Abstract: The current scientific consensus on human origins is widely perceived by Evangelical Christians to be at odds with core theological doctrines at the heart of Evangelical faith. But is the situation as dire as some would claim? After setting the biblical and biological stages, the remainder of this paper briefly examines fruitful ways in which science seems to rub up against a key doctrine in theological anthropology: the challenge of the historical Adam and the nature of human sinfulness. I will make the case that modern science can be a friend to theological anthropology, by sharpening our focus on theological essentials, and by avoiding missteps as we construct a robust, biblically based anthropology.

INTRODUCTION
Are there options for the many Christians for whom the scientific data is compelling and for whom – simultaneously – the biblical story of people who are created in the image of God yet profoundly flawed sinners in need of a Savior is an even more essential description of the human condition? In a word, I want to answer “yes”, and make a plea for creative, synthetic thinking in this area. How might science help theology in this synthesis? British neuroscientist and Christian Donald Mackay puts it this way:
While 21st century notions of science should never be read into ancient texts, they may serve as a stimulus to work even harder to understand the core biblical message and its implications. My hope is that this essay will encourage new syntheses that lean into the astonishing findings of recent science without jumping too quickly to positions that scrap classical theological categories.

THE BIBLE AND HUMAN ORIGINS

As an Evangelical, I always want to begin with key Bible passages, which in this case include Genesis 1-3, 1 Corinthians 15, and Romans 5. What constraints do these passages place on us? Biblical interpretation is highly contested, and space simply does not permit a defense of interpretive decisions in this section. With that apology, this hopelessly brief thumbnail reflects my own recent musings.

Genesis 1-3. Given that Genesis 2:4 begins a new tōlĕdōt section (ʾellê ṭôleḏôṯ) describing what is generated by the heavens and the earth, one way to construe Gen. 1 is as a prologue and general statement about humankind3,4,5 “Image” (ṣelem) and likeness” (demut) (1:26) are probably interchangeable6 and set humankind apart theologically from the rest of the created order.7 Given Ancient Near Eastern cultural practices8 image bearing is probably primarily related to the function of vice regency of humans over the rest of creation9. Such image bearing is communal (v. 27) and applies to all humankind, not just the king.10 When God pronounces the creation “very good” (ṭôḇ meʾōḏ, 1:31) ṭôḇ (“good”) is in no way synonymous with “paradise”.11,12 Indeed, the need to “subdue” the earth and exercise “dominion” over it implies that “very good” simply means that the creation – and the people within it - are functioning as intended. There is no reason to suppose that natural life cycles (including death) were not a part of this proper function.13

The continued use of the definite article with the word “human” (ʾāḏām) and figurative elements14 in Chapter 2 suggest that the sequel continues to view Adam and Eve largely archetypally15. The wordplay involving the use of ʾāḏām and ʾāḏāmāh (“ground”), that the beasts and birds are formed from the same “ground” (2:19), and that the Hebrew phrase “living being” (nep̱eš ḥayyâ) in 2:7 refers to animals elsewhere (1:20, 21, 24, 30; 2:19) all accentuate the physical continuity of humans and animals, which comports well with the scientific story (see below). Importantly, there is no obvious emphasis on capacities in Genesis 1 and 2 (although see 16).

The next chapter of Genesis records human calamity, symptomatic of human assertion of moral autonomy apart from YHWH17. The text itself mentions no cosmic disruption of the created order18. Instead, the effects are limited to the couple themselves as part of life outside the garden. Although 2:17 says that “in the day you eat it you shall surely die”, because Adam and Eve did not physically die immediately suggests that while physical death was an eventual consequence of their disobedience, the primary referent is spiritual. As Blocher puts it, “In the Bible, death is the reverse of life – it is not the reverse of existence … It is a diminished existence, but nevertheless an existence.”19 The consequences of eating from the Tree of Life have a further implication, given the clue that humans are made of “dust” (ʿāp̱ār). Since the curse in Gen. 3:19 involves a return to dust, and since passages such as Eccl. 3:20, Job 10:9 and Psalm 103:14 indicate being “dusty” is synonymous with “mortal”, one reading of the text is that Adam and Eve, like other humans, were created mortal, and lost the opportunity for immortality due to their disobedience. 20

A final word is in order about the cultural setting of Gen. 4. Given references to various Neolithic industries and agriculture, some opt for a Neolithic historical setting for the Garden.21 However, as Jack Collins has pointed out, there are many other ways to interpret the cultural setting22, and other aspects of the passage could provide dates far earlier.23 It seems the text need not constrain us to a particular historical setting. Importantly, Cain’s fear (4:14-15) indicates that that were other humans alive at the time.
I Corinthians 15 and Romans 5. Paul uses Adam as a foil for Christ in two key places. In 1 Corinthians 15 Paul says (vv. 21-22): “for as all die in Adam, so all will be made alive in Christ.” As pointed out by N.T. Wright, the contrast emphasizes what empowers the “natural body” [sōma psychikon] and the “spiritual body” [sōma psychikon]. The upshot is that the “natural body” results “from the fact that it is animated earthly dust and that Paul is speaking here of physical death.” Bernard Ramm notes, “If the notion of sin is in the chapter, it certainly stands deep in the shadows.” The main force of the comparison seems to be the mortality of humans compared with the immortality available through Christ, not the absence of mortality prior to the sin of Gen. 3.

Romans 5 seems more problematic. Sin and some sort of “death” are clearly connected in Romans 5:12. But what sort of death? Some think spiritual, whereas others emphasize physical death. Douglas Moo suggests that we need not choose. Perhaps sin led to spiritual separation from God for Adam and Eve, and ultimately loss of the possibility of immortality for them and the rest of humanity. The text does not imply that there was no death prior to Adam and Eve’s disobedience, only that sin led to mortality for Adam and Eve, placing them in solidarity with all people. Significantly, Rom. 5:12-21 never explains the nature of that solidarity, but whatever the connection, people ratify their solidarity via personal sin (v. 12).

Does the parallelism in 1Cor. 15 and Rom. 5 require that Adam and Eve were real people living in a real past? John Stott certainly thought so: “The analogy is meaningless if Adam’s act of disobedience was not an event as historical as Christ’s act of obedience.” So does Tim Keller. Not everyone is convinced, however. NT scholar James Dunn, in his commentary on Romans, says:

…it would not be true to say that Paul’s theological point here depends on Adam being a ‘historical’ individual or on his disobedience being a historical event as such.... Indeed, if anything, we should say that the effect of the comparison between two epochal figures, Adam and Christ, is not so much to historicize the individual Adam as to bring out the more than individual significance of the historic Christ.

Dunn’s main point is that whatever else may be said about Adam as an historical person, in the NT, as in the OT, Adam plays a largely archetypal/representative role. Nevertheless, since the parallelisms in 1 Cor. 15 and Rom. 5 (and the genealogy in Luke 3) seem to prima facie assume a parallel between two historical people (Adam and Jesus), I will present scenarios below that seek to preserve the “event character” of Genesis.

SCIENCE AND HUMAN ORIGINS

We have a shared evolutionary history with other primates

What does science have to say about the human story? Modern Homo sapiens, their extinct forerunners, and the great apes are in the family Hominidae, or “hominids”. The line that leads to humans is usually called “hominins.” Based on genetics, the last common ancestor of chimpanzees, bonobos, and our lineage lived about 6 million years ago (mya). Several lines of evidence indicate our common ancestry:

1. Similarity of genetic elements. Depending on how one does the calculation (due to DNA duplications and rearrangements), the DNA of chimps is 95 to > 98% identical to our own.
2. The organization of chromosomes. The organization of unique genetic elements (known as synteny) is even more striking. Human chromosome 2 provides strong evidence that chimps and humans came from a common ancestor.
3. “Broken” and mobile genetic elements. Sometimes genes that were once functional in our distant ancestors develop mutations that render them non-functional (such genes are called “unitary pseudogenes”) or genetic information from viruses has inserted into our DNA in very specific locations. The details provide strong evidence for common ancestry.
4. Evolution of genes since the great ape and hominin lineages split: Genomic analysis also shows how we differ from the great apes, including genes that may influence brain development. These include the regulatory protein FoxP2, involved in speech, which shows changes specific to Homo sapiens. Other genetic changes show that humans have undergone significant brain evolution.
Our family tree is a “bushy” one with African origins.

Fossil finds are providing a remarkable window on human evolution (Figure 1 provides a brief sketch, which is being augmented by rapid discoveries). Several fossils provide candidates for organisms near the branch point between the great apes and hominins, including *Sahelanthropus tchadensis* (6-7 mya) and *Orrorin tugenensis* (approx. 6 mya). The Australopithecines are hominins who lived 4-2 mya. These include *Australopithecus anamensis* (approx. 4 mya), *A. afarensis* (3.85-2.95 mya), and *A. gardhi* (2.5 mya).

*A. afarensis* had an upright, bipedal anatomy, yet retained chimpanzee-like features. *A. afarensis* had a small brain case, typically less than 500 cubic centimeters, about 1/3 the size of a modern human. *A. afarensis* has been suggested as an ancestor to our own genus, *Homo*, which emerged in Africa. *Homo habilis* (literally “handyman” in Latin) lived 2.4-1.4 mya. *H. habilis* was short (3.5-4.5 ft) and retained ape-like traits, but had a somewhat larger brain, up to 680 cc. *H. habilis* remains are heavily associated with stone tools of the Mode I industry (also called Oldowan tools after the Olduvai Gorge; the earliest Mode I tools date slightly older than *H. habilis*). *Homo ergaster* (1.8 mya) was as tall as six feet and more like humans today. A closely related (or possibly the same) species, *Homo erectus*, spread...
over a large region of Africa and Asia, making it the first long-range migratory hominin. *H. erectus* also used a new type of tool (the Mode II or Acheulean technology). This upgraded industry requires advanced planning to manufacture, and so seems to suggest an increase in mental capacities.

*H. erectus* persisted longer than any other hominin species, but eventually went extinct throughout most of its range. *Homo heidelbergensis*, much more similar in appearance to people alive today, appeared in Africa about 700,000-600,000 years ago. *H. heidelbergensis* had a bigger brain (about 1200 cc), only 200 cc short of the average size of humans alive today. Eventually *H. heidelbergensis* migrated into Europe, the Middle East, and Central Asia. *H. heidelbergensis* (or the related *H. antecessor*) is thought to have given rise to three species: *Homo sapiens*, *Homo neanderthali*, and the Denisovans. The branch of the biological family tree that led to anatomically modern humans separated from that leading to Neanderthals and Denisovans about 750,000-550,000 years ago. Individuals with modern human skeletal anatomy were in place by about 200,000 years ago in Africa, with evidence of transitional forms even earlier (about 300,000 years ago) in Morocco and other places in Northern Africa.

Analysis of mitochondrial DNA and Y chromosomes along with whole genomes of humans alive today provided key initial insights regarding the human evolutionary story embedded in our genes. These studies point to the African origins of our species that accords well with the fossil data. These basic results have been dramatically refined and extended due to advances in our ability to isolate, sequence, and statistically analyze DNA from modern and ancient samples. The story shows that anatomically modern humans left Africa for Europe and Central Asia about 130,000-100,000 years ago. After a second wave of emigration about 50,000 years ago interbreeding of *H. sapiens* with Neanderthals and Denisovans occurred (in the latter case, possibly in two location/times). This interbreeding is retained in bits of the genetic endowments of various people outside of Africa today. By about 40,000 years ago *H. sapiens* was the lone surviving hominin.

Accelerated cultural development occurred after the rise of anatomically modern humans

The record of developments in tool technology correlates with the hominin fossil record, but the appearance of new tools sometimes shows a “lag phase”. A good example is the use of stone tools. Mode II tools invented during the heyday of *H. erectus* were used essentially unchanged until 160,000 years ago, when Neanderthals and early anatomically modern humans began using Mode III (Mousterian) tools. This suggests that anatomical and cultural innovations do not always coincide. What is clear is that there was an acceleration in cultural development beginning about 50,000 years ago, 150,000 years after the appearance of anatomically modern humans. Caves at the tip of Africa show local flowering of culture, including art and new stone tools, preceding a general spread of culture, such as the well-known cave paintings of Chauvet, France (approximately 40,000 years ago). When behaviorally modern humans acquired symbolic thinking, intentionality and syntactic language is hotly contested, in part because anatomical changes are not always decisive, and in part because we are limited to inferences based on the defects observed in modern human patients (e.g., mutations in *FoxP2*, mentioned earlier lead to language impairment).

Putting it all together: genomics and anthropology lead to a coherent story with caveats

Based on this whirlwind tour, we can conclude several things: first, the hominin family tree is a bushy one (Figure 1) that includes Neanderthals, and Denisovans, as well as some truly bizarre hominins, such as *Homo naledi*, and *Homo floresiensis*, the diminutive “hobbit” species. Second, several *Homo* species were living at the same time. Third, there is a gradual change in many physical features over 4 million years. This, combined with genomic analysis is all consistent with the evolution of the genus *Homo*.

What does this basic story require? This question is one Christians ask, because they have another source of information: special revelation, which they are often trying to bring into dialogue with scientific data. This question is very different from the one scientists usually ask: “What is the most straightforward interpretation of the genetic data?” To see how this plays out, consider one straightforward interpretation of the genetic data...
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(from mitochondrial DNA, Y chromosomes, and whole genome analyses). Scientists think it reasonable that the populations of hominins that led to modern people never dipped below a few thousand individuals. This is a sensible interpretation of much of the genetic data and has been summarized for Christian audiences by Dennis Venema. However, there are three caveats. First, while the details are very technical, some of the data underlying this conclusion have been challenged. For example, the particular genes used by Ayala and colleagues in their analysis (called major histocompatibility loci), as well as some of their methodology, have been called into question.

Second, the statistical analyses are usually performed with certain assumptions about the structure of the populations involved, and not a starting population of two. Is there a possibility of a population as small as two individuals in the past history of hominins? A different type of analysis is needed to test if such an extreme “genetic bottleneck” took place in the past or not. Based on a long, technical discussion between three Christian geneticists/computational biologists (Dennis Venema, Richard Buggs, and S. Joshua Swamidass), there is reason to believe that the methods cannot rule out a bottleneck of one male and one female hominin that would have occurred before 600-700,000 years ago and earlier than 7 mya. The recent end of this range is about the time when H. heidelbergensis (or perhaps H. antecessor) was alive. Note, however, that neither is there positive evidence for such a bottleneck, nor any obvious scientific explanation for why such a narrowing of the population would have occurred. The point here is only that current methodologies cannot rule this out. What these data do appear to rule out is a recent bottleneck of two individuals; the data seem to rule out a recent primal couple as the only genetic ancestors of all people alive today during the last few tens of thousands of years.

Third, genetics and genealogical science are not the same. Based on work by Joseph Chang and colleagues, nicely reviewed by population geneticist Graham Coop, genealogies are counterintuitive, as Joshua Swamidass has pointed out in detail in a recent paper on this topic. Genealogical science is counterintuitive in two ways. First, due to the shuffling of physical bits of DNA in the chromosomes of eggs and sperm in each generation, genealogical ancestors are often genetic “ghosts”: they leave no physical evidence of their ancestry in their descendants, especially many generations removed. In addition, we are all related genealogically. This leads to interesting discussions about our relation to royalty, but there is a more serious point as well: genealogy, combined with the extensive mixing of human populations revealed by paleogenomics, confirms the modern scientific notion that we are a single species.

FAITHFUL CHRISTIAN APPROACHES TO HUMAN ORIGINS

The Bible and science are key ingredients in any attempt at synthesis regarding human origins, but theology has arguably shaped the discussion even more. Science has limited utility in thinking about theologically relevant categories because its data are limited to the material world. Nevertheless, returning to Donald MacKay’s point, science can help us to avoid missteps and spur us to fruitfully reexamine our theology.

Augustine casts a long shadow over discussions of human origins

The long shadow that Augustine casts is a crucial backdrop for Evangelicals and conservative magisterial Protestants. There are many reliable guides to Augustine, but I will use a helpful distillation from Jesse Couehoven: (1) the source of original sin is a primal sin. (2) All human beings share in this sin because of our solidarity with Adam, the progenitor of the race. (3) From birth, all human beings have an inherited sin, which comes in two forms: imputed guilt, and a constitutional fault of disordered desire (which Augustine called concupiscence). Augustine speculates about how both sin and penalty are transmitted from generation to generation. In some of his writing concupiscence is famously connected to sexual intercourse. Since many modern “Augustinians” eschew imputation of original guilt, I will assume that this issue is separable from the rest of the core, leaving the key ideas of (1) accounting for primal sin; (2) solidarity with Adam and Eve; and (3) our congenital propensity to sin.

There are also a few surprises about Augustine: (1) Perhaps maddeningly, Augustine never really settled on a
theory of the generation of the soul. Augustine had no theory regarding how the primal sin occurred. He connects it to pride, but, given his views of the paradisaical state of Eden, originating sin remains extremely mysterious and unexplained in his system. (1) and (2) mean that Christians are free to adopt a range of approaches, nor do they need to explain sin’s origins any better than Augustine. (3) Augustine knew nothing about modern genetics. As we have already discussed, given the “genetic ghosting” that occurs over many generations, bits of nuclear DNA cannot act as if they carry some sort of “sin gene”. Notions that verge on talking about sin in this way are simply mistaken. We are therefore free to seek other mechanisms of corporate solidarity that lie outside genetic transmission. (4) Interestingly, Augustine held that Adam was mortal, but capable of immortality; his sin led to his physical death, similar to the suggestion made earlier in this essay and by Walton. This idea fits comfortably with Adam as a transformed, existing human (see below).

Two variations on Augustine’s approach are worth mentioning. First, in the medieval Catholic tradition, especially in Aquinas, Adam and Eve were able to live in a blessed state due to the *donum superadditum* (“superadded”, or preternatural gifts) by God’s grace. Original sin is then chiefly *privation of original justice*. When Adam and Eve disobeyed, grace was withdrawn, and subsequent generations persist in weakness and sin as a result. Original sin is “transmitted with human nature, by propagation, not by imitation”.

The second variant emphasizes federal headship (“federal” comes from Latin *foedus*, “head”). This idea is incipient in Calvin but extended by Scholastic Reformers such as Francis Turretin: “Adam was the germ, root and head of the human race, not only in a physical sense and seminally, but morally and in a representative sense. He entered into covenant for himself and his posterity.” Here Turretin mentions physical descent from Adam, but *theologically*, as he is followed by most Reformed theologians later, Adam functions as a representative. How his tragic sin is transmitted remains mysterious.

Models of human origins in the light of the Bible and science
What can we conclude from all of this? First, any model must affirm universal human sinfulness. Second, treating Adam and Eve primarily as archetypes or representatives is being faithful to the main thrust of Genesis and the Pauline corpus. Third, any model should take the scientific data seriously regarding humans as evolved creatures. Fourth, if a synthesis is to retain an Augustinian flavor, it will need to connect to a primal catastrophe involving humans at the “headwaters” (Bernard Ramm’s term), and will need to contend with how that catastrophe reverberates to all people. With these ideas in mind, let me propose some models that bring the science and the biblical witness into dialogue.

**Existential recapitulation model.** In this model the Genesis accounts are a universal story of human sinfulness. This approach takes deeply seriously the *existential* fact of universal human sinfulness but empties the Fall of historical content. This is the dominant model in liberal theological traditions, beginning with Schleiermacher (significantly, writing before Darwin), but including well-known existential theologians such as Kierkegaard, Tillich, and Reinhold Niebuhr as well as the Christocentric approaches of Karl Barth and Dietrich Bonhoeffer. How hominins came to be spiritually alive is considered impenetrable, or follows a gradualist line of argument: we will never know when humans became spiritually aware, but God does. Nor will we ever know how sin entered history (e.g., Barth’s “impossible possibility”). Without any event character, there is no originating original sin, and so there is a tendency to focus on the inevitability of sin. Friedrich Schleiermacher and contemporary theologians such as Margorie Hewitt Suchocki add in a strong acknowledgement of the corruptive effects of the human environment on each of us, which leads to this inevitability.

Anyone who has read Bonhoeffer cannot say that he underestimates human sinfulness! That such a faithful saint could adopt this view suggests that it is faithful to core Christian commitments. While this approach removes the possibility of conflict between the biblical and scientific accounts, the lack of an historical antecedent troubles many. One concern is a sense that the authority of the Bible is at stake. Another concern has to do with
theodicy. James K.A. Smith, commenting on Peter Enns’s work, say this:

… if we don’t have an account of the origin of sin we will end up making God the author of evil…Enns thinks he can save the Gospel by simply affirming universal human sinfulness without taking a stand on the origin of sin; but that is to fail to recognize that what’s at stake is the goodness of God. If God uses evolutionary processes to create the world and sin is inherent in those processes, then creation is synonymous with fall and God is made the author of sin. [italics his]

I think Smith speaks for many, so the remainder of the models mentioned here try to preserve the “event character” of a Fall in various ways. These are certainly not unique, and borrow heavily from the typologies of Denis Alexander, Loren Haarsma, and Greg Cootsona. One common challenge these models face is the nature of the imago Dei. If it is an impartation of something “value-added”, e.g. an immaterial spiritual essence, then each of these models faces the issues of God’s view of anatomically indistinguishable entities who nevertheless are not considered fully human. For many, such models are deeply troubling, because they appear to create a group that are, theologically, sub-human. And raise a nest of pragmatic issues, such as what the status of progeny of interbreeding between those with and without the imago.

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Just as I can go out on the streets of Cambridge today and have no idea just by looking at people, all of them members of the species Homo sapiens, which ones are spiritually alive, so there was no physical way of distinguishing between Adam and Eve and their contemporaries.

In this view there is a new “species”, but this is a spiritual, not biological reality.

(2) Protohistorical model. In this model, perhaps best situated in the period of the original evolution of our species in Africa or during the early explosive phase of cultural and linguistic development of modern humans, God revealed Himself – perhaps including through a theophany – to disclose His will, including the need for obedience. Through their disobedience, these humans fractured their relationship with God, and through the withdrawal of God’s sustaining grace, they became inextricably mired in communal and personal sin that was then transmitted to subsequent generations. Given that these events are not material, genetics and paleontology would be expected to be silent on how these events. This position is adopted by Robin Collins and Greg Cootsona has argued that this is C.S. Lewis’s view in The Problem of Pain:

For long centuries, God perfected the animal form which was to become the vehicle of humanity and the image of himself…we do not know how many of these creatures God made, nor how long they continued in the Paradisal state. But sooner or later they fell…. They wanted, as we say, to “call their souls their own.” But that means to live a lie, for our souls are not, in fact, our own.

How is sin transmitted in this model? Lewis was never clear, but it is not obvious that he is thinking of heredity transmission. Perhaps some sort of cultural transmission is in view, as has been discussed in detail in the light of recent research on cultural evolution by Benno Van den Toren and David Wilcox. This model is not historiographic in any way but does refer to events in a real past. It takes the archetypal functions of Adam and Eve seriously. A weakness of this model according to some (e.g., Alexander) is that it does not account for the Neolithic cultural referents in Gen. 4, but as pointed out earlier, it is not clear how much one should rely on the supposed cultural setting.

(3) Ancient representative-ancestor model. In this approach, Adam and Eve are shorthand for, or embedded in, a group of ancient humans who are representatives of or contain ancestors of all humanity. At a point when the human population was only a few thousand individuals, God specially selected a small group to receive special revelation. Although they potentially could have lived according to God’s expectations by His grace, they chose to sin in a concentrated event. Alternatively, the Genesis account may reflect compression of a more protracted process. Under common assumptions regarding population sizes of hominins in the past, they would not be the sole genetic progenitors of people today, but could have been among them. This seems to be the model envisioned, in various forms, by N.T. Wright and James K.A. Smith, as well as biologist Gary Fugle. Here is Wright’s version:
…just as God chose Israel from the rest of humankind for a special, strange, demanding vocation, so perhaps what Genesis is telling us is that God chose one pair from the rest of early hominids for a special, strange, demanding vocation. This pair (call them Adam and Eve if you like) were to be the representatives of the whole human race… eventually colonizing the whole creation… God the Creator put into their hands the fragile task of being his image-bearers. If they failed, they would bring the whole purpose for the wider creation, including all those other nonchosen hominids, down with them. They were supposed to be the life-bringers, and if they failed in their task, the death that was already endemic in the world as it was would engulf them as well.

Wright takes the archetypal connection to Israel and the elected role of Adam and Eve seriously. Wright construes the imago in a representational way, so there does not appear to be an “ontological additive” in his model. Smith adds some additional elements to this basic scenario. Note that if there is an ontological conferral, then this model has the problem noted above regarding theologically “human” and theological “non-human” individuals side-by-side. One mechanism whereby this problem could be avoided is through a “joint conferral” mechanism of Derek Kidner (see below).

A variation of this model has been put forward by some Roman Catholic thinkers, in alignment with official Catholic teaching. In this model an original couple are in essence ancestors of the entire human race, although some allow for a group of contemporaries with the chance for interbreeding. Ann Gauger would place this progenitor within the Homo erectus line; Vincent Torley sides with H. heidelbergensis. Nicanor Austriaco suggests a later date: perhaps a small number of individuals acquired mutations that allowed for the development of the first symbolic thinking/language, leading to in effect a new species, which would have undergone disproportionately rapid spread. Some propose a spiritual transformation to create in effect a new, spiritualized species, which would then have outcompeted contemporaries by propagation. Given that this subspecies of the ancient ancestor model involves a non-material essence, it has the advantage that “propagation” involves bodies, but does not follow the same rules of genetic “dilution” that physical propagation models suffer from.

(4) Recent, elected representative model. According to this model, God chose a Neolithic couple in the Near East 8,000-40,000 years ago (or perhaps a small community), to whom He revealed himself in a special way. This model assumes Adam and Eve are representatives because, as we have seen, the data does not fit the possibility that they are the sole genetic progenitors of all people today. This pair was selected to act as representatives/priests (but not ancestors) for all human beings, but they disobeyed God and fell into sin. Because they sinned as representatives of all humanity (or because they failed in their special mission) the opportunity for special fellowship with and grace from God was forfeited, consigning all of humanity to sin.

John Stott, who favored a model of this sort, referred to this first couple or community as “Homo divinus”, the first divine humans. Homo divinus were the first humans who were truly spiritually alive in fellowship with God.

This model fits the prima facie context of Gen. 4, but, as we saw earlier, other ways of construing the apparent context are possible. This model also fits the genealogical data in the Bible. As most often presented, this model focuses on the representative nature of Adam as the federal head of the whole of humanity alive at that time. It is worth noting that the federal headship model is not free of problems, even if one is not trying to bring it into dialogue with evolutionary biology. Although not an insurmountable obstacle, a key issue is justice: is it fair for me to be punished for the disobedience of another?

This model raises another question: there were likely thousands of biologically and culturally modern Homo sapiens alive at the time Adam and Eve were elected. What of them? Derek Kidner makes an interesting suggestion, picked up by Tim Keller. He suggests that at the time spiritual life was breathed into Adam, God may have now conferred his image on Adam’s collaterals, to bring them into the same realm of being. Adam’s “federal” headship of humanity extended, if that was the case, outwards to his contemporaries as well as onwards to his offspring, and his disobedience disinherited both alike.
This is of course nowhere in Genesis itself but is consistent with it.

There are other questions in this model, such as the eternal destiny of those who lived before Adam and Eve. Like so many other issues in this discussion, there is mystery, which presumably resides in the mind of God. Fortunately, we can affirm with the Psalmist that “the LORD abides forever; He has established His throne for judgment, and He will judge the world in righteousness; He will execute judgment for the peoples with equity.” (Psalm 9:7-8)

5) Genealogical ancestor models. These models are based on science described in detail by Joshua Swamidass, propose that Adam and Eve are genealogical - not genetic - ancestors of all of us. These models can be applied to a recent Adam and Eve, since even a Neolithic Adam and Eve are capable of being genealogical ancestors of all living people. In these models the events of the Fall apply to a special pair of (presumably modern) humans who are genealogically related to people alive today.

These models have the advantage of capturing a non-modern notion of lineal relatedness – genealogy – rather than importing a concept foreign to the biblical writers (genetics). As Swamidass has pointed out, miraculous creation cannot be detected by genetic science, so these models allow for genealogical descent from a de novo couple. A key attraction of these models is that they provide a means to read the text in a “literal” fashion without creating a conflict with genetics. This may appeal to some based on their hermeneutical precommitments.

Swamidass’s main point was scientific; while he himself does not state whether he holds to a de novo model, he is at pains to point out what the science allows. Additional work will be required to work out theological implications of genealogical ancestor models. There are several potential entailments of these models. First, in order to comport with genomic and other evidence for common descent, models involving recent genealogical ancestry presume that there were people “outside the garden”, i.e., biologically compatible beings capable of interbreeding with Adam and Eve’s descendants. This may lessen these models’ appeal for those for whom it is crucial that there be a “one-and-only-one” pair of biological progenitors of modern humans. Second, since genealogical ancestors rarely pass on actual genetic information to their descendants, if one conceives of transmission of sin along essentially physical lines it is unclear that there is mechanistic value added compared to option (4). Genealogical transmission may, however, be useful under dualist ontologies. Finally, for those who favor a model involving a recent de novo created pair, it is unclear why God would choose to supernaturally create two humans who are essentially identical biologically to those who already exist, and who do not obviously leave a trace, when he could imbue existing humans with a spiritual nature or reveal Himself to them to initiate a new relationship, as in models (3) and (4).

THEOLOGICAL OPPORTUNITIES IN THE SCIENTIFIC STORY OF HUMAN ORIGINS

In closing, let me suggest one way in which science can help theology. The evidence is overwhelming to most scientists that God has used evolutionary processes as a key brush as He has painted the sweeping canvas of creation. While there are disagreements about detectability of population bottlenecks and the like, there is no disagreement that humans reflect a long evolutionary history. How can this actually help stimulate creative theology? Let me suggest that science can explore material mechanisms as adjuncts to theological formulations. While the thrust of the biblical message relating to the imago Dei seems to reflect functional, relational, and electoral roles for humans as image bearers, Alan Torrance and others have pointed out that it is reasonable to ask what species-level capacities are concomitant with image-bearing. Although there are problems with scientific identification of criteria that absolutely cannot be found in incipient form in advanced animals (e.g., tool use, sophisticated communication, cooperation, rudimentary self-awareness, morality) humans are clearly quantitatively exceptional in many categories, including symbolic thinking, the nature of all extant human languages, predisposition to religious thinking, and what Michael Tomasello has termed “joint” and “collective intentionality.” Elaborating those exceptionalisms may lead to creative synergies that do not overinterpret the
scientific data but nevertheless leverage it to illumine or theologically unique position as the “image” (בְּצֶלַם) and “likeness” (יוֹרָדָה) of our Creator (Gen. 1:26).

CONCLUSIONS

Augustine certainly casts a long shadow over many of the issues discussed in this paper. He also provides important guidance regarding being tentative as we build models:

In matters that are obscure and far beyond our vision, even in such as we may find treated in Holy Scripture, different interpretations are sometimes possible without prejudice to the faith we have received. In such a case, we should not rush in headlong and so firmly take our stand on one side that, if further progress in the search of truth justly undermines this position, we too fall with it.140

None of the models discussed in this paper are without challenges. One piece of good news about the Good News, is, of course, that “God’s foolishness is wiser than human wisdom, and God’s weakness is stronger than human strength.” (1 Cor. 1:25, NRSV) Elaborating models that retain faithfulness to the core biblical message and to the witness of God’s creation will require wisdom that only God can provide.

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Notes


3 So Lucas et al, 2016; Walton, Lost World of Adam and Eve, pp. 58ff. The NIV in 2:19, which rules out a sequel and seems to enforce an interpretation of recursion. Note that the NIV is contra many other English translations (e.g., NASB, ESV, NRSV, etc.).

4 John Walton has suggested the further possibility that Genesis 1 could refer to not just the single couple referred to in Genesis 2, but other humans. See Walton, The Lost World of Adam and Eve, pp.63ff.

5 A few have placed a significant temporal gap prior to the events of Chapter 4. Davis, J.J. “Genesis, Inerrancy, and the Antiquity of Man”. In Nicole, R.R. and Michaels, J.R., eds. Inerrancy and Common Sense. Grand Rapids: Baker, pp. 137-159; this idea is also cited in Blocher, Original Sin, p. 40. Space does not permit here, but these ideas may be worth exploring.


8 e.g., Hess (1995).

9 See the now classic treatment in Middleton, Liberating Image.

10 Walton, John H. The Lost World of Adam and Eve, p. 89.


12 Walton, John H. Lost World of Adam and Eve, p. 55.

13 Alexander, Creation or Evolution, ch. 11 contains a detailed discussion of this point. See also Walton, Lost World of Adam and Eve, proposition 5. Psalm 104 shows evidence that predation or death is not “good”.

14 There are clearly many elements of this and the next chapter of Genesis that suggest figurative and evocative language. For example, Gordon Wenham has pointed out the “garden in the east” may evoke temple language. Genesis, p. 61.

15 As evidenced by the varying use of “the man” vs. the proper name “Adam” in the LXX at 2:16, KJV/NASB/ESV at 2:20; TEV at 3:20; NEB at 3:21, NRSV not until 4:25. See esp. the table in Walton, Lost World of Adam and Eve, p. 61.

16 Ron Cole-Turner has recently enumerated a ten-fold typology of image bearing. Clearly this discussion will not exhaust that richness! Cole-Turner, R. The End of Adam and Eve, Ch. 9.


18 Bimson, J.J. “Doctrines of the Fall and Sin after Darwin.” In Northcott, M.S. and Berry, R.J., eds. Theology After Darwin.


20 The Creation Project’s Sapientia website has an interesting panel discussion about the mortality of Adam and Eve: https://henrycenter.tiu.edu/2018/05/the-enigma-of-death/


22 Collins, J. Did Adam and Eve Really Exist? Who They were and Why You Should Care. Wheaton, IL: Crossway,(2011) p. 112ff.

23 Bimson, J.J. “Doctrines of the Fall and Sin after Darwin.”


27 Augustine, working with the Old Latin text of Romans 5:12 ("sin came into the world through one man, and death came through sin, and so death spread to all, in whom all have sinned.") took Adam to be the one in whom all have sinned. In fact, as most modern translations based on the Greek read, “death spread to all because all have sinned” (NRSV), shifting the meaning towards individual responsibility for sin.

28 Lucas et al (2016); also Alexander, Creation or Evolution, who opt for this view.

29 Harris, Mark. The Nature of Creation (Acumen, 2013).


31 See below for discussion of the Old Latin translation of v. 12 that influenced Augustine.


33 “[Paul] most definitely wanted to teach us that Adam and Eve were real historical figures. If Adam doesn’t exist, Paul’s whole argument—that both sin and grace work ‘covenantly’—falls apart. You can’t say that ‘Paul was a man of his time’ but we can accept his basic teaching about Adam. If you don’t believe what he believes about Adam, you are denying the core of Paul’s teaching.” Keller, T. “Creation, Evolution, and Christian Laypeople” (BioLogos white paper): “https://biologos.org/uploads/projects/Keller_white_paper.pdf”

34 e.g., Peter Enns, who views Adam as an ahistorical type of Israel, views Paul’s thinking as culturally embedded but mistaken. See Enns, P. The Evolution of Adam, Grand Rapids, MI: Brazos Press (2012), ch. 6. I do not personally share Enns’s view.


*H. erectus* may have persisted quite late in parts of Asia.

*Homo antecessor* (see Figure 1) may have preceded *H. heidelbergensis*, but fossil evidence is currently scant.


Rather than cite all of the papers from the Reich and Pääbo groups, readers are urged to consult Reich, *Who We Are*, ch. 1-4 for a review.


Alexander, D. *Creation of Evolution?*, pp. 271-279.


Venema and McKnight, *Adam and the Genome*.


Buggs’s original query about previous analysis is here: “Adam and Eve: a tested hypothesis?” https://naturecoevocommunity.nature.com/users/24561-richard-uggs/posts/22075-adam-and-eve-a-tested-hypothesis

The most important results and explanation by Josh Swamidass are here: “Heliocentric certainty against a bottleneck of two”. https://discourse.peacefulscience.org/t/heliocentric-certainty-against-a-bottleneck-of-two/61; Buggs’s conclusion to the
This page contains a discussion on the concept of original sin, its development, and its implications in theological and biological contexts. It references several authors and works, including Karl Barth, Charles Hodge, Augustus Strong, and William Shedd, among others. The text also touches on the idea of human nature and the consequences of sin, as well as the role of grace in redemption. It integrates insights from biology, such as the recent common ancestry of all living humans, and uses these to frame the theological discussion.
In light of genre considerations and ANE parallels, some interpreters with warm Christian sensibilities, such as Denis Lamoureux, feel that the approach that takes the Genesis narrative most seriously leads then to read Genesis 1-11 as ahistorical. Importantly, this is a hermeneutical conclusion irrespective of any synthesis with science. See, for example Lamoureux, D. Evolutionary Creation; Enns, P. The Evolution of Adam.


Alexander, D. Creation of Evolution,


Cootsona, G. More Science and Christian Faith, ch. 5

Davis Young raises just this issue. Young, D. Ancient Alexander, Creation or Evolution, p. 291.


Alexander, Creation or Evolution?

I am indebted to Loren Haarsma for this intentional ambiguous wording that captures the “two among a group” aspect of this and the next model.


Fugle, G. Laying Down Arms to Heal the Creation-Evolution Divide. Eugene, OR: Wipf & Stock, pp. 252-253. Fugle suggests tow possibilities; the first is similar to a single genetic progenitor model: “Adam was singly taken aside by God from physically evolved humans and the image was divinely imparted to him.” Fugle recognizes problems vis-à-vis the genetic data, and suggests a second model, whereby God “revealed himself in a special way to two individuals or a group of humans and this knowledge of God spread outward to other people who would hear.”

Walton, J. The Lost World of Adam and Eve, pp. 177-178.

Smith, J.A.K. “What Stands on the Fall”. Smith combines Augustinian themes with some influences from Irenaeus and medieval Catholicism. These details are interesting and, were space not at issues, well worth unpacking in detail.


In particular, Pius XII in Humani generis (section 37): “When, however, there is question of another conjectural opinion, namely polygenism, the children of the Church by no means enjoy such liberty. For the faithful cannot embrace that opinion which maintains that either after Adam there existed on this earth true men who did not take their origin through natural generation from him as from the first parent of all, or that Adam represents a certain number of first parents.”


Torley, V. “Who was Adam and when did he live? Twelve theses and a caveat” https://uncommondescent.com/intelligent-design/who-was-adam-and-when-did-he-live-twelve-theses-and-a-caveat/


Austriaco argues that the new species would have, in the Aristotelian/Thomistic sense, a new essence. Ibid.


One challenge here is that most Catholics are creationists with regard to the soul, i.e., souls are de novo creations joined to bodies by God. It is not clear how the effects of sin are transmitted if the operative aspect is immaterial and an immediate creation of God. Traducianism seems to be a better fit in this regard, but faces other challenges. See Crisp (2006).

Stott, J.R.W. Understanding the Bible, p. 55.

So Kidner, Genesis; Alexander, Creation or Evolution; Fugle, Laying Down Arms.

See McFarland, “In Adam’s Fall” and Crisp (2006) for further discussion of the difficulties. The latter uses 19th American Reformed theologians as a case study. They are by no means insurmountable, but often the issues are underappreciated.

Kidner, Genesis, pp. 30-31.

Keller, T. “Creation, Evolution and Christian Lay People”


Swamidass, J. (2018). See the discussion earlier related to traducianism vs. creationism of the soul.


See, for example, the extensive data at the Matrix of Comparative Anthropogeny (MOCA) at the Univ. of California San Diego: https://carta.anthropogeny.org/moca


Augustine, *De Genesi ad litteram*, i.18: