, they found the evidence in support of evolutionary theory overwhelmingly convincing. Having been presented with a false choice by their church or denomination—young earth creationism and faith or evolution and atheism—many had the sense that the church had let them down, even lied to them. In the light of their own hurt and disillusionment, several authors express concern for their students, young people, and children of the church today. They observe that young Christians are too often presented with the same false choice. When these young Christians see the scientific evidence in support of evolutionary theory, they, too, often experience disillusionment and hurt. Unfortunately, not all these young Christians will patiently work to reconcile faith and science. When they believe that the church has been less than honest with them, there is a real risk that they will abandon their faith. Jeff Hardin and Stephen Ashley Blake specifically address the responsibility of scientists who are Christians to act as bridges between science and faith for church communities, in order to help avoid this kind of hurt and disillusionment.

Thankfully, the authors of this book conclude that abandonment of their faith is not the only or the best response. Each author testifies that, in the end, they found no conflict between science and faith. When properly understood, the “two books”—science and faith—written by the same author, are not only compatible but also harmonious, and no one should be told they must choose between the two. Rather than finding that they had to abandon their faith at the end of their journeys, the authors found harmony an

deepening of their faith. The authors testify over and over to an increased sense of wonder, awe, mystery, and delight in God's creation and were compelled to respond with worship.

Consistent with the emphasis on intellectual humility, the authors do not suggest that they have the issues all solved. They readily admit to having ongoing questions for which they are seeking answers. But they are not afraid of their questions, and in their confidence, they encourage us, as readers, to approach our own questions without fear.

Finally, the authors describe the critical role of mentors, models, and communities in creating safe, nonjudgmental spaces in which they had permission to ask hard questions, disagree, dialogue, and listen.

You will not find the evidence on which the authors depended along their journeys in this book, but you will find references to authors and books in which you can find that evidence for your own journey. In this book, you will find honest stories with which you might identify. You will find safe spaces to ask your questions, and you will be introduced to members of a community working to create those safe spaces. I think that anyone curious about embarking on their own journey to reconcile faith and science, as well as those well along that road, will enjoy and find encouragement in this collection of stories. The essays are short, easy to read, well written, and compelling. I will recommend this book to students who are struggling to reconcile their faith and evolutionary theory as an assurance that it can be done and done well.

This is the first book in a new series, BioLogos Books on Science and Christianity, in a partnership between BioLogos and IVP Academic. I look forward to more.

Reviewed by Sara Sybesma Tolsma, Department of Biology, Northwestern College, Orange City, IA 51041.



PSYCHOLOGY

THE BRAIN'S WAY OF HEALING: Remarkable Discoveries and Recoveries from the Frontiers of Neuroplasticity by Norman Doidge, MD. New York: Viking, 2015. 409 pages. Paperback; \$19.95. ISBN: 9780670025503.

Norman Doidge's first book, *The Brain That Changes Itself* (2007), profiled case studies of neurologically impaired patients who were desperate for a cure. It became a *New York Times* bestseller that subsequently spun off as a successful educational film. The book's overarching theme explores the concept of brain plas-

ticity—the notion that the mammalian brain is not fixed but can change both structurally and functionally well into adulthood. While Doidge's first book introduced the reader to the major scientists who challenged previous dogma insisting that the adult brain could not alter its functional characteristics, his new book, *The Brain's Way of Healing*, emphasizes the application of neuroplasticity to treating complex neurological illnesses with behavioral treatments.

The Brain's Way of Healing includes eight chapters featuring compelling stories of people who, through no fault of their own, live with severe neurological impairments. Their ailments include Parkinson's disease, traumatic brain injury, stroke, autism, multiple sclerosis, attention deficit disorder, among others. Each had been told that they would never get better from their illness.

In *The Brain's Way of Healing*, Doidge attempts to categorize different types of neuroplastic healing that can occur and examines the various ways the brain can adapt to overcome injury or disease. As a neuro-clinician who specializes in psychiatry and psychoanalysis, he proposes his own stages for neuroplastic changes. However, traditional neuroscientists who place more emphasis on systematic experimental methodologies might feel that Doidge's description of neuroplastic changes are too broad and lack the precision characteristic of scientific theorizing. For example, Doidge's use of the phrase the "brain is rewiring itself" appears to include instances of axonal or dendritic sprouting, creation of new brain cells through neurogenesis, processes involving the repairing of damaged tissue, as well as the altering of neuropathways that circumvent previously used circuitry. These different types of brain-altering processes could be more clearly nuanced, particularly when Doidge addresses the efficacy of the behavioral treatments described in the case studies.

Doidge believes that neuroplastic healing in the brain occurs by using different forms of energy such as light, sound, touch (including movement), and electricity. These forms of energy can be used to modify patterns of the brain's electrical signals, which, according to Doidge, lead to structural changes in the brain. For example, sensory cortical real estate initially dedicated to one body part, such as the hand, is now taken over by abutting cortical areas in the face after a limb amputation. Research by Michael Merzenich revealed that the lack of sensory input to the brain from an amputated finger resulted in an altered cortical brain map. Doidge explained the change in terms of energy—in this case electrical signaling—that had ceased. The cortical areas

Book Reviews

responsible for the motor pathways from the intact fingers increased in size, eventually taking over the brain area that previously controlled the missing finger.

Doidge clearly shows his biases against contemporary medicine. He believes clinicians have overlooked the body to treat the brain. He also opposes Western medicine's emphasis on using drugs to cure. Doidge prefers behavioral therapies, such as movement or applying some form of energy (e.g., light, sound) to the body as a way of treating the brain. While he does acknowledge the presence of bidirectional communication feedback loops between the brain and the peripheral nervous system, it was disappointing that he failed to mention anything from the new scholarship on the embodied mind. Instead, he promulgates a spurious dichotomy between Western and Eastern views of medicine by making them appear more diametrically opposed than they actually are.

The Brain's Way of Healing reads like a science fiction novel. It captures readers with a riveting narrative style. For example, the book's first chapter describes the case study of a registered nurse who suffered from debilitating chronic pain after she injured her back. Surgeons told her that there was too much damage for surgery to be of any help. She was placed on a steady regimen of opioid medicines to control the pain; even strong painkillers like morphine were not effective. After a decade spent at home and feeling depressed and suicidal, she sought an alternative therapy that involved visualizing the shrinking of brain areas responsible for processing pain. The woman testified that her pain had subsided dramatically within four weeks and eventually disappeared completely, allowing her to return to her normal way of life. Doidge's explanation is that "competitive plasticity" occurred in the brain, disabling the posterior parietal lobe from processing the pain signals as it had in the past.

In this case study, as with the others described in the book, one questions the quality of the evidence Doidge uses to arrive at the conclusion that a particular neuroplastic therapy was responsible for the prophylactic outcomes. Much of the evidence presented is anecdotal and appears to be uncritically accepted as truth. In addition, there is a reliance on retrospective memories without a cautionary eye toward the possible influence of hindsight biases that could alter the patient's narrative. Also, there was no mention of any brain imaging data (i.e., fMRI, PET) that could elucidate or confirm that specific brain areas are supposedly now rewired. Doidge does acknowledge the possibility of a placebo effect causing the pain reduction. However, it is quickly ruled

out by his reasoning that the duration of the relief far surpasses what may be credited to only placebo.

It is likely that *PSCF* readers will be disappointed by the paucity of data used to explain how the therapies work. While attempting to understand how a particular therapy might cause brain-based changes through mechanisms of neuroplasticity, Doidge resorts to less credible "evidence" as a substitute for genuine scientific methods. Although *The Brain's Way of Healing* is a stimulating read, it raises more questions than it answers.

From a Christian perspective, *PSCF* readers will note Doidge's nonreductionist approach to clinical neuroscience. The author describes the individuals who comprise the neurologically based case studies from a holistic perspective involving mind, body, and soul. Although Doidge does not attempt to integrate religious constructs with scientific findings explicitly, his writing is infused with implicit musings that could resonate with spiritual and religious communities. For example, personhood is viewed more broadly than the sum of one's intellect (mind) and body. There is an appreciation for the mystery and wonder that is present in all people, whether their brains have been ravaged by disease or are fully intact. In many respects, *The Brain's Way of Healing* is reminiscent of the writings by the late neurologist Oliver Sacks, who was known for his ability to write about the existential qualities of his former patients with a humanizing grace. Sacks never seems to focus on the brokenness of humanity; he unabashedly emphasizes the growth potential of all people, regardless of their challenges. Doidge's writing reflects this same uplifting quality that provides hope for those whom traditional medicine has not been able to help.

Reviewed by Bryan C. Auday, Department of Psychology, Gordon College, Wenham, MA 01984.



SOCIAL SCIENCE

UNDERSTANDING GENDER DYSPHORIA: Navigating Transgender Issues in a Changing Culture by Mark A. Yarhouse. Downers Grove, IL: InterVarsity Press, 2015. 191 pages. Paperback; \$20.00. ISBN: 9780830828593.

Transgender, gender fluid, gender queer, transsexual: Almost weekly, it seems, new words emerge to describe and express a diversity of gender experience and expression well beyond the traditional female/male, woman/man binaries. Are those who do not fit the traditional gender binaries suffering from a mental disorder, or are they expressing

perversity or something to celebrate? Struggles and arguments on this question reverberate throughout modern society. In the midst, Christians often stand bewildered, wondering how to respond. Knee jerk, oversimplified reactions abound in both the secular and Christian media, and those who experience gender dysphoria can be deeply hurt in the crossfire.

While there are plenty of excellent (and not-so-excellent) books and other resources to help Christians think through issues of sexuality and sexual orientation, gender dysphoria has received far less attention. In *Understanding Gender Dysphoria: Navigating Transgender Issues in a Changing Culture*, professor, clinical psychologist, and evangelical Christian Mark Yarhouse has provided a much-needed, thoughtful, serviceable resource for Christian families, churches, and communities. In the midst of a cacophony of competing perspectives, his voice stands out as compassionate, wise, balanced, and sane. Yarhouse acknowledges the complexity of people's experiences of gender dysphoria, accurately outlines the current state of the research, and situates both in the context of evangelical Christian theology. What he does not do is take seriously the possibility that traditional conservative evangelical theology might have something to learn from those who challenge the reality and appropriateness of a binary view of gender. However, by refusing that challenge he has created a "safe space" for evangelical Christians within which he presents a different challenge: To get comfortable with the complexity and lack of knowledge around gender dysphoria and to focus on humility, listening, and being in relationship with those who struggle with dysphoria.

Yarhouse begins with two chapters introducing readers to the complexity of sex and gender and an outline of evangelical Christian perspectives on these topics. The next three chapters summarize the scientific and clinical dimensions of gender dysphoria, from potential causes to prevalence to prevention and treatment. In the final two chapters, he provides concrete suggestions for Christian individuals and institutions as they wonder how to respond. Throughout, he emphasizes the complexity of gender diversity, the many as-yet-unanswered questions about cause, and the importance of recognizing that people do not choose to be gender dysphoric. Stories of real people dealing with gender dysphoria in the context of their Christian faith and faith communities put an important face on the issue, and give life to the theories. The writing is conversational but also academic in style. The book could have used more careful copy-editing to catch errors and awkward sentences; however, the overall points get through despite these distractions. Some readers may struggle

with the technical language in the three chapters on cause, prevalence, and treatment; however, each chapter has a concluding section that summarizes the main points in a more accessible manner.

I have followed Yarhouse's work for many years, and find this to be one of his most nuanced. While continuing to hold to the traditional evangelical perspective that God's intention for creation is a clear female-male binary, he gently scolds the many Christian communities who send a message of exclusion and sinfulness to those who are dealing with a complex issue that has no simple solutions. Particularly helpful is his identification of three different lenses through which people consider gender issues—integrity, disability, and diversity—and showing how each has value and limitations for the Christian. He also clearly lays out how to use these lenses when dealing with real people in their real struggles. His clinical experience, wisdom, and compassion shine through as a guide and a model for humility, grace, and relationality.

One of the most moving and powerful moments in this book, for me, is a quotation from a friend of Yarhouse's who deals with gender dysphoria. It captures the spirit of the book well. She says,

This central paradox in Christianity allows us to love our own brokenness precisely because it is through that brokenness that we image the broken body of our God—and the highest expression of divine love ... It's also always struck me as particularly fitting and beautiful that when Christ is resurrected, his body is not returned to a state of perfection ... but rather it still bears the marks of his suffering and death—and indeed that it is precisely through these marks that he is known by Thomas. (pp. 59–60)

Some readers may be disappointed that Yarhouse does not provide clear, strong answers about what is "right" and "wrong" about expressions of gender diversity and various approaches to its treatment. His challenge to get comfortable with the messiness may be strong meat to some. Others may be disappointed at his unwillingness to consider that traditional evangelical Christian theology around sex and gender might well need some revision in the light of current knowledge and understanding. He outright rejects any consideration of transgender experience as something to celebrate and learn from. His dismissive attitude toward those who hold what he calls the "strong form" of the diversity lens, those who suggest that we need to deconstruct and challenge the sex/gender binary, seems oddly closed-minded given the open tone of the rest of the book. There is some excellent, thoughtful work by deeply committed Christian scholars that actively engages the

Book Reviews

challenge to the sex/gender binary (e.g., Megan DeFranza's *Sex Difference in Christian Theology*, and work by Margaret Farley and Lise Sowle Cahill). That Yarhouse does not even acknowledge this work, yet does choose to cite uncritically the divisive and controversial work of Paul McHugh, is troubling, and also puzzling, given that he acknowledges throughout the book that a rigid adherence to stereotypical expressions of femininity and masculinity is a source of great pain for the gender dysphoric person, something that Christians need to recognize and relinquish.

Given the complexity of gender dysphoria and the rapid changes in knowledge, theories, and recommendations from mental health professional organizations, all of which Yarhouse acknowledges, I expect and hope that this book will be released in a second edition in roughly the next five years.

In writing to Christians about sexuality and gender, it is impossible to please everyone. Yet Yarhouse has produced a book that should be of service to virtually all who are interested, personally or theoretically, in this topic, and are not already foreclosed. I know that I will be recommending it widely.

Reviewed by Heather Looy, The King's University, Edmonton, AB T6B 2H3.



TECHNOLOGY

PHILOSOPHY OF TECHNOLOGY: An Introduction for Technology and Business Students by Maarten J. Verkerk, Jan Hoogland, Jan van der Stoep, and Marc J. de Vries. New York: Routledge, 2015. 336 pages, index. Paperback; \$59.95. ISBN: 9781138904392.

This is probably the best book on the philosophy of technology that I have yet come across—best, not only for technology and business students, but also for researchers and reflective practitioners. It is inspired by a Christian philosophy but should be more than acceptable to non-Christians of all kinds, because of the wide range of technology issues it covers well.

This book provides both breadth and depth in a way that is readable and readily understandable. It provides considerable understanding of many issues and challenges that we face today, clearly explained. It is informative and comprehensive, merging philosophical thinking with practical technology development and with responsibility in society, and provides useful insight for communities of practice concerned with each. This broad view

encourages philosophers and developers to be aware of responsibility, developers and media pundits to think philosophically, and philosophers and politicians to remember the realities of development.

It is able to achieve this by basing its discussion of technology on a radically different way of understanding things, which brings theory and practice together and takes meaningfulness seriously. Hence, the book helpfully addresses the issues that most deeply trouble us. This is rooted in a little-known philosophy that has Christian (Calvinistic) roots, that of Herman Dooyeweerd. It seems that each chapter is inspired by a different insight found in Dooyeweerd's thought, but seldom is Dooyeweerd thrust on the reader.

Philosophy of Technology has three parts. Part I, entitled Thinking and Making, has two chapters, which look at the phenomenon of technology from a philosophical perspective. Technology is not just something that happens but has a special meaning or role in the world, which is to disclose deeper meaningfulness for the good of the world.

Part II, entitled Making and Designing, has six chapters, each of which discusses a different aspect of design and development of technology. Chapter 3 discusses complexity that developers face; chapter 4, how technology artifacts should embody diversity in a way that coheres; chapter 5, the function and structure of artifacts; chapter 6, knowledge and the role of the engineer; chapter 7, methodology for development and design; and chapter 8, ensuring that technology does not dehumanize. These chapters will not teach us the details of, for example, computer programming, but rather they provide a perspective, a wisdom, with which computer programmers might operate.

Part III, entitled Designing and Thinking, has six chapters, which discuss technology in the world. Chapter 9 shows how technology is not just a technical but a social activity. Chapter 10 portrays pessimism and optimism about technology: will it lead to destruction and enslavement or open up bright futures? Chapter 11 discusses globalization and cultures, specifically the role technology plays in these. Chapter 12 discusses the cyborg possibility, namely, humans augmented with technology. Chapter 13 discusses responsibilities surrounding technology. The final chapter, 14, discusses expectations for the future, the "secular sacred" and the limits of technology.

The book thus covers not only the two streams of philosophy of technology mentioned by Carl Mitcham,

those concerned with “humanities” and “technology in itself,” but also the philosophy of technology development.

The principles and issues each chapter covers are given flesh with copious helpful examples, and four case studies are included, showing in detail how the principles in several chapters are worked out, in nanotechnology, factory design, military networks, and health care. With each chapter there is a helpful portrait of a thinker who has explored some issues relevant to the chapter, ranging from philosopher Martin Heidegger for chapter 2 on the meaning of technology, and Christian ethicist Egbert Schuurman on responsibility in chapter 13, to Herbert Simon for chapter 6 and Langdon Winner for chapter 9.

I find that each chapter can be read almost independently of the others, and this is a great help to those who like delving into a book in random order. Each chapter is inspired by one portion of Dooyeweerd’s philosophy: for example, chapter 2 is inspired by Dooyeweerd’s giving primacy of meaning; chapter 4, by Dooyeweerd’s approach to diversity; chapter 13, by Dooyeweerd’s view that normativity (good, bad) is not to be bolted on but is intrinsic to the very fabric of reality; and chapter 14, by the importance of faith.

There are, perhaps, four limitations to this book. One is that, as a translation of a Dutch work that appeared in 2007, its examples come from more than ten years ago and sometimes long before that. I found no mention of Twitter, Facebook, tablets, or computer games, and the way these are shaping people’s lives today. However, for two reasons this might not matter. First, the principles and issues discussed are carefully developed to apply to today’s situation, and probably tomorrow’s too; for example, responsibility will never become obsolete. Second, readers might like to take the challenge of applying its principles to today’s technology at several levels, either as an undergraduate exercise, as PhD research, or even as a longer-term post-doctoral research program, and, of course, to practical planning for life with technology.

The second limitation is that the text tends to hide the philosopher who seems to have inspired it (Dooyeweerd), rather than explicitly referencing his thought. The discussion of meaning in chapter 2 references Heidegger and Dilthey but actually goes beyond both by using some of Dooyeweerd’s thought, though it does not name him. On the other hand, mentioning Dooyeweerd in every chapter would sound too much like adulation, so perhaps the authors have struck the right balance.

More importantly, third, the work does not differentiate sufficiently between technology in general and information/communication technology (ICT) in particular. The focus is on the formative activity of shaping that lies at the root of all technology, whereas what gives ICT special importance today is the lingual activity of writing and reading, of signifying and interpreting, of information storage and selection rather than of construction. To cover this, however, would require a whole new book, and not just an extra chapter or two in this work. Perhaps that should be the authors’ next project, especially if they can achieve the same breadth, depth, readability, winsomeness, and wisdom.

The fourth limitation is the book’s scope. Though the work imports thought from a host of thinkers to help support and build up its view of technology, it provides little help to those who want to export ideas to those thinkers and engage critically in their discourses. By importing, it demonstrates that the Dooyeweerdian/Christian foundation on which its view is based is highly relevant to mainstream thought. But some might wish to explore exporting: how Dooyeweerdian thought can affirm, critique, and enrich the thought of Heidegger, Simon, Latour, and others. However, exporting was not its aim, so this limitation cannot be seen as a criticism. Other books will need to be written that export Dooyeweerdian or Christian thinking to engage with and enrich mainstream thought.

The book’s aim is to help us understand the phenomenon that is technology, in a way that combines philosophical reflection and sound theory with practical insight. In doing this, it functions extremely well in a readable, interesting, and informative way. It provides material that students can take further. It is inspired by a Christian philosophy, but should be of equal interest to Christians and non-Christians alike; indeed, my experience is that a Dooyeweerdian foundation, as is used in this work, seems to be attractive to non-Christians more than to Christians, because it provides a way to tackle the diversity and complexity of everyday experience, and it recognizes the faith aspect alongside, rather than above or below, other more “profane” aspects of life.

At the end of his Foreword, Carl Mitcham writes,

In most cases, books are honoured by the writing of forewords. In the present instance, however, given the special achievements of this book, I am equally if not more honoured by having been invited to write.

This shows the quality of this work.

Reviewed by Andrew Basden, University of Salford, Salford, UK, M5 4WT.

Book Reviews

RECLAIMING CONVERSATION: The Power of Talk in a Digital Age by Sherry Turkle. New York: Penguin Press, 2015. 448 pages. Hardcover; \$27.95. ISBN: 9781594205552.

Everyone is addicted to their phone, but no one is quite sure what to do about it. In *Reclaiming Conversation*, Sherry Turkle continues what she calls her path of repentance from excitedly championing new technology, such as the internet and social networking, toward a more reluctant position, now expressing worry about some of the negative effects that unfettered technology adoption can bring. Following her prior work, *Alone Together*, which began a broad conversation on our relationship with technology, *Reclaiming Conversation* looks specifically at the ways we communicate through technology and how an overreliance on texting, email, and social networking can impoverish our relationships, the public sphere, and even our own sense of self.

This book is not so much about bashing or blaming technology (there is a cottage industry of such books), but a plea for recognizing the importance of conversation to human life. As an outline for the book, Turkle uses Thoreau's metaphor of the three chairs in his cabin, "one for solitude, two for friendships, and three for society" (p. 10). Under solitude she discusses our inability to be alone with our thoughts without pulling out our phones to consume media. Turkle argues that "one of the benefits of solitude is an increased capacity for self-reflection" (p. 79), which, in turn, leads to more empathy toward others. She then shows how this underdeveloped empathy affects family, friendships, and romance (two chairs), and education, work, and politics (three chairs).

In each chapter, Turkle brings together recent sociological studies as well as her own interviews to show how dependence on technologically mediated communication impoverishes conversation over time. Though I personally prefer footnotes to Turkle's style of avoiding annotations in the main text and offloading all references to the end, the book is well documented and the collection of research is valuable for anyone working in this area. Another strength of Turkle's work is that she takes the time to show how complex these movements can be. For example, families for whom disagreements tend to escalate into screaming and yelling might initially find it helpful to move their disagreements to text or email. On those media, one is able to edit one's emotions and think before writing something one might regret. However, while this initially helps, over time individuals begin to edit themselves in all kinds of situations to the point where they feel less able to communicate openly and freely in person. Many

people no longer want their friends to drop by unexpectedly, and younger generations find themselves "averse ... to talking on the phone" (p. 148) because the fluidity and unpredictability of live conversation is foreign and frightening. At the same time, people feel trapped by the permanent record of all those texts and emails, feeling unable to move forward. The constant curation of the online self eventually becomes a heavy, unmanageable burden from which many never escape.

Turkle also rightly points out that the solution many in the tech industry have given to the problem of lack of empathy is simply to develop more apps. Empathy apps supposedly train humans to be more caring, and Turkle ends the book wondering about the trend toward humans having more conversations with a machine, which effectively adds a "fourth chair" in Thoreau's metaphor. What begins as simple commands to Siri on one's iPhone will eventually become full-fledged relationships with machine AI, especially in cases of child or elder care. Turkle worries that these controlled conversations will further inoculate people against wanting to engage in unpredictable, free-flowing, sometimes painful human conversations.

One of the challenges for Turkle is how to articulate the way that conversation as distraction should work. On one hand, the constant distraction of alerts on our devices and never-ending texts and emails seems to reduce productivity, and Turkle argues that creative people need long periods of alone time to develop ideas. But on the other hand, she also brings evidence that working from home prevents co-workers from bumping into each other and serendipitously sharing information that does not transfer well in emails or formal meetings. If open work environments are not helpful, neither is isolated, remote work or constant email. What, then, is the solution? Turkle points out that these kinds of conundrums mean that simple solutions like "turn off your phone and talk" will not solve all our problems. More complex solutions, such as doctors hiring scribes to do data entry so the physician can look a patient in the eye, will take time and creativity.

Another challenge in the book is to ground the need for conversation beyond itself and to articulate what kinds of conversations are truly good. Turkle shows that open conversations can help a business be more productive, but the idea that productivity is an inherent good toward which humans should work is simply assumed. She also argues that conversation can make us more empathetic or help us engage with the world around us, but she does not mention that pre-digital people who had the kind

of conversations Turkle wants us to have were not necessarily more empathetic. So is face-to-face, eye-to-eye conversation itself inherently good, or is there more to it than that? That said, her final “guideposts” (pp. 319–33) are helpful for thinking through how we might overcome some of the negative impacts of digital communication and work toward a world in which creativity and human connection can flourish.

If one is looking for a book explaining what a conversation is and how to have a good one, Turkle’s book probably will not be of much benefit, but for someone looking for language to describe the relational difficulties that have arisen since the advent of the smartphone, *Reclaiming Conversation* offers a rich exploration that is, interestingly enough, rooted in great conversations between the author and others.

Reviewed by John Dyer, Executive Director of Communications and Educational Technology, Dallas Theological Seminary, Dallas, TX 75204-6411. ☆

Letter

Pursuing the Truth despite the Cost

David Fasold was a merchant marine officer on a commercial transport boat and so knew a lot about boats. He heard about the possible Noah’s ark at Dogubayazit, Turkey, from Ron Wyatt, and when he came with Ron to see it in 1985, he was sure that it was a wreck of a boat. In 1988, his book, *The Ark*

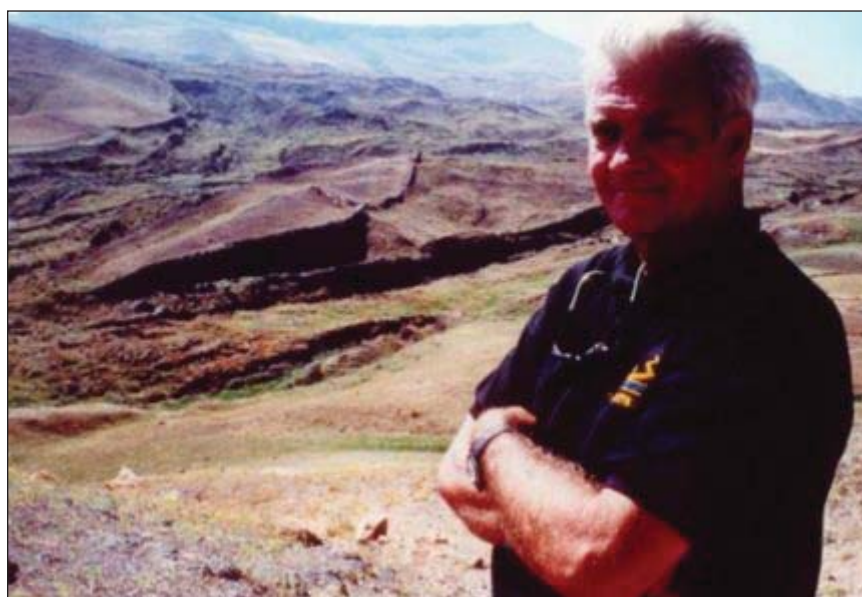
of *Noah*, which describes the reasons for his belief that the boat-shaped formation was Noah’s ark, was published. However, he had no training in geology. After several years of hearing from Ron Wyatt and others that the ribs, deck, and walls of the boat remains were composed of petrified wood, he began to have some doubts.

Fasold hired a TV crew from Germany to come with him to the ark site to photograph the petrified wood of the boat ribs, himself paying for the crew’s airline tickets and expenses. While they were there, he discovered that Ron had carved the eroded and weathered fractures in the structure so that the spaces between the fractures made the rock layers between the fractures stand out like ribs. Unfortunately, he could not see any petrified wood in them. So, Fasold had to tell the TV crew that he was sorry he had wasted their time, and he sent them home.

Because of his rising doubts, Fasold collected twelve samples from various places at the structure that were being described as petrified wood, along with an “iron bracket,” a part of an “anchor stone,” and a “reed stone.” With some risk, he smuggled the samples out of Turkey through customs. Somehow he got hold of me and asked me to voice my opinion. I had not been to the site, but I did a thin section study for him on all the samples he had collected. I then invited him to California State University Northridge and showed him what thin sections of fossilized wood looked like compared with thin sections of basalt and andesite. I also went to his house in San Diego and gave him a slide show on volcanic rocks so that he could understand what processes occur in the formation of volcanoes. When all of this was done, he had no doubt in his mind that the formation was not Noah’s ark.

David told me that his book, *The Ark of Noah*, was selling so fast that it was number 15 in world sales and that his book publisher was translating his book into five different foreign languages. But realizing now that the structure was not Noah’s ark, he cancelled all further publication of the book, likely costing him hundreds of thousands of dollars in royalties. David just wanted the truth.

He agreed to co-author an article with me for my website titled



David Fasold in front of what at the time he thought were the remains of the ark (photo provided by David Fasold).

"Bogus 'Noah's Ark' from Turkey Exposed as a Common Geologic Structure," which stated that the formation was not the remains of the ark. The article was later published in the *Journal of Geological Education* 44 (1996): 439-44.

Wikipedia, when recently checked, claims that Fasold later changed his mind and again believed that the site in eastern Turkey was Noah's ark. This is not true. David had invested his savings and sold his house in order to study the site for many years. Having canceled his book, he died in 1998 essentially penniless, unable to even pay for his hospital care. So, I honor David as someone who demonstrated integrity to the end of his life, always willing to accept the truth, no matter how much it cost him.

Lorence G. Collins
ASA Friend
lorenccec@sismatrix.net



A CALL FOR BOOK REVIEWERS

The readers of *PSCF* have long appreciated the many insightful book reviews published within its covers. 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 that describes your areas of expertise and preferred mailing address to Patrick Franklin at patrick.franklin@prov.ca.

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, if a book is offered to you, you would still be able to accept or decline the mailing of the book.



UNITED STATES POSTAL SERVICE® Statement of Ownership, Management, and Circulation (All Periodicals Publications Except Requester Publications)

1. Publication Title Perspectives on Science and Christian Faith	2. Publication Number 0 0 2 8 3 7 4 0	3. Filing Date 9/22/2016
4. Issue Frequency Quarterly	5. Number of Issues Published Annually 4	6. Annual Subscription Price \$50.00
7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4®) 218 Boston St, Ste 208, Topsfield, MA 01983		Contact Person Lyn Berg Telephone (include area code) 978-887-8833
8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer) Same as above		
9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank) Publisher (Name and complete mailing address) American Scientific Affiliation, 218 Boston St, Ste 208, Topsfield, MA 01983 Editor (Name and complete mailing address) James Peterson, Roanoke College, 221 College Ln, Salem, VA 24153 Managing Editor (Name and complete mailing address) Lyn Berg, 218 Boston St, Ste 208, Topsfield, MA 01983		

10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)

Full Name	Complete Mailing Address
The American Scientific Affiliation, Inc	218 Boston St, Ste 208, Topsfield, MA 01983

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box ☒ None

Full Name	Complete Mailing Address

12. Tax Status (For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)
☒ The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
☐ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

13. Publication Title Perspectives on Science and Christian Faith		14. Issue Date for Circulation Data Below 9/1/2016	
15. Extent and Nature of Circulation Worldview		Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)		1644	1632
b. Paid Circulation (By Mail and Outside the Mail)	(1) Mailed Outside-County Paid Subscriptions Stated on PS Form 3541 (Include paid distribution above nominal rate, advertiser's proof copies, and exchange copies)	1289	1277
	(2) Mailed In-County Paid Subscriptions Stated on PS Form 3541 (Include paid distribution above nominal rate, advertiser's proof copies, and exchange copies)	0	0
	(3) Paid Distribution Outside the Mails Including Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Paid Distribution Outside USPS®	193	195
	(4) Paid Distribution by Other Classes of Mail Through the USPS (e.g., First-Class Mail®)	4	2
c. Total Paid Distribution (Sum of 15b (1), (2), (3), and (4))		1486	1474
d. Free or Nominal Rate Distribution (By Mail and Outside the Mail)	(1) Free or Nominal Rate Outside-County Copies Included on PS Form 3541	49	48
	(2) Free or Nominal Rate In-County Copies Included on PS Form 3541	0	0
	(3) Free or Nominal Rate Copies Mailed at Other Classes Through the USPS (e.g., First-Class Mail)	1	1
	(4) Free or Nominal Rate Distribution Outside the Mail (Carriers or other means)	38	33
e. Total Free or Nominal Rate Distribution (Sum of 15d (1), (2), (3) and (4))		88	82
f. Total Distribution (Sum of 15c and 15e)		1574	1556
g. Copies not Distributed (See Instructions to Publishers #4 (page #3))		70	76
h. Total (Sum of 15f and g)		1644	1632
i. Percent Paid (15c divided by 15f times 100)		94.41	94.73

* If you are claiming electronic copies, go to line 16 on page 3. If you are not claiming electronic copies, skip to line 17 on page 3.

UNITED STATES POSTAL SERVICE® Statement of Ownership, Management, and Circulation (All Periodicals Publications Except Requester Publications)

16. Electronic Copy Circulation x	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Paid Electronic Copies	156	166
b. Total Paid Print Copies (Line 15c) + Paid Electronic Copies (Line 16a)	1642	1652
c. Total Print Distribution (Line 15b + Paid Electronic Copies (Line 16a))	1730	1740
d. Percent Paid (Both Print & Electronic Copies) (16b divided by 16c × 100)	94.91	94.94

☒ I certify that 50% of all my distributed copies (electronic and print) are paid above a nominal price.

17. Publication of Statement of Ownership	
<input checked="" type="checkbox"/> If the publication is a general publication, publication of this statement is required. Will be printed in the 12/1/2016 issue of this publication.	<input type="checkbox"/> Publication not required.

18. Signature and Title of Editor, Publisher, Business Manager, or Owner Vicki Best, Director of Operations and Development	Date 9/22/2016
--	-------------------

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

Index

Volumes 66–68, 2014–2016

The locations of indices for previous volumes are listed on the inside back cover of the journal. Numbers and letter in each entry refer to volume, issue, page number, month, and year. For example, 68:4, 250, D 2016 refer to volume 68, issue number 4, page 250, December 2016. The names of the book reviewers are listed in parentheses after each book review by book author.

Author Exchange

- Ackerman, Thomas P. "Response to Donald Morton," 67:2, 138, J 2015.
Morton, Donald C. "Climate Science Continued," 67:2, 135, J 2015.

Acknowledgment

- Reviewers in 2013, 66:1, 1, M 2014.
2014 Peer Reviewers, 67:1, 2, M 2015.
2015 Peer Reviewers, 68:1, 2, M 2016.

Articles

- Ackerman, Thomas. "Christian Action in the Face of Climate Change," 66:4, 242, D 2014.
Beaver, Bruce. "Should We Frack?," 67:3, 175, S 2015.
Berry, R. J. (Sam). "Natural Evil: Genesis, Romans, and Modern Science," 68:2, 87, J 2016.
Boorse, Dorothy. "New Findings in Environmental Science and Their Implications for Christians," 66:4, 194, D 2014.
Branson, Robert D. "Science, the Bible, and Human Anatomy," 68:4, 229, D 2016.
Bunch, Wilton H. "Theodicy through a Lens of Science," 67:3, 189, S 2015.
Carlson, Clayton D. "Transgenerational Epigenetic Inheritance," 66:2, 95, J 2014.
Carlson, Richard F., and Jason N. Hine. "Two Interlocking Stories: Job and Natural Evil and Modern Science and Randomness," 66:1, 23, M 2014.
Chan, Man Ho. "Can Natural Laws Create Our Universe?," 66:1, 35, M 2014.
Clouser, Roy. "Reading Genesis," 68:4, 237, D 2016.
Collins, Lorence G. "Noah's Ark near Dogubayazit, Turkey," 68:4, 218, D 2016.
Crisman, Karl-Dieter. "Open Source Software and Christian Thought," 67:1, 3, M 2015.
Davidson, Gregg. "Genetics, the Nephilim, and the Historicity of Adam," 67:1, 24, M 2015.
Ewert, Winston, and Robert J. Marks II. "A Mono-Theism Theorem: Gödelian Consistency in the Hierarchy of Inference," 66:2, 103, J 2014.

- Faries, Dillard W. "A Personal God, Chance, and Randomness in Quantum Physics," 66:1, 13, M 2014.
Franklin, Patrick. "Understanding the Beginning in Light of the End: Eschatological Reflections on Making Theological Sense of Evolution," 66:3, 154, S 2014.
Garte, Sy. "New Ideas in Evolutionary Biology: From NDMS to EES," 68:1, 3, M 2016.
Gray, Terry M. "The ASA Does Not Take an Official Position on Controversial Questions," 68:3, 177, S 2016.
Howell, Russell W. "The Matter of Mathematics," 67:2, 74, J 2015.
Jones, D. Gareth. "The Changing Face of the Science-Faith Dialogue in a Biomedical Arena," 68:3, 165, S 2016.
———. "In Vitro Fertilization and the Destruction of Embryos," 67:3, 163, S 2015.
Kim, Andrew. "Bernard Ramm's Scientific Approach to Theology," 68:3, 155, S 2016.
Lamoureux, Denis O. "Beyond Original Sin: Is a Theological Paradigm Shift Inevitable?," 67:1, 35, M 2015.
———. "Beyond the Cosmic Fall and Natural Evil," 68:1, 44, M 2016.
Mann, Robert B. "Physics at the Theological Frontiers," 66:1, 2, M 2014.
Miller, Keith B. "The Fossil Record of the Cambrian 'Explosion': Resolving the Tree of Life," 66:2, 67, J 2014.
Morton, Donald C. "Climate Science and the Dilemma for Christians," 66:4, 236, D 2014.
Murphy, George L. "Necessary Natural Evil and Inevitable Moral Evil," 68:2, 111, J 2016.
Phillippy, Douglas C. "A Pranalogical Approach to Faith-Integration with Students," 67:2, 89, J 2015.
Poe, Harry Lee. "The English Bible and the Days of Creation: When Tradition Conflicts with Text," 66:3, 130, S 2014.
Rios, Christopher M. "1941–2016: The American Scientific Affiliation at 75," 68:3, 148, S 2016.
Sluka, Robert D., and Paul Simonin. "Marine Capture Fisheries – A Call to Action in Response to Limits, Unintended Consequences, and Ethics," 66:4, 203, D 2014.
Sollereder, Bethany. "Evolution, Suffering, and the Creative Love of God," 68:2, 99, J 2016.
Srokosz, M. A. "Geoengineering or Planet Hacking?," 66:4, 213, D 2014.

Index

- Tenneson, Michael, David Bundrick, and Matthew Stanford. "A New Survey Instrument and Its Findings for Relating Science and Theology," 67:3, 200, S 2015.
- van den Toren, Benno. "Human Evolution and a Cultural Understanding of Original Sin," 68:1, 12, M 2016.
- Warners, David, Michael Ryskamp, and Randall Van Dragt. "Reconciliation Ecology: A New Paradigm for Advancing Creation Care," 66:4, 221, D 2014.
- Warren, E. Janet. "Feminine Sin and Female Scientists," 67:1, 14, M 2015.
- Wilcox, David L. "Genetic Insights for Human Origins in Africa and for Later Neanderthal Contact," 66:3, 140, S 2014.
- _____. "Our Genetic Prehistory: Did My Genes Make Me Do It?," 66:2, 83, J 2014.
- _____. "A Proposed Model for the Evolutionary Creation of Human Beings," 68:1, 22, M 2016.
- Wilkerson, Joshua B. "Cultivating Mathematical Affections: The Influence of Christian Faith on Mathematics Pedagogy," 67:2, 111, J 2015.
- Wilson, Jason. "Integration of Faith and Mathematics from the Perspectives of Truth, Beauty, and Goodness," 67:2, 100, J 2015.
- Wood, John R. "An Ecological Perspective on the Role of Death in Creation," 68:2, 74, J 2016.
- Zonnefeld, Valorie. "Practical Applications of an Integrally Christian Approach to Teaching Mathematics," 67:2, 124, J 2015.

Book Reviews by Book Author

- Abbate, Janet. *Recoding Gender: Women's Changing Participation in Computing*, 68:1, 71, M 2016. (Serita Nelesen)
- Alexander, Amir. *Infinitesimal: How a Dangerous Mathematical Theory Shaped the Modern World*, 67:2, 147, J 2015. (Jon Tandy)
- Anderson, Ted R. *The Life of David Lack: Father of Evolutionary Ecology*, 66:2, 119, J 2014. (R. J. [Sam] Berry)
- Applegate, Kathryn, and J. B. Stump, eds. *How I Changed My Mind about Evolution: Evangelicals Reflect on Faith and Science*, 68:4, 272, D 2016. (Sara Sybesma Tolsma)
- Ashton, Kevin. *How to Fly a Horse: The Secret History of Creation, Invention, and Discovery*, 68:3, 211, S 2016. (Kevin Timmer)
- Ball, Philip. *Curiosity: How Science Became Interested in Everything*, 66:3, 183, S 2014. (Don Petcher)
- Barrett, Matthew, and Ardel B. Caneday, eds. *Four Views on the Historical Adam*, 66:3, 191, S 2014. (Sara Sybesma Tolsma)
- Blancke, Stefaan, Hans Henrik Hjermitsev, and Peter C. Kjærgaard, eds. *Creationism in Europe*, 68:3, 204, S 2016. (Adam R. Shapiro)
- Bret, Antoine. *The World Is Not Six Thousand Years Old – So What?*, 67:4, 287, D 2015. (Brent Royuk)
- Brown, Candy Gunther. *The Healing Gods: Complementary and Alternative Medicine in Christian America*, 66:2, 120, J 2014. (John F. Pohl, MD)

- Brunner, Daniel L., Jennifer L. Butler, and A. J. Swoboda. *Introducing Evangelical Ecotheology: Foundations in Scripture, Theology, History, and Praxis*, 67:2, 143, J 2015. (Jeffrey T. Ploegstra)
- Burge, Gary M. *Mapping Your Academic Career: Charting the Course of a Professor's Life*, 68:2, 132, J 2016. (Derek Schuurman)
- Cain, Clifford Chalmers, ed. *Re-Vision: A New Look at the Relationship between Science and Religion*, 68:3, 208, S 2016. (Tony Jelsma)
- Camosy, Charles C. *Beyond the Abortion Wars: A Way Forward for a New Generation*, 68:2, 133, J 2016. (Hendrik van der Breggen)
- Carr, Nicholas. *The Glass Cage: Automation and Us*, 67:1, 70, M 2015. (Gene B. Chase)
- Charles, J. Daryl, ed. *Reading Genesis 1–2: An Evangelical Conversation*, 66:2, 124, J 2014. (Patrick S. Franklin)
- Childress, Ron. *And West Is West*, 68:3, 213, S 2016. (Matthew Dickerson)
- Churchland, Patricia S. *Touching a Nerve: The Self as Brain*, 66:4, 259, D 2014. (Lloyd W. J. Aultman-Moore)
- Coleman, Richard J. *State of Affairs: The Science-Theology Controversy*, 68:2, 142, J 2016. (Amos Yong)
- Crysdale, Cynthia, and Neil Ormerod. *Creator God, Evolving World*, 68:1, 65, M 2016. (Lloyd W. J. Aultman-Moore)
- de Lange, Frits. *Loving Later Life: An Ethics of Aging*, 68:3, 199, S 2016. (Robert Dean)
- Delio, Ilia, ed. *From Teilhard to Omega: Co-creating an Unfinished Universe*, 67:4, 288, D 2015. (Anthony L. Blair)
- Dembski, William. *Being as Communion: A Metaphysics of Information*, 67:3, 230, S 2015. (Robert Doede)
- Doctorow, Cory. *Information Doesn't Want to Be Free: Laws for the Internet Age*, 67:4, 300, D 2015. (Karl-Dieter Crisman)
- Doidge, Norman. *The Brain's Way of Healing: Remarkable Discoveries and Recoveries from the Frontiers of Neuroplasticity*, 68:4, 273, D 2016. (Bryan C. Auday)
- Domingos, Pedro. *The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World*, 68:3, 214, S 2016. (Russell C. Bjork)
- Efron, Noah J. *A Chosen Calling: Jews in Science in the Twentieth Century*, 67:1, 59, M 2015. (Stephen Contakes)
- Eggers, Dave. *The Circle*, 68:3, 201, S 2016. (Eric Gossett)
- Ferngren, Gary B. *Medicine and Religion: A Historical Introduction*, 66:4, 256, D 2014. (John F. Pohl, MD)
- Finlay, Graeme. *Human Evolution: Genes, Genealogies and Phylogenies*, 68:1, 64, M 2016. (Jenelle Dunkelberger)
- Fitch, Walter M. *The Three Failures of Creationism: Logic, Rhetoric and Science*, 66:2, 122, J 2014. (Cassandra Arendt)
- Francis, Pope. *Laudato Si': On Care for Our Common Home*, 68:4, 266, D 2016. (Dorothy Boorse)
- Fugle, Gary N. *Laying Down Arms to Heal the Creation-Evolution Divide*, 67:4, 286, D 2015. (Charles E. Chaffey)
- Fuller, Robert C. *The Body of Faith: A Biological History of Religion in America*, 67:1, 67, M 2015. (Martin LaBar)
- Glass, Bruce. *Exploring Faith and Reason: The Reconciliation of Christianity and Biological Evolution*, 67:1, 62, M 2015. (Peter Dijkstra)

- Greely, Henry T. *The End of Sex and the Future of Human Reproduction*, 68:4, 267, D 2016. (Elizabeth Y. Heeg)
- Greenway, William. *For the Love of All Creatures: The Story of Grace in Genesis*, 68:3, 209, S 2016. (Michael Gilmour)
- Gundlach, Bradley J. *Process and Providence: The Evolution Question at Princeton, 1845–1929*, 67:2, 150, J 2015. (Neil Beavan)
- Gupta, Mona. *Is Evidence-Based Psychiatry Ethical?*, 67:3, 229, S 2015. (Theresa Zolner)
- Harris, Michael. *Mathematics without Apologies: Portrait of a Problematic Vocation*, 68:2, 138, J 2016. (Calvin Jongsma)
- Harrison, Peter. *The Territories of Science and Religion*, 67:4, 281, D 2015. (Matthew Walhout)
- Hart, John. *Cosmic Commons: Spirit, Science, and Space*, 68:1, 62, M 2016. (Amos Yong)
- Haskell, David George. *The Forest Unseen: A Year's Watch in Nature*, 66:2, 118, J 2014. (Cheryl Heinz)
- Hendel, Ronald. *The Book of Genesis: A Biography*, 68:1, 68, M 2016. (J. Richard Middleton)
- Hengeveld, Rob. *Wasted World: How Our Consumption Challenges the Planet*, 66:1, 47, M 2014. (Charles E. Chaffey)
- Hill, Carol, Gregg Davidson, Tim Helble, and Wayne Ranne, eds. *The Grand Canyon, Monument to an Ancient Earth: Can Noah's Flood Explain the Grand Canyon?*, 68:4, 268, D 2016. (Davis A. Young)
- Holder, Rodney D. *Big Bang, Big God: A Universe Designed for Life?*, 66:3, 188, S 2014. (George L. Murphy)
- Holeman, Virginia Todd. *Theology for Better Counseling: Trinitarian Reflections for Healing and Formation*, 66:1, 60, M 2014. (Brad D. Strawn)
- Honderich, Ted. *Actual Consciousness*, 67:2, 153, J 2015. (George Tsakiridis)
- Isaacson, Walter. *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*, 67:3, 231, S 2015. (Russell C. Bjork)
- Jeeves, Malcolm. *Minds, Brains, Souls and Gods: A Conversation on Faith, Psychology and Neuroscience*, 66:1, 62, M 2014. (Adam Johnson)
- Johnson, Curtis. *Darwin's Dice: The Idea of CHANCE in the Thought of Charles Darwin*, 68:1, 63, M 2016. (James Bradley)
- Johnson, Elizabeth A. *Ask the Beasts: Darwin and the God of Love*, 66:3, 190, S 2014. (Bethany Sollereder)
- Johnson, Steven. *How We Got to Now: Six Innovations That Made the Modern World*, 68:3, 212, S 2016. (William Jordan)
- Jones, D. Gareth. *The Peril and Promise of Medical Technology*, 66:4, 253, D 2014. (Hessel Bouma III)
- Jorink, Eric, and Ad Maas, eds. *Newton and the Netherlands: How Isaac Newton Was Fashioned in the Dutch Republic*, 67:1, 60, M 2015. (Arie Leegwater)
- Kirkpatrick, Frank G. *The Mystery and Agency of God: Divine Being and Action in the World*, 66:4, 262, D 2014. (Amos Yong)
- Koperski, Jeffrey. *The Physics of Theism: God, Physics, and the Philosophy of Science*, 67:4, 293, D 2015. (Stephen A. Batzer)
- Kureethadam, Joshtrom Isaac. *Creation in Crisis: Science, Ethics, Theology*, 68:1, 61, M 2016. (Charles E. Chaffey)
- Larsen, Timothy. *The Slain God: Anthropologists and the Christian Faith*, 67:4, 280, D 2015. (Eloise Meneses)
- Leon, Sharon M. *An Image of God: The Catholic Struggle with Eugenics*, 67:1, 58, M 2015. (Erika Dyck)
- Liederbach, Mark, and Seth Bible. *True North: Christ, the Gospel, and Creation Care*, 67:1, 54, M 2015. (Erin K. B. Vander Stelt)
- Livingstone, David N. *Dealing with Darwin: Place, Politics, and Rhetoric in Religious Engagements with Evolution*, 67:4, 284, D 2015. (Arie Leegwater)
- Losh, Elizabeth. *The War on Learning: Gaining Ground in the Digital University*, 68:2, 143, J 2016. (David Mulder)
- Madueme, Hans, and Michael Reeves, eds. *Adam, the Fall, and Original Sin: Theological, Biblical, and Scientific Perspectives*, 67:4, 289, D 2015. (Denis O. Lamoureux)
- Magaña, Sonny, and Robert J. Marzano. *Enhancing the Art & Science of Teaching with Technology*, 67:4, 302, D 2015. (Kara C. Sevensma)
- Marks, Robert J., II, Michael J. Behe, William A. Dembski, Bruce L. Gordon, and John C. Sanford, eds. *Biological Information: New Perspectives*, 67:1, 64, M 2015. (Pattle Pak-Toe Pun)
- Mayer-Schönberger, Viktor, and Kenneth Cukier. *Big Data: A Revolution That Will Transform How We Live, Work, and Think*, 67:2, 156, J 2015. (Eric Gossett)
- McFarland, Ian A. *From Nothing: A Theology of Creation*, 67:2, 151, J 2015. (Robert Dean)
- Messer, Neil. *Flourishing: Health, Disease, and Bioethics in Theological Perspective*, 67:1, 57, M 2015. (Derrick L. Hassert)
- Mitchell, C. Ben, and D. Joy Riley, MD. *Christian Bioethics: A Guide for Pastors, Health Care Professionals, and Families*, 68:2, 135, J 2016. (James J. Rusthoven)
- Moo, Jonathan A., and Robert S. White. *Let Creation Rejoice: Biblical Hope and Ecological Crisis*, 66:4, 251, D 2014. (Abbie C. Schrottenboer)
- Moritz, Joshua. *Science and Religion: Beyond Warfare and Toward Understanding*, 68:3, 210, S 2016. (Ralph Stearley)
- Muller, Richard A. *Energy for Future Presidents: The Science behind the Headlines*, 66:1, 48, M 2014. (John Mickus)
- Murphy, George L. *Models of Atonement: Speaking about Salvation in a Scientific World*, 66:2, 126, J 2014. (Amos Yong)
- Nicolaides, Demetris. *In the Light of Science: Our Ancient Quest for Knowledge and the Measure of Modern Physics*, 68:3, 202, S 2016. (Leonard J. Bond)
- Northcott, Michael S. *A Political Theology of Climate Change*, 66:4, 252, D 2014. (David P. Gushee)
- Numbers, Ronald L., and Kostas Kampourakis, eds. *Newton's Apple and Other Myths about Science*, 68:3, 205, S 2016. (Carolyn E. Anderson)
- Oliver, Kendrick. *To Touch the Face of God: The Sacred, the Profane, and the American Space Program, 1957–1975*, 67:2, 144, J 2015. (Mark Shelhamer)

Index

- Osborn, Ronald E. *Death Before the Fall: Biblical Literalism and the Problem of Animal Suffering*, 66:3, 186, S 2014. (Colin M. Toffelmire)
- Pääbo, Svante. *Neanderthal Man: In Search of Lost Genomes*, 66:3, 185, S 2014. (Clayton Carlson)
- Peppard, Christiana. *Just Water: Theology, Ethics, and the Global Water Crisis*, 66:3, 179, S 2014. (John Mickus)
- Petroski, Henry. *To Forgive Design: Understanding Failure*, 66:1, 50, M 2014. (Gayle Ermer)
- Pfaff, Donald W. *The Altruistic Brain: How We Are Naturally Good*, 68:2, 131, J 2016. (James Van Slyke)
- Pleins, J. David. *In Praise of Darwin: George Romanes and the Evolution of a Darwinian Believer*, 67:1, 66, M 2015. (Bethany Sollereder)
- Powell, James Lawrence. *Four Revolutions in the Earth Sciences: From Heresy to Truth*, 68:2, 137, J 2016. (Jeffrey Greenberg)
- Powers, John C. *Inventing Chemistry: Herman Boerhaave and the Reform of the Chemical Arts*, 66:4, 255, D 2014. (Arie Leegwater)
- Principe, Lawrence M. *The Secrets of Alchemy*, 66:4, 258, D 2014. (Arie Leegwater)
- Rabins, Peter. *The Why of Things: Causality in Science, Medicine, and Life*, 66:3, 180, S 2014. (James Bradley)
- Richardson, Sarah S. *Sex Itself: The Search for Male and Female in the Human Genome*, 67:2, 155, J 2015. (Elizabeth Y. Heeg)
- Rios, Christopher M. *After the Monkey Trial: Evangelical Scientists and a New Creationism*, 67:4, 278, D 2015. (Mark A. Kalthoff)
- Rosen, Larry D. *iDisorder: Understanding Our Obsession with Technology and Overcoming Its Hold on Us*, 67:2, 146, J 2015. (Victor T. Norman)
- Ross, Hugh. *Navigating Genesis: A Scientist's Journey through Genesis 1–11*, 67:4, 298, D 2015. (Colin M. Toffelmire)
- Rowlands, Mark. *Can Animals Be Moral?*, 67:4, 291, D 2015. (Henry Schuurman)
- Rudwick, Martin J. S. *Earth's Deep History: How It Was Discovered and Why It Matters*, 67:2, 149, J 2015. (Ralph Stearley)
- Rusthoven, James J. *Covenantal Biomedical Ethics for Contemporary Medicine: An Alternative to Principles-Based Ethics*, 67:1, 55, M 2015. (Edward Langerak)
- Schneider, Nathan. *God in Proof: The Story of a Search from the Ancients to the Internet*, 66:2, 123, J 2014. (Anthony L. Blair)
- Schuurman, Derek C. *Shaping a Digital World: Faith, Culture, and Computer Technology*, 66:1, 53, M 2014. (Russell C. Bjork)
- Scruton, Roger. *The Soul of the World*, 67:4, 295, D 2015. (Lloyd W. J. Aultman-Moore)
- Senechal, Marjorie. *I Died for Beauty: Dorothy Wrinch and the Cultures of Science*, 66:1, 55, M 2014. (Judith Toronchuk)
- Shapiro, Adam R. *Trying Biology: The Scopes Trial, Textbooks, and the Antievolution Movement in American Schools*, 66:3, 182, S 2014. (Christopher M. Rios)
- Shubin, Neil. *The Universe Within: Discovering the Common History of Rocks, Planets, and People*, 66:1, 54, M 2014. (Jerry H. Kavouras)
- Simmons, Ernest L. *The Entangled Trinity: Quantum Physics and Theology*, 66:4, 262, D 2014. (Amos Yong)
- Sloan, Phillip R., Gerald McKenny, and Kathleen Eggleston, eds. *Darwin in the Twenty-First Century: Nature, Humanity, and God*, 68:4, 270, D 2016. (Bradford McCall)
- Stanley, Matthew. *Huxley's Church and Maxwell's Demon: From Theistic Science to Naturalistic Science*, 68:3, 206, S 2016. (Arie Leegwater)
- Steinberg, Paul F. *Who Rules the Earth?: How Social Rules Shape Our Planet and Our Lives*, 68:1, 60, M 2016. (Gerda Kits)
- Suddendorf, Thomas. *The Gap: The Science of What Separates Us from Other Animals*, 67:4, 297, D 2015. (Tyrone Genade)
- Teresi, Dick. *The Undead: Organ Harvesting, the Ice-Water Test, Beating-Heart Cadavers – How Medicine Is Blurring the Line Between Life and Death*, 66:1, 52, M 2014. (Robin Pals Rylaarsdam)
- Thompson, Curt. *Anatomy of the Soul: Surprising Connections between Neuroscience and Spiritual Practices That Can Transform Your Life and Relationships*, 66:1, 63, M 2014. (Lucie R. Johnson)
- Toomey, David. *Weird Life: The Search for Life That Is Very, Very Different from Our Own*, 66:2, 118, J 2014. (Monica Lee Tischler)
- Toyama, Kentaro. *Geek Heresy: Rescuing Social Change from the Cult of Technology*, 67:4, 303, D 2015. (Victor T. Norman)
- Treanor, Brian, Bruce Ellis Benson, and Norman Wirzba, eds. *Being-in-Creation: Human Responsibility in an Endangered World*, 68:3, 198, S 2016. (Jordan Reinders)
- Turkle, Sherry. *Alone Together: Why We Expect More from Technology and Less from Each Other*, 66:4, 261, D 2014. (Leslie Wickman)
- _____. *Reclaiming Conversation: The Power of Talk in a Digital Age*, 68:4, 278, D 2016. (John Dyer)
- Verkerk, Maarten J., Jan Hoogland, Jan van der Stoep, and Marc J. de Vries. *Philosophy of Technology: An Introduction for Technology and Business Students*, 68:4, 276, D 2016. (Andrew Basden)
- Wade, Nicholas. *A Troublesome Inheritance: Genes, Race and Human History*, 67:1, 68, M 2015. (Sy Garte)
- Wallace, J. Warner. *Cold-Case Christianity: A Homicide Detective Investigates the Claims of the Gospels*, 66:1, 59, M 2014. (Kenell Touryan)
- Walton, John H. *The Lost World of Adam and Eve: Genesis 2–3 and the Human Origins Debate*, 68:1, 67, M 2016. (August H. Konkel)
- Ward, Peter, and Joe Kirschvink. *A New History of Life: The Radical New Discoveries about the Origins and Evolution of Life on Earth*, 68:2, 140, J 2016. (Ben McFarland)
- Warren, E. Janet. *Cleansing the Cosmos: A Biblical Model for Conceptualizing and Counteracting Evil*, 66:1, 57, M 2014. (Gregory A. Boyd)

- Wilkinson, Katharine K. *Between God and Green: How Evangelicals Are Cultivating a Middle Ground on Climate Change*, 67:4, 277, D 2015. (David Dornbos Jr.)
- Wirzba, Norman. *From Nature to Creation: A Christian Vision for Understanding and Loving Our World*, 68:3, 197, S 2016. (Bruce E. Buttler)
- Yanofsky, Noson S. *The Outer Limits of Reason: What Science, Mathematics, and Logic Cannot Tell Us*, 66:3, 187, S 2014. (Sam Pimentel)
- Yarhouse, Mark A. *Understanding Gender Dysphoria: Navigating Transgender Issues in a Changing Culture*, 68:4, 274, D 2016. (Heather Looy)
- Yarhouse, Mark A., and Erica S. N. Tan. *Sexuality and Sex Therapy: A Comprehensive Christian Appraisal*, 67:2, 154, J 2015. (Heather Looy)

Book Reviews by Book Reviewer

- Anderson, Carolyn E. Review of *Newton's Apple and Other Myths about Science* by Ronald L. Numbers and Kostas Kampourakis, eds., 68:3, 205, S 2016.
- Arendt, Cassandra. Review of *The Three Failures of Creationism: Logic, Rhetoric and Science* by Walter M. Fitch, 66:2, 122, J 2014.
- Auday, Bryan C. Review of *The Brain's Way of Healing: Remarkable Discoveries and Recoveries from the Frontiers of Neuroplasticity* by Norman Doidge, 68:4, 273, D 2016.
- Aultman-Moore, Lloyd W. J. Review of *Creator God, Evolving World* by Cynthia Crysdale and Neil Ormerod, 68:1, 65, M 2016.
- _____. Review of *The Soul of the World* by Roger Scruton, 67:4, 295, D 2015.
- _____. Review of *Touching a Nerve: The Self as Brain* by Patricia S. Churchland, 66:4, 259, D 2014.
- Basden, Andrew. Review of *Philosophy of Technology: An Introduction for Technology and Business Students* by Maarten J. Verkerk, Jan Hoogland, Jan van der Stoep, and Marc J. de Vries, 68:4, 276, D 2016.
- Batzer, Stephen A. Review of *The Physics of Theism: God, Physics, and the Philosophy of Science* by Jeffrey Koperski, 67:4, 293, D 2015.
- Beavan, Neil. Review of *Process and Providence: The Evolution Question at Princeton, 1845–1929* by Bradley J. Gundlach, 67:2, 150, J 2015.
- Berry, R. J. (Sam). Review of *The Life of David Lack: Father of Evolutionary Ecology* by Ted R. Anderson, 66:2, 119, J 2014.
- Bjork, Russell C. Review of *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution* by Walter Isaacson, 67:3, 231, S 2015.
- _____. Review of *The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World* by Pedro Domingos, 68:3, 214, S 2016.
- _____. Review of *Shaping a Digital World: Faith, Culture, and Computer Technology* by Derek C. Schuurman, 66:1, 53, M 2014.
- Blair, Anthony L. Review of *From Teilhard to Omega: Co-creating an Unfinished Universe* by Ilia Delio, ed., 67:4, 288, D 2015.
- _____. Review of *God in Proof: The Story of a Search from the Ancients to the Internet* by Nathan Schneider, 66:2, 123, J 2014.
- Bond, Leonard J. Review of *In the Light of Science: Our Ancient Quest for Knowledge and the Measure of Modern Physics* by Demetris Nicolaides, 68:3, 202, S 2016.
- Boorse, Dorothy. Review of *Laudato Si': On Care for Our Common Home* by Pope Francis, 68:4, 266, D 2016.
- Bouma, III, Hessel. Review of *The Peril and Promise of Medical Technology* by D. Gareth Jones, 66:4, 253, D 2014.
- Boyd, Gregory A. Review of *Cleansing the Cosmos: A Biblical Model for Conceptualizing and Counteracting Evil* by E. Janet Warren, 66:1, 57, M 2014.
- Bradley, James. Review of *Darwin's Dice: The Idea of CHANCE in the Thought of Charles Darwin* by Curtis Johnson, 68:1, 63, M 2016.
- _____. Review of *The Why of Things: Causality in Science, Medicine, and Life* by Peter Rabins, 66:3, 180, S 2014.
- Buttler, Bruce E. Review of *From Nature to Creation: A Christian Vision for Understanding and Loving Our World* by Norman Wirzba, 68:3, 197, S 2016.
- Carlson, Clayton. Review of *Neanderthal Man: In Search of Lost Genomes* by Svante Pääbo, 66:3, 185, S 2014.
- Chaffey, Charles E. Review of *Creation in Crisis: Science, Ethics, Theology* by Josh Trom Isaac Kureethadam, 68:1, 61, M 2016.
- _____. Review of *Laying Down Arms to Heal the Creation-Evolution Divide* by Gary N. Fugle, 67:4, 286, D 2015.
- _____. Review of *Wasted World: How Our Consumption Challenges the Planet* by Rob Hengeveld, 66:1, 47, M 2014.
- Chase, Gene B. Review of *The Glass Cage: Automation and Us* by Nicholas Carr, 67:1, 70, M 2015.
- Contakes, Stephen. Review of *A Chosen Calling: Jews in Science in the Twentieth Century* by Noah J. Efron, 67:1, 59, M 2015.
- Crisman, Karl-Dieter. Review of *Information Doesn't Want to Be Free: Laws for the Internet Age* by Cory Doctorow, 67:4, 300, D 2015.
- Dean, Robert. Review of *From Nothing: A Theology of Creation* by Ian A. McFarland, 67:2, 151, J 2015.
- _____. Review of *Loving Later Life: An Ethics of Aging* by Frits de Lange, 68:3, 199, S 2016.
- Dickerson, Matthew. Review of *And West Is West* by Ron Childress, 68:3, 213, S 2016.
- Dijkstra, Peter. Review of *Exploring Faith and Reason: The Reconciliation of Christianity and Biological Evolution* by Bruce Glass, 67:1, 62, M 2015.
- Doede, Robert. Review of *Being as Communion: A Metaphysics of Information* by William Dembski, 67:3, 230, S 2015.
- Dornbos, David, Jr. Review of *Between God and Green: How Evangelicals Are Cultivating a Middle Ground on Climate Change* by Katharine K. Wilkinson, 67:4, 277, D 2015.
- Dunkelberger, Jenelle. Review of *Human Evolution: Genes, Genealogies and Phylogenies* by Graeme Finlay, 68:1, 64, M 2016.

Index

- Dyck, Erika. Review of *An Image of God: The Catholic Struggle with Eugenics* by Sharon M. Leon, 67:1, 58, M 2015.
- Dyer, John. Review of *Reclaiming Conversation: The Power of Talk in a Digital Age* by Sherry Turkle, 68:4, 278, D 2016.
- Ermer, Gayle. Review of *To Forgive Design: Understanding Failure* by Henry Petroski, 66:1, 50, M 2014.
- Franklin, Patrick S. Review of *Reading Genesis 1–2: An Evangelical Conversation* by J. Daryl Charles, ed., 66:2, 124, J 2014.
- Garte, Sy. Review of *A Troublesome Inheritance: Genes, Race and Human History* by Nicholas Wade, 67:1, 68, M 2015.
- Genade, Tyrone. Review of *The Gap: The Science of What Separates Us from Other Animals* by Thomas Suddendorf, 67:4, 297, D 2015.
- Gilmour, Michael. Review of *For the Love of All Creatures: The Story of Grace in Genesis* by William Greenway, 68:3, 209, S 2016.
- Gossett, Eric. Review of *Big Data: A Revolution That Will Transform How We Live, Work, and Think* by Viktor Mayer-Schönberger and Kenneth Cukier, 67:2, 156, J 2015.
- _____. Review of *The Circle* by Dave Eggers, 68:3, 201, S 2016.
- Greenberg, Jeffrey. Review of *Four Revolutions in the Earth Sciences: From Heresy to Truth* by James Lawrence Powell, 68:2, 137, J 2016.
- Gushee, David P. Review of *A Political Theology of Climate Change* by Michael S. Northcott, 66:4, 252, D 2014.
- Hassert, Derrick L. Review of *Flourishing: Health, Disease, and Bioethics in Theological Perspective* by Neil Messer, 67:1, 57, M 2015.
- Heeg, Elizabeth Y. Review of *The End of Sex and the Future of Human Reproduction* by Henry T. Greely, 68:4, 267, D 2016.
- _____. Review of *Sex Itself: The Search for Male and Female in the Human Genome* by Sarah S. Richardson, 67:2, 155, J 2015.
- Heinz, Cheryl. Review of *The Forest Unseen: A Year's Watch in Nature* by David George Haskell, 66:2, 118, J 2014.
- Jelsma, Tony. Review of *Re-Vision: A New Look at the Relationship between Science and Religion* by Clifford Chalmers Cain, ed., 68:3, 208, S 2016.
- Johnson, Adam. Review of *Minds, Brains, Souls and Gods: A Conversation on Faith, Psychology and Neuroscience* by Malcolm Jeeves, 66:1, 62, M 2014.
- Johnson, Lucie R. Review of *Anatomy of the Soul: Surprising Connections between Neuroscience and Spiritual Practices That Can Transform Your Life and Relationships* by Curt Thompson, 66:1, 63, M 2014.
- Jongsma, Calvin. Review of *Mathematics without Apologies: Portrait of a Problematic Vocation* by Michael Harris, 68:2, 138, J 2016.
- Jordan, William. Review of *How We Got to Now: Six Innovations That Made the Modern World* by Steven Johnson, 68:3, 212, S 2016.
- Kalthoff, Mark A. Review of *After the Monkey Trial: Evangelical Scientists and a New Creationism* by Christopher M. Rios, 67:4, 278, D 2015.
- Kavouras, Jerry H. Review of *The Universe Within: Discovering the Common History of Rocks, Planets, and People* by Neil Shubin, 66:1, 54, M 2014.
- Kits, Gerda. Review of *Who Rules the Earth?: How Social Rules Shape Our Planet and Our Lives* by Paul F. Steinberg, 68:1, 60, M 2016.
- Konkel, August H. Review of *The Lost World of Adam and Eve: Genesis 2–3 and the Human Origins Debate* by John H. Walton, 68:1, 67, M 2016.
- LaBar, Martin. Review of *The Body of Faith: A Biological History of Religion in America* by Robert C. Fuller, 67:1, 67, M 2015.
- Lamoureux, Denis O. Review of *Adam, the Fall, and Original Sin: Theological, Biblical, and Scientific Perspectives* by Hans Madueme and Michael Reeves, eds., 67:4, 289, D 2015.
- Langerak, Edward. Review of *Covenantal Biomedical Ethics for Contemporary Medicine: An Alternative to Principles-Based Ethics* by James J. Rusthoven, 67:1, 55, M 2015.
- Leegwater, Arie. Review of *Dealing with Darwin: Place, Politics, and Rhetoric in Religious Engagements with Evolution* by David N. Livingstone, 67:4, 284, D 2015.
- _____. Review of *Huxley's Church and Maxwell's Demon: From Theistic Science to Naturalistic Science* by Matthew Stanley, 68:3, 206, S 2016.
- _____. Review of *Inventing Chemistry: Herman Boerhaave and the Reform of the Chemical Arts* by John C. Powers, 66:4, 255, D 2014.
- _____. Review of *Newton and the Netherlands: How Isaac Newton Was Fashioned in the Dutch Republic* by Eric Jorink and Ad Maas, eds., 67:1, 60, M 2015.
- _____. Review of *The Secrets of Alchemy* by Lawrence M. Principe, 66:4, 258, D 2014.
- Looy, Heather. Review of *Sexuality and Sex Therapy: A Comprehensive Christian Appraisal* by Mark A. Yarhouse and Erica S. N. Tan, 67:2, 154, J 2015.
- _____. Review of *Understanding Gender Dysphoria: Navigating Transgender Issues in a Changing Culture* by Mark A. Yarhouse, 68:4, 274, D 2016.
- McCall, Bradford. Review of *Darwin in the Twenty-First Century: Nature, Humanity, and God* by Phillip R. Sloan, Gerald McKenny, and Kathleen Eggleston, eds., 68:4, 270, D 2016.
- McFarland, Ben. Review of *A New History of Life: The Radical New Discoveries about the Origins and Evolution of Life on Earth* by Peter Ward and Joe Kirschvink, 68:2, 140, J 2016.
- Meneses, Eloise. Review of *The Slain God: Anthropologists and the Christian Faith* by Timothy Larsen, 67:4, 280, D 2015.
- Mickus, John. Review of *Energy for Future Presidents: The Science behind the Headlines* by Richard A. Muller, 66:1, 48, M 2014.
- _____. Review of *Just Water: Theology, Ethics, and the Global Water Crisis* by Christiana Peppard, 66:3, 179, S 2014.
- Middleton, J. Richard. Review of *The Book of Genesis: A Biography* by Ronald Hendel, 68:1, 68, M 2016.

- Mulder, David. Review of *The War on Learning: Gaining Ground in the Digital University* by Elizabeth Losh, 68:2, 143, J 2016.
- Murphy, George L. Review of *Big Bang, Big God: A Universe Designed for Life?* by Rodney D. Holder, 66:3, 188, S 2014.
- Nelesen, Serita. Review of *Recoding Gender: Women's Changing Participation in Computing* by Janet Abbate, 68:1, 71, M 2016.
- Norman, Victor T. Review of *Geek Heresy: Rescuing Social Change from the Cult of Technology* by Kentaro Toyama, 67:4, 303, D 2015.
- _____. Review of *iDisorder: Understanding Our Obsession with Technology and Overcoming Its Hold on Us* by Larry D. Rosen, 67:2, 146, J 2015.
- Petcher, Don. Review of *Curiosity: How Science Became Interested in Everything* by Philip Ball, 66:3, 183, S 2014.
- Pimentel, Sam. Review of *The Outer Limits of Reason: What Science, Mathematics, and Logic Cannot Tell Us* by Noson S. Yanofsky, 66:3, 187, S 2014.
- Ploegstra, Jeffrey T. Review of *Introducing Evangelical Eco-theology: Foundations in Scripture, Theology, History, and Praxis* by Daniel L. Brunner, Jennifer L. Butler, and A. J. Swoboda, 67:2, 143, J 2015.
- Pohl, John F. Review of *The Healing Gods: Complementary and Alternative Medicine in Christian America* by Candy Gunther Brown, 66:2, 120, J 2014.
- _____. Review of *Medicine and Religion: A Historical Introduction* by Gary B. Ferngren, 66:4, 256, D 2014.
- Pun, Pattle Pak-Toe. Review of *Biological Information: New Perspectives* by Robert J. Marks II, Michael J. Behe, William A. Dembski, Bruce L. Gordon, and John C. Sanford, eds., 67:1, 64, M 2015.
- Reinders, Jordan. Review of *Being-in-Creation: Human Responsibility in an Endangered World* by Brian Treanor, Bruce Ellis Benson, and Norman Wirzba, eds., 68:3, 198, S 2016.
- Rios, Christopher M. Review of *Trying Biology: The Scopes Trial, Textbooks, and the Antievolution Movement in American Schools* by Adam R. Shapiro, 66:3, 182, S 2014.
- Royuk, Brent. Review of *The World Is Not Six Thousand Years Old – So What?* by Antoine Bret, 67:4, 287, D 2015.
- Rusthoven, James J. Review of *Christian Bioethics: A Guide for Pastors, Health Care Professionals, and Families* by C. Ben Mitchell and D. Joy Riley, MD, 68:2, 135, J 2016.
- Rylaarsdam, Robin Pals. Review of *The Undead: Organ Harvesting, the Ice-Water Test, Beating-Heart Cadavers – How Medicine Is Blurring the Line Between Life and Death* by Dick Teresi, 66:1, 52, M 2014.
- Schrotenboer, Abbie C. Review of *Let Creation Rejoice: Biblical Hope and Ecological Crisis* by Jonathan A. Moo and Robert S. White, 66:4, 251, D 2014.
- Schuurman, Derek. Review of *Mapping Your Academic Career: Charting the Course of a Professor's Life* by Gary M. Burge, 68:2, 132, J 2016.
- Schuurman, Henry. Review of *Can Animals Be Moral?* by Mark Rowlands, 67:4, 291, D 2015.
- Sevensma, Kara C. Review of *Enhancing the Art & Science of Teaching with Technology* by Sonny Magaña and Robert J. Marzano, 67:4, 302, D 2015.
- Shapiro, Adam R. Review of *Creationism in Europe* by Stefaan Blancke, Hans Henrik Hjermslev, and Peter C. Kjærgaard, eds., 68:3, 204, S 2016.
- Shelhamer, Mark. Review of *To Touch the Face of God: The Sacred, the Profane, and the American Space Program, 1957–1975* by Kendrick Oliver, 67:2, 144, J 2015.
- Sollereder, Bethany. Review of *Ask the Beasts: Darwin and the God of Love* by Elizabeth A. Johnson, 66:3, 190, S 2014.
- _____. Review of *In Praise of Darwin: George Romanes and the Evolution of a Darwinian Believer* by J. David Pleins, 67:1, 66, M 2015.
- Stearley, Ralph. Review of *Earth's Deep History: How It Was Discovered and Why It Matters* by Martin J. S. Rudwick, 67:2, 149, J 2015.
- _____. Review of *Science and Religion: Beyond Warfare and Toward Understanding* by Joshua Moritz, 68:3, 210, S 2016.
- Strawn, Brad D. Review of *Theology for Better Counseling: Trinitarian Reflections for Healing and Formation* by Virginia Todd Holeman, 66:1, 60, M 2014.
- Tandy, Jon. Review of *Infinitesimal: How a Dangerous Mathematical Theory Shaped the Modern World* by Amir Alexander, 67:2, 147, J 2015.
- Timmer, Kevin. Review of *How to Fly a Horse: The Secret History of Creation, Invention, and Discovery* by Kevin Ashton, 68:3, 211, S 2016.
- Tischler, Monica Lee. Review of *Weird Life: The Search for Life That Is Very, Very Different from Our Own* by David Toomey, 66:2, 118, J 2014.
- Toffelmire, Colin M. Review of *Death Before the Fall: Biblical Literalism and the Problem of Animal Suffering* by Ronald E. Osborn, 66:3, 186, S 2014.
- _____. Review of *Navigating Genesis: A Scientist's Journey through Genesis 1–11* by Hugh Ross, 67:4, 298, D 2015.
- Tolsma, Sara Sybesma. Review of *Four Views on the Historical Adam* by Matthew Barrett and Ardel B. Caneday, eds., 66:3, 191, S 2014.
- _____. Review of *How I Changed My Mind about Evolution: Evangelicals Reflect on Faith and Science* by Kathryn Applegate and J. B. Stump, eds., 68:4, 272, D 2016.
- Toronchuk, Judith. Review of *I Died for Beauty: Dorothy Wrinch and the Cultures of Science* by Marjorie Senechal, 66:1, 55, M 2014.
- Touryan, Kenell. Review of *Cold-Case Christianity: A Homicide Detective Investigates the Claims of the Gospels* by J. Warner Wallace, 66:1, 59, M 2014.
- Tsakiridis, George. Review of *Actual Consciousness* by Ted Honderich, 67:2, 153, J 2015.
- van der Breggen, Hendrik. Review of *Beyond the Abortion Wars: A Way Forward for a New Generation* by Charles C. Camosy, 68:2, 133, J 2016.
- Vander Stelt, Erin K. B. Review of *True North: Christ, the Gospel, and Creation Care* by Mark Liederbach and Seth Bible, 67:1, 55, M 2015.

Index

- Van Slyke, James. Review of *The Altruistic Brain: How We Are Naturally Good* by Donald W. Pfaff, 68:2, 131, J 2016.
- Walhout, Matthew. Review of *The Territories of Science and Religion* by Peter Harrison, 67:4, 281, D 2015.
- Wickman, Leslie. Review of *Alone Together: Why We Expect More from Technology and Less from Each Other* by Sherry Turkle, 66:4, 261, D 2014.
- Yong, Amos. Review of *Cosmic Commons: Spirit, Science, and Space* by John Hart, 68:1, 62, M 2016.
- _____. Review of *The Entangled Trinity: Quantum Physics and Theology* by Ernest L. Simmons, 66:4, 262, D 2014.
- _____. Review of *Models of Atonement: Speaking about Salvation in a Scientific World* by George L. Murphy, 66:2, 126, J 2014.
- _____. Review of *The Mystery and Agency of God: Divine Being and Action in the World* by Frank G. Kirkpatrick, 66:4, 262, D 2014.
- _____. Review of *State of Affairs: The Science-Theology Controversy* by Richard J. Coleman, 68:2, 142, J 2016.
- Young, Davis A. Review of *The Grand Canyon, Monument to an Ancient Earth: Can Noah's Flood Explain the Grand Canyon?* by Carol Hill, Gregg Davidson, Tim Helble, and Wayne Ranney, eds., 68:4, 268, D 2016.
- Zolner, Theresa. Review of *Is Evidence-Based Psychiatry Ethical?* by Mona Gupta, 67:3, 229, S 2015.

Communications

- Anderson, V. Elving. "Christian Commitment and the Scientist," 66:3, 171, S 2014.
- Barnard, David T. "Something Unintended: One Experience of Science and Vocation," 68:4, 263, D 2016.
- Benecchi, Susan D., Gladys V. Kober, and Paula Gossard. "At The Crossroads of Science and Faith: An Astronomy Curriculum," 68:2, 119, J 2016.
- Bowen, John P. "The Gospel Is Always Bigger," 66:4, 248, D 2014.
- Contakes, Stephen M. "Logical Pitfalls and Communication Gaps: Frequent Lines of Argument That Dead-End the Origins Conversation," 66:3, 174, S 2014.
- Crouch, Andy. "Delight in Creation: The Life of a Scientist," 66:1, 40, M 2014.
- Fleenor, Matthew C. "The Ways of Jesus and Science at an IVGCF Meeting," 67:4, 272, D 2015.
- Gingerich, Owen. "Do the Heavens Declare the Glory of God?," 66:2, 113, J 2014.
- Hill, Carol A. "How the Book, *Can Noah's Flood Explain the Grand Canyon?*, Came to Be," 68:2, 125, J 2016.
- Parlebas, Jean Claude. "Science and Christian Faith in the France of Pascal and Today," 67:3, 223, S 2015.
- Schuurman, Derek C. "Introducing Open Source and the Raspberry Pi to Schools in Developing Nations," 67:1, 50, M 2015.

Editorials

- Peterson, James C. "Conflict and Collaboration," 67:2, 73, J 2015.
- _____. "Happy Anniversary," 66:2, 65, J 2014.
- _____. "Have I Got a Job for You," 66:1, 1, M 2014.
- _____. "Live and Learn," 68:4, 217, D 2016.
- _____. "Natural Evil and the Love of God," 68:2, 73, J 2016.
- _____. "Perfection Is Elusive," 66:4, 193, D 2014.
- _____. "Qwerty, Time, and Risk," 67:1, 1, M 2015.
- _____. "Reviewing Book Reviews," 67:4, 233, D 2015.
- _____. "The Science and Theology of Creation and Sin," 68:1, 1, M 2016.
- _____. "A Sense of Place," 67:3, 161, S 2015.
- _____. "Since ASA Is Open to Dialogue, Would PSCF Publish an Article Advocating Geo-centrism?," 68:3, 145, S 2016.
- _____. "What Is Not Said," 66:3, 129, S 2014.

Interview

- Rios, Christopher M. "An Interview with Randy Isaac, ASA Executive Director, 2005-2016," 68:3, 191, S 2016.

Letters

- Alexanian, Moorad. "Microscopic and Macroscopic Quantum Realms" (PSCF 66, no. 1 [2014]: 2-34), 66:2, 127, J 2014.
- Collins, Lorence G. "Pursuing the Truth despite the Cost" (PSCF 68, no. 4 [2016]: 218-28), 68:4, 279, D 2016.
- Davidson, Gregg. "Response to Dick Fischer" (PSCF 67, no. 2 [2015]: 159), 67:2, 160, J 2015.
- Fischer, Dick. "Historical Adam?" (PSCF 67, no. 1 [2015]: 24-34), 67:2, 159, J 2015.
- Lamoureux, Denis O. "Response to Ken Touryan," (PSCF 67, no. 2 [2015]: 157), 67:2, 158, J 2015.
- Padgett, Alan. "A Correction to the Review of Russell, *Time in Eternity*" (PSCF 65, no. 2 [2013]: 135-7), 66:1, 64, M 2014.
- Patterson, Gary. "A Different View of *Touching a Nerve* by Patricia Churchland" (PSCF 66, no. 4 [2014]: 259-61), 67:1, 72, M 2015.
- Seely, Paul H. "Concordism vs. Context" (PSCF 66, no. 3 [2014]: 130-9), 66:4, 263, D 2014.
- Thorson, Walter R. "Thinking Consistently and Coherently about Truth," 67:3, 232, S 2015.
- Touryan, Kenell J. "If Adam Did Not Exist, Who Else Did Not?" (PSCF 67, no. 1 [2015]: 35-49), 67:2, 157, J 2015.
- _____. "Important Development Concerning the Impact of Fracking (PSCF 67, no. 3 [2015]: 175-87)," 67:4, 304, D 2015.
- Warren, E. Janet. "A Response to the Review of *Cleansing the Cosmos: A Biblical Model for Conceptualizing and Counteracting Evil*" (PSCF 66, no. 1 [2014]: 57-9), 66:2, 127, J 2014.

American Scientific Affiliation

The American Scientific Affiliation (ASA) is a fellowship of Christians in science and related disciplines, who share a common fidelity to the Word of God and a commitment to integrity in the practice of science. Founded in 1941, the purpose of the ASA is to explore any and every area relating Christian faith and science. *Perspectives on Science and Christian Faith* is one of the means by which the results of such exploration are made known for the benefit and criticism of the Christian community and of the scientific community. The ASA Statement of Faith is at www.asa3.org → HOME/ABOUT → ASA BELIEFS.

Executive Director, ASA:

LESLIE A. WICKMAN, 218 Boston Street, Suite 208, Topsfield, MA 01983

Executive Council, ASA:

LYNN L. BILLMAN, 12800 W Ellsworth Pl, Lakewood, CO 80228-1611

—President

JOHNNY W. LIN, PO Box 53182, Bellevue, WA 98015 —Past President

STEPHEN O. MOSHIER, Wheaton College, Wheaton, IL 60187

—Vice President

JOHN R. WOOD, The King's University, Edmonton, AB T6B 2H3

—Secretary-Treasurer

DOROTHY BOORSE, Gordon College, Wenham, MA 01984

FAITH TUCKER, Mountain View, CA 94041

—Students and Early Career Scientists Representative

Editor, *God and Nature*:

Emily Ruppel, 218 Boston Street, Suite 208, Topsfield, MA 01983

American Scientific Affiliation Forums

We encourage members to submit comments and questions on the articles published in this journal on the ASA **PSCF Discussion Forum** at www.asa3.org → FORUMS → PSCF DISCUSSION.

The ASA home page/forums also contains links to four other members-only discussion groups. The **General Discussion** is for thoughtful discussion of various issues in science and faith. **Books** hosts a series of discussions on seminal books on science and faith. There are also forums for discussion about the **Annual Meeting** and **Education**.

An **Open Forum** is open to the public for dialogue on topics of science and faith at www.asa3.org → FORUMS → OPEN FORUM.

Canadian Scientific & Christian Affiliation

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

Canadian Scientific and Christian Affiliation, PO Box 63082, University Plaza, Dundas, ON L9H 4H0. Website: www.csc.ca.

Executive Director, CSCA:

DON McNALLY, NetAccess Systems, Hamilton, ON

Executive Council, CSCA:

E. JANET WARREN, Medicine/Theology, Hamilton, ON —President

Patrick Franklin, Providence Theological Seminary, Otterburne, MB

—Vice President

BOB GEDDES, The Presbyterian Church in Canada, Hamilton, ON

—Secretary-Treasurer

DAN RÜDISILL, Institute for Christian Studies, Toronto, ON —Student and Early Career Representative

ARNOLD SIKKEMA, Trinity Western University, Langley, BC —Past President

How Do I Join the ASA?

Anyone interested in the objectives of the Affiliation may have a part in the ASA. Membership and subscription applications are available at www.asa3.org → HOME/ABOUT → WHO CAN JOIN?

Full membership is open to all persons with at least a bachelor's degree in science who can give assent to our statement of faith. Science is interpreted broadly to include anthropology, archeology, economics, engineering, history, mathematics, medicine, political science, psychology, and sociology as well as the generally recognized science disciplines. Philosophers and theologians who are interested in science are very welcome. Full members have voting privileges and can hold office.

Associate membership is available to interested nonscientists who can give assent to our statement of faith. Associates receive all member benefits and publications and take part in all the affairs of the ASA except voting and holding office.

Full-time students may join as **Student Members** (science majors) with voting privileges or as **Student Associates** (nonscience majors) with no voting privileges.

Spouses and **retirees** may qualify for a reduced rate. **Full-time overseas missionaries** are entitled to a complimentary membership.

An individual wishing to participate in the ASA without joining as a member or giving assent to our statement of faith may become a **Friend** of the ASA. Friends receive all member benefits and publications and take part in all the affairs of the ASA except voting and holding office.

Subscriptions to *Perspectives on Science & Christian Faith (PSCF)*, are available at \$50/year (individuals), \$85/year (institutions) and \$20/year (student premiers).

How Do I Find Published PSCF Articles?

Articles appearing in *Perspectives on Science and Christian Faith* are abstracted and indexed in the *ATLA Religion Database*; *Christian Periodical Index*; *EBSCO*; *Gale: Cengage Learning*; *Religion Index One: Periodicals*; *Religious & Theological Abstracts*, and *Guide to Social Science and Religion in Periodical Literature*. Book Reviews are indexed in *Index to Book Reviews in Religion*. Present and past issues of *PSCF* are available in microfilm form at a nominal cost. For information, write to NA Publishing, Inc. PO Box 998, Ann Arbor, MI 48106-0998 or go to www.napubco.com.

Contents of past issues of *PSCF* are available at www.asa3.org → PUBLICATIONS → PSCF.



American Scientific Affiliation
218 Boston Street, Suite 208
Topsfield, MA 01983

Phone: (978) 887-8833

FAX: (978) 887-8755

E-mail: asa@asa3.org

Website: www.asa3.org



Editorial

Live and Learn 217 James C. Peterson

Articles

Noah's Ark near Dogubayazit, Turkey? 218 Lorence G. Collins
Science, the Bible, and Human Anatomy 229 Robert D. Branson
Reading Genesis 237 Roy Clouser

Communication

Something Unintended: One Experience of
Science and Vocation 263 David T. Barnard

Book Reviews

Laudato Si': On Care for Our Common Home 266 Pope Francis
The End of Sex and the Future of Human Reproduction 267 Henry T. Greely
*The Grand Canyon, Monument to an Ancient Earth:
Can Noah's Flood Explain the Grand Canyon?* 268 Carol Hill, Gregg Davidson,
Tim Helble, and
Wayne Ranney, eds.
Darwin in the Twenty-First Century: Nature, Humanity, and God 270 Phillip R. Sloan,
Gerald McKenny, and
Kathleen Eggleston, eds.
*How I Changed My Mind about Evolution:
Evangelicals Reflect on Faith and Science* 272 Kathryn Applegate and
J. B. Stump, eds.
*The Brain's Way of Healing: Remarkable Discoveries and
Recoveries from the Frontiers of Neuroplasticity* 273 Norman Doidge
*Understanding Gender Dysphoria: Navigating Transgender Issues
in a Changing Culture* 274 Mark A. Yarhouse
*Philosophy of Technology: An Introduction for Technology
and Business Students* 276 Maarten J. Verkerk, Jan
Hoogland, Jan van der Stoep,
and Marc J. de Vries
Reclaiming Conversation: The Power of Talk in a Digital Age 278 Sherry Turkle

Letter

Pursuing the Truth despite the Cost 279 Lorence G. Collins

Index

Volumes 66–68, 2014–2016 281