

Who were Adam and Eve? Scientific Reflections on Collins's *Did Adam and Eve Really Exist?*

T.C. Wood

Center for Origins Research, Bryan College, Dayton, TN

C. John Collins. 2011. *Did Adam and Eve Really Exist? Who They Were and Why You Should Care*. Crossway, Wheaton, Illinois. ISBN 978-1-4335-2425-7, 192 pp, \$15.99.

Editor: J.W. Francis

Received January 23, 2012; Accepted October 1, 2012; Published October 29, 2012

I first encountered C. John Collins's arguments for a historical Adam and Eve in his 2010 paper "Adam and Eve as Historical People, and Why it Matters," published in *Perspectives on Science and the Christian Faith*. His essay was one of four in that issue focusing on the historicity of Adam and Eve, and it was the only one defending a historical Adam. Collins made it clear in his essay that he disagrees with young-age creationists on quite a number of issues. At the same time, Collins offered some very serious thoughts about the importance of the historicity of Adam for Christian theology, which I think many young-age creationists would welcome. I'm pleased to see that these important arguments are developed further in Collins's latest book *Did Adam and Eve Really Exist? Who They Were and Why You Should Care*.

Put most succinctly, Collins focuses on the coherence of what he sees as the biblical metanarrative of creation, fall, and redemption. In Collins's words,

The best way to read the parts of the Bible, then, is in relation to the overarching story by which the individual Biblical authors deliberately interpreted their world. This story ... requires "redemption" for all people now that something has gone wrong at the headwaters of mankind. The Bible writers portray this as the true story for all people everywhere, and that "truth" involves events that really took place, or "history" (p. 49).

According to Collins, modern efforts to alter our understanding of Adam, Eve, and the origin of sin and human death do not merely offer new ways of reading obscure texts. They fundamentally alter the message of salvation. Thus, efforts to minimize the importance of the traditional understanding of the origin of humans, sin, and death actually undermine the message of salvation.

The book is bracketed by chapters of introduction and

conclusion. Collins makes his primary argument in Chapter 2, and the remaining chapters then deal with Biblical references to Adam and Eve (Chapter 3), human uniqueness (Chapter 4), and the implications of his argument for the science of human origins (Chapter 5). It is clear throughout the book that biblical and theological issues are paramount for Collins. For example, Collins spends nearly a quarter of his text reviewing Biblical and extrabiblical texts that mention or are thought to refer to Adam. This material responds directly to assertions that references to Adam and Eve in the Old Testament are confined to Genesis (e.g., Harlow 2010). Collins cites references to the origin of marriage (Mal. 2:15) and the garden of Eden (esp. Ezek. 28:11-19). Most importantly, he discusses three possible allusions to events of the Fall in Ecclesiastes 7:29, Hosea 6:7, and Job 31:33.

With regard to the common claim that Genesis 1-11 contains contradictions that prevent it from being read as historical, Collins generally takes a more cautious approach. For example, while some scholars have recently tried to make the identity of Cain's wife into a problem for a historical or creationist reading of Genesis (e.g., Collins 2003; Harlow 2010; Moritz 2011a), Collins is justifiably cautious. He notes that Jewish exegetes believe that Cain married his sister, an opinion favored by Christian commentators as well. Similarly, while many scholars view Genesis 1 and 2 as contradictory (e.g., Hyers 2003; Guy 2006; Haarsma and Haarsma 2007, p. 84; Harlow 2010), Collins argues for a coherent narrative unity of Genesis 1-5. Collins even notes in passing that Christ's quotation of both Genesis 1 and 2 on the origin of marriage (Matt. 19:4-5) implies that Christ "read Genesis 1 and 2 as complementary texts" (p.76).

In his brief discussion of human uniqueness, Collins adopts an interpretation of the Image of God that embraces different themes.

While it has become popular of late to equate the Image with a position as God's representatives rather than a quality that makes us like God (e.g. Gentry, 2008; Moritz 2011b), Collins argues for a synthesis of these seemingly different perspectives. According to Collins, it is the totality of God-like qualities that make us suitable representatives of God to the rest of creation. Especially helpful in this regard is Collins's emphasis on a holistic understanding of the resemblance of God to humans. "Other animals may have features that are analogous to these special features of human beings, but the total assembly of characteristics that we find in humans is distinct" (p. 96). In contrast, Moritz's (2011a) critique of human uniqueness focuses on individual qualities in a reductionistic manner. Collins's argument would seem to be a simple and effective rebuttal to Moritz's claims that humans are not qualitatively unique from animals.

Since my formal training is in science, I found Chapter 5, containing Collins's discussion of the science of human origins, of particular interest. To his credit, Collins recognizes his own scholarly limitations (as a theologian and not a scientist) and does not attempt a full-blown synthesis of science and scripture. Instead, he tries to describe "bounds to sound thinking" and how those bounds relate to a brief sample of human origins proposals made by various Christian scholars. According to Collins, the bounds are

- (1) ... the origin of the human race goes beyond a merely natural process... (p. 120).
- (2) We should see Adam and Eve at the headwaters of the human race ... (p. 120).
- (3) The "fall" ... was both historical (it happened) and moral (it involved disobeying God), and occurred at the beginning of the human race (p. 120).
- (4) If someone should decide that there were ... more human beings than just Adam and Eve at the beginning of mankind, then ... he should envision these humans as a single tribe. Adam would then be the chieftain of this tribe ... and Eve would be his wife (p. 121).

Rather than debate these criteria, I will here evaluate some of the scenarios he discusses based on the most recent scientific findings.

Collins's discussion of scientific proposals that fit these criteria is necessarily brief and cautious, and in that light I think Lamoreaux's (2011) dismissal of this chapter as "concordism" is unfortunate. If concordism is anything, it is the conviction that the biblical *text* can be interpreted to make sense in light of the findings of science or other "secular" human scholarship. Since Collins's argument is primarily concerned with the implications of theology and metanarrative rather than the minutia of the text, he can hardly be said to be proposing a concordist position. Following his misinterpretation of Collins's argument, Lamoreaux (2011) concludes that Collins must be arguing for Adam as a tribal leader, where I see Collins offering this idea as one understanding among others that are consistent with his theological argument for a historical Adam. As a non-scientist, Collins emphasized that his intent in this chapter was not "to assess the science but to display how to keep the reasoning within the bounds of sound thinking" (p. 130). Given Collins's limited treatment of science, I think he succeeds in that goal quite well.

Collins begins his discussion with two paragraphs on young-

age creationism. According to Collins, one young-age creationist idea views "Adam and Eve as the first members of the genus *Homo*" (p. 122). That summarizes only a few young-age creationists (Wood 2010). It is true that nearly all young-age creationists recognize Neandertals as human, and a significant number of young-age creationists would also include the *Homo erectus* complex in the human family (see Wood 2010 for a review). As I found out recently though (Wood 2011), extending the human family to include such controversial fossils as *Homo rudolfensis* or *Homo habilis* is objectionable to many creationists. Nevertheless, what he describes as a young-age creationist view is certainly a possible – if unpopular – scenario for human origins.

Collins judges this position to be unlikely since "the earliest *Homo* is dated at two million years ago, and this leaves a very long time without any specific cultural remains in the paleontological record" (p. 122). While that might be true, it is certainly not evaluating the young-age creationist claims on their own terms. Instead, he's mixing one idea of young-age creationism (a humanity broader than just *Homo sapiens*) with the conventional chronology that young-age creationists explicitly reject. A better strategy would be either to outline his objections to the young-age chronology (of which there could be many) or to evaluate the young-age creationist proposal on its own terms (assuming for the sake of argument that the chronological assumptions are uncontroversial). I will revisit possible young-age creationist scenarios at the end of the essay.

Given that Collins accepts conventional chronology, it seems only fair to evaluate his discussion of human origins based on progressive creationist or theistic evolutionist models for human origins. In his review of possible scenarios, Collins singles out only a few models for comment. He favorably cites the "RTB model," which identifies Adam and Eve as specially created *Homo sapiens* "less than 100,000 years ago" or "70,000 to 50,000 years ago" (Rana and Ross 2005, pp. 137, 248), and briefly criticizes Alexander's (2008) evolutionary model. He also rejects models that place Adam in the Neolithic, around 10,000 years ago. He speaks most favorably of a vague passage from C.S. Lewis, which he "tweaks" with a suggestion from Kidner. According to this model, God created humans from pre-existing hominins, first in the form of Adam and Eve and subsequently in their "collaterals" (tribe?), of which Adam was the head. Thus, as the covenantal head of the first humans, Adam's fall applied to all of his contemporaries and to all humans that came after them.

The notion of creating Adam and Eve from pre-existing hominins seems to avoid the problem of re-interpreting the evidence of human evolution, while simultaneously retaining a belief in the unique creation of modern humans. Biologically, we bear such similarity to other primates because they are the physical source of Adam and Eve's bodies. Spiritually, we still stand apart, as a striking contrast to other animals. Despite this advantage, I suspect that recent advances in ancient genomics render this proposal (and the RTB model) problematic. The source of that problem is the Neandertals.

The degree of humanity exhibited by Neandertals has long been debated, even among non-Christian scholars. Those who favor a more "advanced" depiction of Neandertals point to evidence of sophisticated tool manufacture and use, the use of fire (Roebroeks and Villa 2011), deliberate burial (Pettitt 2002), and even the

possible enjoyment of music (Turk 1996). The significance of most of these evidences has been challenged at one time or another by other experts (e.g., Higham et al. 2010, D'Errico et al. 1998, among many others), some of whom depict Neandertals as more "primitive." Young-age creationists who wish to include Neandertals in the human family emphasize the evidences for advanced Neandertals (e.g. Lubenow 2004). Old-age creationists and theistic evolutionists who see Adam and Eve as *Homo sapiens* emphasize the more primitive depiction of Neandertals (e.g., Ross and Rana 2005). Evolutionary biologists interested in the origin of religiosity (e.g., King 2008) seem content to celebrate the ambiguity of the evidence, which could be interpreted as evidence of a gradually emerging spirituality in hominins.

Until only recently, there seemed to be no way to resolve the theological relationship of Neandertals to *Homo sapiens*. With the recent sequencing of ancient hominin genomes, however, significant new data has come to light that bear directly on Neandertals' humanity. Neandertal DNA sequences were first reported in 1997, and soon after the completion of the human genome project, discussion began on a project aimed at generating a sequence of the entire Neandertal genome (see Pennisi 2006). After significant milestones were achieved, including the complete sequencing of a Neandertal mitochondrial genome (Green et al. 2008) and methodological advances (Briggs et al. 2009), a draft genome derived from three Neandertal fossils recovered from a Croatian cave was published (Green et al. 2010). With an estimated <1% of the sequence derived from modern contamination, the Neandertal genome gives us an extremely detailed look at the genetics of this enigmatic species.

In their original report, the Neandertal genome team summarized basic features of the Neandertal genome along with the results of various comparisons with human and chimpanzee genomes. Most significant among these comparisons were analyses that showed a striking similarity between modern humans and Neandertals at certain locations in the genome. Since these similarities were absent from human genomes of African origin, the most likely explanation was a phenomenon called introgression. Introgression is the flow of genes from one population to another as a result of ongoing hybridization. In the case of the Neandertals, the evidence of introgression implies that Neandertals interbred with the ancestors of modern Eurasians and that the Neandertal-*Homo sapiens* hybrid offspring were fertile, found *Homo sapiens* mates, and passed their Neandertal genes to their descendants. If the estimates of introgression are correct, 1-5% of the genes of an average European or Asian human today originally came from Neandertals.

Just eight months after the publication of the Neandertal genome, a second ancient hominin genome was published (Reich et al. 2010). This second genome came from an enigmatic group simply called Denisovans, initially identified from a pinky finger bone recovered from the Denisova Cave in the Altai Mountains of Siberia. Two additional teeth are all the fossil remains known of these hominins. Genetically, the Denisovans were strikingly different from modern *Homo sapiens*. Initial studies of their mitochondrial DNA indicated that they diverged from the lineage leading to modern humans around one million years ago (Krause et al. 2010), but a fuller analysis of the complete genome indicated that Denisovans were the sister taxon of Neandertals, which would

make them more recent relatives to modern humans. As was the case with Neandertals, however, the Denisovan genome exhibited evidence of introgression, this time with the ancestors of modern Melanesians. Once again, this evidence implies that the ancient Denisovans mated with ancient *Homo sapiens* and that the hybrid offspring found *Homo sapiens* mates to pass their genes into the ancestral Melanesian population.

If we accept the conventional timescale, as Collins does, Neandertals are thought to have diverged from the ancestors of modern *Homo sapiens* approximately 500,000-600,000 years ago (Krings et al. 1997, 1999; Green et al. 2008; Krause et al. 2010). Compared to Rana and Ross's (2005) placement of Adam and Eve at less than 100,000 years ago, these dates precede the creation of humans. Not surprisingly, Reasons to Believe has a long history of viewing Neandertals as non-human animals, unconnected to the origin of true humans (e.g., Ross 1997; Rana 2000, 2003). Although Collins does not mention Neandertals in his book, his favorable discussion of Ross and Rana's (2005) model and his dismissal of the young-age creationist model suggest that he too would view Adam and Eve as *Homo sapiens*, and therefore Neandertals would not be human. Or perhaps, considering his otherwise humble approach to the scientific evidence, Collins would not have a definite opinion about Neandertals.

If Neandertals are not human (as Ross and Rana [2005] insist), what then are the implications of reported genetic introgression for Christian theology? One possible reaction would be to deny the evidence, but it is difficult to imagine an alternative explanation that would satisfactorily explain the data (for a relatively simple discussion, see Liang and Nielsen 2011). Another possible response would be to affirm the successful hybridization of humans with non-human animals. This possibility was affirmed by RTB staff members Ross, Rana, and Samples in a May 10, 2010 podcast (available at <http://www.podtrac.com/pts/redirect.mp3/c450913.r13.cf2.rackcdn.com/20100510-hrfrks.mp3>). The theological and cultural challenges of this interpretation would appear to be significant. First, there is the problem of the initial human/animal hybrids. Were they human or not? Did they have souls? Given their animal parentage, were they morally culpable for their sin? Given their human parentage, were they eligible for redemption by Christ's death?

These questions might sound to some easily resolved or perhaps unimportant, but given the human distinctiveness that Collins affirms in his discussion of the Image of God, how can that distinctiveness be bridged by human/animal hybrids without somehow degrading the Image? A human/animal hybrid would be expected to have only a fraction of the intellectual capabilities of its human parentage. If those intellectual capabilities are part of the Image as Collins affirms, did the hybrids have only half an Image of God? Even if Collins were to accept a positional view of the Image as discussed above, it is still unclear how a human/animal parentage would affect the covenantal relationship implied in that view. Would God merely overlook or somehow redeem the animal parentage of a human/animal hybrid?

Further, the cultural implications of a human/animal hybrid would seem to significantly hinder the possibility of persistent introgression. A single human/animal hybrid would pose theological challenges, but one could merely shrug it off as unimportant if the hybrid was viewed as a one-time freak of

nature. In this case, however, the detection of Neandertal genes in modern Eurasians requires multiple episodes of hybridization and the mating of the hybrid offspring with human mates. If we follow Collins's view of the Image of God as the sum total of qualitative differences that separate humans from animals, how could a human/animal hybrid possess enough cognitive capacity (Image of God) to find a human mate? If we viewed the initial hybridization as the consequence of rape of a human girl by a Neandertal male, could we simply view the hybrid offspring as rapists also?

These challenges are compounded when we consider hybridization with Denisovans, and inferential evidence of hybridization with unspecified African hominins (Hammer et al. 2011). Thus, if we view Adam and Eve as recent *Homo sapiens*, we are left with the unsettling conclusion that early humans committed bestiality, had half human, half animal offspring, and that offspring mated with other humans to such an extent that modern humans carry around perhaps as much as 4% animal genes. However, following Collins's example of humbly discussing an unfamiliar field, I must confess that I am simply unsure about the theological implications of this position.

Despite my theological uncertainty, these uncomfortable conclusions and challenges can be avoided by simply accepting Neandertals and Denisovans as fully human descendants of Adam and Eve. The theological problems listed above would be avoided, and there would be no additional theological problems caused by broadening our understanding of "humanity" to include multiple species (Wood 2011). This possibility raises a great deal of biological or otherwise scientific challenges. Accepting the conventional chronology, Adam and Eve and the creation and Fall of humans must have occurred more than 500,000 years ago (the date of the divergence of the Neandertal/Denisovan lineage and *Homo sapiens*). Collins's concern about "a very long time without any specific cultural remains in the paleontological record" (p. 122) seems to apply, especially in light of the cultural advances ascribed to the earliest humans in Genesis 4 (cities, metalworking, musical instruments). Perhaps we might assert that these evidences were destroyed in the Flood, but if we did, how would we account for the relatively extensive fossil record of Neandertals? Why would Neandertal remains be preserved without any evidence of the advanced culture associated with humans of the time?

Alternatively, we could (as I do) reject the absolute dating of the conventional scientific chronology, or more properly, we could compress that chronology to a short period of post-Flood and post-Babel history. Consequently, the full humanity of Neandertals, Denisovans, and potentially other *Homo* species could be affirmed, along with any hybrids between those *Homo* species and *Homo sapiens*. The lack of technology associated with early *Homo* species could be viewed as simply the first generations of humans recovering from the shattering of human culture at Babel. The scientific challenges posed by this view, however, are numerous. Aside from the obvious problem of radiometric dating and the evidence of great antiquity of hominin fossils, mutation rates necessary to generate the sequence differences observed between modern humans, Neandertals, and Denisovans would have to be orders of magnitude greater than they are now (Wood 2012). How life could survive such a high

mutation rate is unclear.

Despite the scientific challenges, the implications of Collins's theological argument seem to fit better with a broad, multi-species view of humanity than with a monospecific view. In light of the genomic evidence of introgression, insisting on a *Homo sapiens* Adam and Eve presents us with a whole new set of theological challenges that potentially threaten the Image of God and ultimately the nature of redemption. The multi-species view of humanity has the added advantage of temporarily deferring the issue of ancestral population size raised by Venema (2010), since the studies cited by Venema were all focused on the original ancestors of *Homo sapiens*, which would not necessarily be expected to be Adam and Eve.

Overall, I find much helpful theological guidance from Collins's book, and I would strongly recommend it to any interested in the current evangelical debate over Adam and Eve. His raises extremely important questions about the biblical and theological consequences of Adam's historicity that cannot be easily dismissed. Those who argue for a literary Adam will need to consider his arguments carefully. If my analysis above is correct, careful readers who are already convinced of a historical Adam will find more than just affirmation of their own beliefs. Instead, Collins's arguments point to deeper and more difficult issues of species and humanity than he could have intended. This book will certainly not resolve the evangelical debate over Adam and Eve, but it is an invaluable contribution nonetheless.

References

- Alexander, D. 2008. *Creation or Evolution: Do We Have to Choose?* Kregel Publications, Grand Rapids, MI.
- Briggs, A.W., J.M. Good, R.E. Green, J. Krause, T. Maricic, U. Stenzel, C. Lalueza-Fox, P. Rudan, D. Brajković, Z. Kućan, I. Gušić, R. Schmitz, V.B. Doronichev, L.V. Golovanova, M. de la Rasilla, J. Fortea, A. Rosas, and S. Pääbo. 2008. Targeted retrieval and analysis of five Neandertal mtDNA genomes. *Science* 325:318-321.
- Collins, C.J. 2010. Adam and Eve as historical people, and why it matters. *Perspectives on Science and the Christian Faith* 62(3):147-165.
- Collins, C.J. 2011. *Did Adam and Eve Really Exist? Who They Were and Why You Should Care*. Crossway, Wheaton, IL.
- Collins, R. 2003. Evolution and original sin. In: Miller, K.B., ed. *Perspectives on an Evolving Creation*. Eerdmans Publishing, Grand Rapids, MI, pp. 469-501.
- D'Errico, F., P. Villa, A.C. Pinto Llona, and R.R. Idarraga. 1998. A Middle Palaeolithic origin of music? Using cave-bear bone accumulations to assess the Divje Babe I bone 'flute.' *Antiquity* 72(275):65-79.
- Green, R.E., J. Krause, A.W. Briggs, T. Maricic, U. Stenzel, M. Kircher, N. Patterson, H. Li, W. Zhai, M.H.-Y. Fritz, N.F. Hansen, E.Y. Durand, A.-S. Malaspinas, J.D. Jensen, T. Marques-Bonet, C. Alkan, K. Prüfer, M. Meyer, H.A. Burbano, J.M. Good, R. Schultz, A. Aximu-Petri, A. Butthof, B. Höber, B. Höffner, M. Siegemund, A. Weihmann, C. Nusbaum, E.S. Lander, C. Russ, N. Novod, J. Affourtit, M. Egholm, C. Verna, P. Rudan, D. Brajkovic, Ž. Kucan, I. Gušić, V.B. Doronichev, L.V. Golovanova, C. Lalueza-Fox, M. de la Rasilla, J. Fortea, A.

- Rosas, R.W. Schmitz, P.L.F. Johnson, E.E. Eichler, D. Falush, E. Birney, J.C. Mullikin, M. Slatkin, R. Nielsen, J. Kelso, M. Lachmann, D. Reich, and S. Pääbo. 2010. A draft sequence of the Neandertal genome. *Science* 328:710-722.
- Gentry, P.J. 2008. Kingdom through covenant: humanity as the divine image. *Southern Baptist Journal of Theology* 12(1): 16-42.
- Green, R.E., A.S. Malaspinas, J. Krause, A.W. Briggs, P.L. Johnson, C. Uhler, M. Meyer, J.M. Good, T. Maracic, U. Stenzel, K. Prüfer, M. Siebauer, H.A. Burbano, M. Ronan, J.M. Rothberg, M. Egholm, P. Rudan, D. Brajković, Z. Kučan, I. Gusić, M. Wikström, L. Laakkonen, J. Kelso, M. Slatkin, and S. Pääbo. 2008. A complete Neandertal mitochondrial genome sequence determined by high-throughput sequencing. *Cell* 134:416-426.
- Guy, F. 2006. The purpose and function of scripture: preface to a theology of creation. In: Bull, B., F. Guy, and E. Taylor, eds. *Understanding Genesis: Contemporary Adventist Perspectives*. Adventist Today Foundation, Riverside, CA.
- Haarsma, D.B. and L.D. Haarsma. 2007. *Origins: A Reformed Look at Creation, Design, and Evolution*. Faith Alive Christian Resources, Grand Rapids, MI.
- Hammer, M.F., A.E. Woerner, F.L. Mendez, J.C. Watkins, and J.D. Wall. Genetic evidence for archaic admixture in Africa. *Proceedings of the National Academy of Sciences USA* DOI 10.1073/pnas.1109300108.
- Harlow, D.C. 2010. After Adam: Reading Genesis in an age of evolutionary science. *Perspectives on Science and the Christian Faith* 62(3):179-195.
- Higham, T., R. Jacobi, M. Julien, F. David, L. Basell, R. Wood, W. Davies, and C.B. Ramsey. 2010. Chronology of the Grotte du Renne (France) and implications for the context of ornaments and human remains within the Châtelperronian. *Proceedings of the National Academy of Sciences USA* 107:20234-20239.
- Hyers, C. 2003. Comparing the biblical and scientific maps of origins. In: Miller, K.B., ed. *Perspectives on an Evolving Creation*. Eerdmans Publishing, Grand Rapids, MI, pp. 19-33.
- King, B.J. 2008. Reflections on Wentzel van Huyssteen's *Alone in the World?* *Zygon* 43(2):451-466.
- Krause, J., Q. Fu, J.M. Good, B. Viola, M.V. Shunkov, A.P. Derevianko, and S. Pääbo. 2010. The complete mitochondrial DNA genome of an unknown hominin from southern Siberia. *Nature* 464:894-897.
- Krings, M., H. Geisert, R.W. Schmitz, H. Krainitzki, and S. Pääbo. 1999. DNA sequence of the mitochondrial hypervariable region II from the Neandertal type specimen. *Proceedings of the National Academy of Sciences USA* 96(10):5581-5585.
- Krings, M., A. Stone, R.W. Schmitz, H. Krainitzki, M. Stoneking, and S. Pääbo. 1997. Neandertal DNA sequences and the origin of modern humans. *Cell* 90(1):19-30.
- Lamoreaux, D.O. Book review: *Did Adam and Eve Really Exist? Perspectives on Science and the Christian Faith* 63(4):277-278.
- Liang, M. and R. Nielsen. 2011. Q&A: Who is *H. sapiens* really, and how do we know? *BMC Biology* 9:20.
- Lubenow, M.L. 2004. *Bones of Contention: A Creationist Assessment of Human Fossils*. Baker Books, Grand Rapids, MI.
- Moritz, J.M. 2011a. Evolution, the end of human uniqueness, and the election of the *Imago Dei*. *Theology and Science* 9(3): 307-339.
- Moritz, J.M. 2011b. The search for Adam revisited: evolution, biblical literalism, and the question of human uniqueness. *Theology and Science* 9(4):367-377.
- Pennisi, E. 2006. The dawn of stone age genomics. *Science* 314: 1068-1071.
- Pettitt, P.B. 2002. The Neanderthal dead: exploring mortuary variability in Middle Palaeolithic Eurasia. *Before Farming* 1(4):1-19.
- Rana, F.R. 2000. DNA study cuts link with the past. *Connections* 2(3):3.
- Rana, F.R. 2003. Neanderthal-to-human link severed. *Connections* 5(2):8-9.
- Rana, F. and H. Ross. 2005. *Who was Adam? A Creation Model Approach to the Origin of Man*. NavPress, Colorado Springs, CO.
- Reich, D., R.E. Green, M. Kircher, J. Krause, N. Patterson, E.Y. Durand, B. Viola, A.W. Briggs, U. Stenzel, P.L.F. Johnson, T. Maracic, J.M. Good, T. Marques-Bonet, C. Alkan, Q. Fu, S. Mallick, H. Li, M. Meyer, E.E. Eichler, M. Stoneking, M. Richards, S. Talamo, M.V. Shunkov, A.P. Derevianko, J.-J. Hublin, J. Kelso, M. Slatkin, and S. Pääbo. 2010. Genetic history of an archaic hominin group from Denisova Cave in Siberia. *Nature* 468:1053-1060.
- Roebroeks, W. and P. Villa. On the earliest evidence for habitual use of fire in Europe. *Proceedings of the National Academy of Sciences USA* 108:5209-5214.
- Ross, H. 1997. Neandertal takes a one-eighty. *Facts & Faith* 11(3):4-5.
- Turk, I. 1997. *Mousterian bone flute and other finds from Divje Babe I cave site in Slovenia*. Institut za Arhaeologijo, Ljubljana, Slovenia.
- Venema, D.R. 2010. Genesis and the genome: genomics evidence for human-ape common ancestry and ancestral population sizes. *Perspectives on Science and the Christian Faith* 62(3):166-178.
- Wood, T.C. 2010. Baraminological analysis places *Homo habilis*, *Homo rudolfensis*, and *Australopithecus sediba* in the human holobaramin. *Answers Research Journal* 3:71-90.
- Wood, T.C. 2011. Baraminology, the image of God, and *Australopithecus sediba*. *Journal of Creation Theology and Science Series B: Life Sciences* 1:6-14.
- Wood, T.C. 2012. Ancient mtDNA implies a nonconstant molecular clock in the human holobaramin. *Journal of Creation Theology and Science Series B: Life Sciences* 2:18-26.