Genesis 1–3 as a Resource for Twenty-First Century Faith

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Abstract: Centuries of pre-scientific tradition underlie the widespread modern misunderstanding of the Book of Genesis. But, in fact, it is full of sharply relevant wisdom for the here and now. We can find real inspiration when we read it with attention to the original cosmological environment of Genesis 1, which supports the idea that it is not a prehistoric account of the origins of the universe, but the text of a six-day festival celebrating the inauguration of the cosmos as a fit and functional home for humanity. Likewise, a contemporary reinterpretation of the Eden story of Genesis 2–3 in terms of the origins, anatomy, and functions of the human brain can undo millennia of guilt and grief imposed by the idea of original sin. In this light, a serious, respectful, and integrated approach to Genesis based on the best of biblical scholarship and of modern neurobiology can reassure us that the widely assumed warfare between science and religion was never necessary in the first place. Rather, a deeply informed biblical faith can inspire us with new confidence in God and in our own human nature.

Keywords: ancient cosmology; six-day creation; Eden myth; science and religion; contemporary faith

It could be argued that centuries of misunderstanding of the Old Testament is the single most significant cause of the supposed warfare between science and religion. The long-standing warfare image is aggravated by the way that the most strident voices from either party rarely

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admit their mutual lack of training in the sophisticated philosophy and serious literature underlying their opponents' position, so neither can see how far each so dangerously underestimates the other. The primary message of this paper is that ancient and contemporary knowledge are better read as cooperating in advancing our understanding of ourselves. This is news that we must break to our contemporaries, especially to students.

Nothing inflames the conflict faster than derogatory criticism of real science by religious believers steeped only in naïve misreadings of the Book of Genesis,[1] opposed by arrogant rejection of all forms of faith from scientists with no knowledge of biblical scholarship.[2] Both sides depend on arguments based on simple, oft-repeated errors of fact, logic, and interpretation, and of basic scholarship. In turn, careful attention to the real bases of both disciplines shows that nearly all apparent contradictions are illusionary.

The Book of Genesis was not written as a single narrative. During its most formative centuries, its content had never been written down at all. It is the product of long, slow years of development of ancient oral traditions dating back to at least 1200–1000 BCE, through multiple generations of people who could not read or write but had phenomenal memories. So the text as we have it is a composite of independent oral and written traditions and complementary points of view.[3] The two creation stories preserved in the Book of Genesis have very different histories and backgrounds. That means that they must be read and understood differently.

1 R. L. Numbers, *The Creationists: The Evolution of Scientific Creationism* (Berkeley: University of California Press, 1992) provides a comprehensive history of creationism. J. C. Sanford, *Genetic Entropy & the Mystery of the Genome* (New York: FMS Publications, 2008) updates creationist views on advances in genetics.

2 R. Dawkins, *The God Delusion* (London: Bantam Press, 2006). C. Hitchens, *God Is Not Great: The Case against Religion* (USA: Hachette Book Group, 2007).

3 K. Armstrong, *A History of God: The 4,000 Year Quest of Judaism, Christianity, and Islam* (London: William Heinemann, 1993).

Genesis 2–3

The oldest written version of the oral tradition, dating to 950–850 BCE, is preserved in Genesis 2–11. This is the Primeval History of all humankind, concerned with all peoples because it long antedated the development of nations, and it describes the creation of the first humans, the Flood, and the new beginning after the Flood. To understand it, we must step into the worldview of the people of that time, not impose ours on them.[4]

The story of the Garden of Eden is a myth in the proper sense, that is, a story about human origins that is not itself literally true, but has significant truth in it. By updating the metaphorical images it uses, and expressing them in terms compatible with contemporary research, the traditional story can still be understood to have important things to say about modern human nature. One of the most profound of such insights concerns ancient ideas about how we make decisions, and especially about the origins of human social behaviour.

The Social Nature of Humanity

Anthropology has amply confirmed that human social behaviour has evolved in gradual stages from our primate ancestors.[5] For thinking people, whether religious or not, this is no longer a contentious issue, but the technical definition of humanity remains difficult, since human characteristics appeared slowly and over a succession of descendent species. The scientific story started with the origins of the earliest sociable anthropoids (the monkey/ape lineage) about 35 million years ago. The separation of the human lineage from the apes was complete by about 5 million years ago; the development of agriculture, the end of purely genetically based evolution, and the rise in influence of cultural traditions began between about 30,000 and 10,000 years ago.

4 J. H. Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate* (Downers Grove, IL: InterVarsity Press, 2009).

5 J. K. McKee, F. E. Poirier, and W. S. McGraw, *Understanding Human Evolution*, 5th edn (Routledge, 2004).

Sociality always has been and still is as much a part of the definition of being human as is bipedal gait and a large brain, and it preceded both those characteristics by many millions of years. Not all primates are sociable, of course, but it is virtually certain that all species of humans and of their immediate ancestors, the australopithecines, always have been. Therefore, the philosopher Hobbes' assumption, that people are independent human egoists who make solitary decisions about social life, was simply wrong; the world never was full of independent human egoists. For the whole of the 4-5 million years or so that hominids have been evolving, and for some 30 million years before that during which the anthropoid ancestors of the human line were evolving, there has been no such thing as a solitary independent individual, except maybe a dead one. The idea that "the sheer dangers of anarchy had forced beings who were natural solitaries to make a reluctant bargain"[6] is based on a series of spectacular misunderstandings of the lives, minds, and social relationships of our human ancestors and of the sociable primates that preceded them.

Any characteristic which, like sociality, has been ingrained in our nature fully as deeply and for much longer than our large brains must exert a powerful influence over our lives. Morality is a key part of the problem of understanding human relationships, and sociality is necessarily linked to morality and to its opposite, the idea of sin. If we wish to understand the processes that have for millennia shaped the human mind and spirit, expressed in the conflicts arising within and between our social groups, we must first understand the processes that shaped the human species. As Mary Midgley puts it:

> Once we accept our evolutionary history as a general background, it is quite natural and proper to use it in explaining many elements of human life. If we shut morality off from that explanatory pattern of thought, we tend to make its relation to the rest of human life unintelligible, which cannot be an advantage.[7]

6 M. Midgley, *The Ethical Primate: Humans, Freedom and Morality* (London: Routledge, 1994), 110.

7 Midgley, *The Ethical Primate*, 14.

Of course, that is not to say that what is natural is necessarily good. There is no need to adopt the ruthless values of natural selection as our own. But if we decide to develop values that are different from those favoured in our ancestors by natural selection, or we wish to change some disconcertingly stubborn parts of our nature, we need to know what we're up against.[8] The advance of medical science has offered solutions to many old questions about how our minds work, although the details are perpetually controversial.[9]

Mind and Brain

First, there is a difference between mind and brain. Although our mind is located in parts of our brain, the brain itself is only a physical organ, whereas the mind is a coordinated set of thinking faculties and reasoning processes including consciousness, imagination, perception, thinking, judgement, language, memory, and emotions. Brain and mind are connected through neural pathways transmitting signals controlling our everyday functions, from breathing, digestion, and pain sensations to movement, thinking, and feeling, and the making of moral judgements.

Evolutionary psychology recognises morality as a product of natural selection, just as is any physical feature. Wright points out that the similarity in physique that makes every page of *Gray's Anatomy* applicable to all humans of all races applies also to their mental architecture—the basic structure of the human mind is species-typical. It is therefore reasonable to speak of "the psychic unity of humankind."[10]

Second, we can now understand the complex structure and long evolution of our physical brains. Far from being a simple box into which teachers can dump information, the human brain is a complicated structure of three main parts, each of which has a different history and set of functions. Only when we appreciate how differently these

8 R. Wright, *The Moral Animal* (New York: Random House, 1994), 31.
9 Rather than trying to cite any particular source for this statement, a simple internet search will reveal some of the many ideas under current discussion.
10 Wright, *The Moral Animal*, 26.

three parts develop, operate, and interact with each other, can we begin to understand how our mind works. More importantly, we can see how that understanding can underpin many of our most ancient perceptions of ourselves, and our internal dilemmas and moral conflicts.

The Snake in Our Heads

The brain comprises three distinct parts, with different evolutionary origins and contemporary functions. Understanding how this complex structure evolved, how its apparently independent parts work together so perfectly, and the implications of this seamless integration for religious belief, can suggest a new set of contemporary metaphors that revolutionise traditional interpretations of Genesis 2–3.[11] Like all metaphors, this one has its limitations, but it is certainly a clear example of the huge significance of intimate communication between three parts comprising one holistic body. This is not a new idea for Christians. Augustine taught that humanity is created, not merely in the image of God, but in the image of the Trinity. So, by the grace of God, we can humbly model the Trinity in our own experience of the three components of our brain as different but loving and completely interdependent parts of our own minds.

The Hindbrain

This is the most ancient component of the brain, lying tucked underneath the main structure, where the top of the spinal cord reaches the base of the brain proper. It controls all our unconscious processes, like breathing, digestion, balance, sleep cycles, visual processing, heart, and circulation. All our most powerful and ancient urges, long needed to satisfy our ancestors' needs for food, sex, and flight from danger, start from here. The very same structures can be found throughout our lineage, dating back to the earliest vertebrates of 450 million years ago.

11 M. Dowd, *Thank God for Evolution: How the Marriage of Science and Religion Will Transform Your Life and Our World* (New York: Viking, 2008), 149.

The genes controlling these processes have been copied down the generations through all our ancestral forms, from before the armoured fishes of the Palaeozoic,[12] through the earliest tetrapods (four-legged animals) to all the reptiles from the Mesozoic to the present. Mutations in genes managing such basic and indispensable functions were instantly fatal, which is why we have inherited them largely unchanged. They comprise the reptilian ancestry of many lower (i.e., automatic) functions of the brains of all later vertebrates, right down to people. The genes that make the scales that clothe the legs of living birds are probably much the same as those that did the same for their reptilian forebears.

The idea of such long-term constancy seems far-fetched, but in fact Nature is very conservative, and seldom invents a new process if a slightly modified old one still works. In human engineering we say "don't reinvent the wheel." Proof of it as applied to our own brains can be demonstrated from Shubin's eloquent account of the way the origins of the first ten cranial nerves that emerge from underneath the brains of sharks and dogfish, and run to the nose, eyes, ears, jaws, etc. are still exactly the same in number, origin and function in humans, although their pathways are substantially rearranged to fit in our differently shaped skull. People who still get hung up on the idea of humans being related to apes have no idea of how far they have underestimated the length of the real and much more wonderful story of our emergence from the lower animals.

The hindbrain is the origin of all our unconscious preferences to "Look after Number One"—our preprogrammed tendency to self-preservation, which conflicts with much of what our conscious education commands us to do. The feeling is well known to anyone seriously attempting to obey our higher moral imperatives. St Paul's oft-cited complaint hit the nail right on the head: "When I want to do the right, only the wrong is in my reach … there is in my bodily members a different law, fighting against the law that my reason approves" (Rom 7:21–

12 N. Shubin, *Your Inner Fish: A Journey into the 3.5 Billion-Year History of the Human Body* (New York: Pantheon, 2008).

24). Paul could hardly have written a better description of the inner conflicts generated by the activities of the hindbrain if he had been schooled in medical science.

The Midbrain

Standard anatomical texts illustrate the position of the midbrain, buried in the middle of the cranial mass, above the top of the spinal cord and the hindbrain and below the forebrain, which lies on top of both. It is the seat of the limbic system, which includes several important glands which produce the hormones that race around the body in the bloodstream. They coordinate information from the senses and the muscles, and control many vital bodily functions.

The limbic system is among the products of the later evolutionary heritage of humankind. Reptiles don't have a limbic system, but all mammals do. The limbic system is important because it amplifies the unconscious signals from the hindbrain. It produces a great range of conscious emotions during waking and dreams during sleep, by adding feelings to basic urges, especially the need to find sexual contacts and compete with others for social status.

Feelings of love, fear, racial hatred, sexual jealousy, and many more that profoundly influence our daily decisions, are common to all people. The problem is that some of these run counter to moral wisdom. That introduces severe personal conflicts, because overruling our deep-seated natural emotions is never easy. Freud knew that well enough, but he was wrong in his speculations that "primitive man was better off knowing no restrictions of instinct." As Wright points out,[13] this is a mere legend. It has been a long, long time since any "primitive man" could enjoy "no restrictions" on these "instincts." Repression and the unconscious are the products of evolution too, and were well developed long before civilisation further complicated human mental life.

During the long Mesozoic period, when the daylight hours were dominated by predatory reptiles, the members of the early mammal

13 Wright, *The Moral Animal*, 323.

lineages kept out of their way by adapting to life as small secretive animals active mainly at night. They swapped the keen colour vision they had inherited from fish, their last common ancestors with reptiles, for characteristics more suited to nocturnal life, such as acute hearing, warm blood, and fur. Humans have more recently recovered the advantages of colour vision, but still share the additional features, such as night vision, good hearing, and strong emotions with other mammals, such as dogs.

The Forebrain

The well-known curly cover wrapped right across the top of the total structure, the forebrain or neocortex, is by far the largest part of the human brain. It has developed so strongly in us that it has changed the shape of our skull, adding a large rounded lump on the top. It is the seat of consciousness, language, and thinking, and its job is to weigh up the information coming from the lower centres, analyse options, and make rational decisions between conflicting stimuli. It is aware of the irrational *biological* urges sent up powerfully from the hind- and midbrain, but cannot totally silence them. It is never immune to thoughts such as ("aaaaah, that is an attractive body, I *want* to get close to it") versus the rational, *social* imperatives and options-weighing facility stored in the neocortex ("impossible, the boss is watching"). Multiple recent studies in primatology show that we share this capacity with our closest mammalian cousins, the primates.

The frontal lobes of the forebrain are the location of the human capacity to develop a higher purpose. This part of our brain is unique to humans. From here we can survey the human endeavour in its broadest terms, and perceive the significance of matters beyond our individual interests. Here is where we decide on, or avoid, the self-discipline needed to commit ourselves to purposes other than our own. Here, if anywhere, we learn to control our inner conflicts of interests and practice the virtues of moral choices and community engagement. As Michael Dowd points out,

> Understanding the unwanted drives within us as having served our ancestors for millions of years is far more empowering than imagining that we are the way we are because of inner demons, or because the world's first woman and man ate a forbidden apple a few thousand years ago. The path to freedom lies in appreciating one's instincts, while taking steps to channel these powerful energies in ways that will serve our higher purpose.[14]

The Origins of Moral Dilemmas

These inevitable inner conflicts are the stuff of all our experiences of interpersonal dilemmas. Most importantly, they are not the result of anything that might or might not have happened in some hypothetical garden during the Iron Age, but of the structure of our brains evolved over millions of years of vertebrate evolution. The ancient concept of original sin has value in identifying our inner predisposition to self-centred actions, but the conclusion that any human ancestors were responsible has not.

Augustine's proposal that human nature is fatally flawed, together with the related idea that sole power of forgiveness should be reserved to the institutional church of the west, was based on politics, not theology. According to theologian Elaine Pagels, one of several reasons why Augustine's theory of the Fall eventually triumphed was that it made palatable the uneasy alliance between the Catholic church and Roman imperial power.[15] Augustine had many opponents, but his theory had a vital competitive edge at a time when the most pressing question was the urgent need to make sense out of the new interdependence of church and state.[16]

The Roman Catholic theology of the Fall is not only contradictory to human nature, it is also completely at odds with both earlier rabbinic and with later Eastern Orthodox traditions. Nevertheless, it was followed throughout the western world until the Enlightenment made

14 Dowd, *Thank God for Evolution*, 162.
15 E. Pagels, *Adam, Eve, and the Serpent* (London: Penguin, 1988), 126.
16 A. Kee, *Constantine versus Christ: The Triumph of Ideology* (London: SCM Press, 1982).

the collision with Augustine's teaching a central, tragic plank of the unnecessary war between science and religion. It has taken centuries of trying and rejecting alternative interpretations to reach the one that seems rational to us today. As Polkinghorne explains, we live in "an evolutionary world to be understood theologically as a world allowed by the Creator to make itself … The picture is of a world endowed with fruitfulness, guided by its Creator, but allowed an ability to realise its fruitfulness in its own particular ways."[17]

The Evolution of the Human Brain

The question arises, why is our brain constructed in this complicated form? The answer can be best illustrated by revisiting the ancient advice against reinventing the wheel. A wheel is a modular unit first invented in ancient times to reduce the effort needed to drag a heavy load along the ground. Its capacity to minimise friction was later used in hundreds of other contexts, from chariots to wrist watches. The early lorries added a new idea, an engine, to better advance the capacity of load-bearing vehicles.

The same idea explains the origins of the human brain. The ancient anatomists recognised the three-part structure, with the whole gradually becoming larger in the higher animals, but they believed all creatures were created separately. So animals from fish to humans were arranged in a natural scale of independent rungs on a ladder from simple to complex, with later abilities eclipsing earlier ones. Now we can agree that the brains of all creatures have the same three parts going right back to the early fish, 450 million years ago, where the earliest versions of three parts are visible as modest bumps at the head end of the spinal cord.

The three parts had the great advantage of being modular units, that is, capable of being added to and modified in the course of evolutionary history. The hindbrain's job has not changed much since it

17 J. Polkinghorne, *Quarks, Chaos and Christianity: Questions in Science and Religion* (London: Triangle SPCK, 1994), 42–43.

was inherited by the early reptiles in the Mesozoic era, which started about 250 million years ago. Its integrated control of basic metabolic functions, plus some reptile-specific additions, has simply been copied down every generation en bloc, which is why we can describe our hindbrain as our legacy from the reptiles. Any modern textbook of evolutionary zoology will include diagrams illustrating the long process of development, deduced from the fossil record.

In the early mammals, starting in about 160 million years ago, the midbrain developed emotional capacities not known to reptiles, and they became added to our lineage. In time, the early hominids of about 2 million years ago inherited all that their ancestors had had, and also hugely expanded the neocortex. Finally, the first true humans refined the frontal lobes, the thinking part that makes us truly human, along with the origin of language only about 200,000 years ago.[18]

Over the last couple of hundred years we have learned much more about our ancestry from palaeontology, anatomy, neurophysiology, and genetics. The story becomes more comprehensive, and yet more marvellous, with every new discovery.

The Origins of Morality

Contrary to earlier assumptions, morality is far from being a cultural imposition unique to humans, although in us the cultural dimension is dominant. There is a substantial case for the view that evolutionary processes be accepted as part of any contemporary theory of morality.

> Moral reasoning is done by us, not by natural selection. But at the same time … human morality cannot be infinitely flexible … Natural tendencies may not amount to moral imperatives, but they do figure in our decision-making.[19]

18 R. Byrne, *The Thinking Ape: Evolutionary Origins of Intelligence* (Oxford University Press, 1995), 162.

19 F. van de Waal, *Good Natured: The Origins of Right and Wrong in Humans and Other Animals* (Cambridge, MA: Harvard University Press, 1996), 39.

All the same, the apparently counter-intuitive transition from animal-level evolutionary egoism ("Look after Number One") to true human ethics still requires explanation.

The most likely explanation of the development of true ethics is that this is another example of the way natural selection can modify a character evolved for one purpose and adapt it to serve another. Whales' flippers and bats' wings are analogous with reptilian feet, and mammalian ear bones are derived from fish jaw bones, simply because evolution is a cumulative process, and the material available for new forms is determined by what has survived from previous forms. Animals are necessarily compromises of design,[20] and their ability to take advantage of the opportunities opened up for them by environmental change is constrained by the history of their lineage and by existing genetic variability. The process works as well on behavioural traits as on feet and wings.

The Advantages of Intelligence

One of the most convincing explanations for the evolution of intelligence is that it allows more scope for social manipulations leading to sexual advantages within a group. These require recognition of individuals, and memory for previous transactions with known group members. Life in a primate group demands skill in navigating the continually shifting alliances that determine personal status and breeding success. Brainier chimps are simply better players of games of repeated exchanges of favours, leading to more mating opportunities. Greater skill in this is certainly rewarded; for example, the alpha male of a band of chimps is not necessarily the strongest one, but the one best able to maintain a dominant position by the manipulation of alliances with others.[21] Once evolved and further refined, as in modern humans,

20 N. Eldredge, *Reinventing Darwin: The Great Evolutionary Debate* (London: Weidenfeld and Nicolson, 1995), 46; G. C. Williams, *Plan and Purpose in Nature* (London: Weidenfeld & Nicolson, 1996).

21 Byrne, *The Thinking Ape*, 195–200.

intelligence was available to be applied to cultural skills, such as abstract mathematics, astronomy and music.

Similarly, the emotions that evolved to assist groups to maintain their cohesion by reciprocal altruism were available to be extended to what Waal[22] calls genuine community concern among chimpanzees. It is not, Waal is careful to point out, that these animals worry about the community as an abstract entity, more that they prefer to maintain the kind of peaceful, cooperative community that is in each of their own best interests. In evolutionary terms it is a short step from there to systems of conscious ethical rules.

Once evolved for related but different purposes, community concern allied with reflective intelligence became available to be refined into genuine, selfless altruism characteristic of the real spiritual world. In turn, each of these characters enhanced the individual breeding success of our far distant ancestors. With time and sociality (i.e., repeated encounters with the same individuals), the ruthless computations of competing self-interest pass from "Me first" to "Cooperation pays." Egoism in the primates has passed from "Look after Number One" to "Scratch my back and I'll scratch yours." Human ethics have thereby grown beyond the original dependence on animal precursors.

Given that background, we can begin to formulate a very different and much less destructive view of what has always been labelled as human immorality, and especially our supposedly inbuilt selfishness, long labelled original sin.

The Eden Myth for Space-Age Kids

Just because traditional myths are embedded in language no longer acceptable today does not make their ancient truths no longer true. One powerful way to defuse the war between modern science and ancient religion is to rediscover the wisdom of our ancestors by recasting their traditional myths into new stories conveying the same truths in con-

22 Waal, *Good Natured*, 205, 117.

temporary terms, more appealing to modern imaginations, especially of children.

For example, the biblical account of the conversation around the apple tree in Eden sounds entirely ridiculous if read literally (one parent was quoted on social media as angrily demanding that no one should teach his children any nonsense about "talking snakes"). Its definition of sin also sounds absurd in light of modern rules limiting judicial proceedings to the guilty parties, not to their descendants. But the same story can appear quite different if retold in terms of an imaginary conversation between the conflicting parts of the human brain, even when we retain the exact words of the original texts.

The Voice of Our Hindbrain

Put aside for a moment any distracting doubts about the reality of talking snakes, and remember that the real, documented, and active reptilian legacy within our own brains *in the here and now* is perfectly represented in the serpent of Eden. It was, yes, a reptile. The conversation can be reimagined into new terms unknown to the authors of Genesis but in their own words, as follows.

> Now the serpent was more crafty than any of the wild animals the Lord God had made. He said to the woman, "Did God really say, 'You must not eat from any tree in the garden?'" The woman said to the serpent, "We may eat fruit from the trees in the garden, but God did say, 'You must not eat fruit from the tree that is in the middle of the garden, and you must not touch it, or you will die.'" "You will not certainly die," the serpent said to the woman. "For God knows that when you eat from it your eyes will be opened, and you will be like God, knowing good and evil" (Genesis 3:1–5).

Eve's hindbrain's suggestions can sound all too familiar to anyone questioning an authoritative but apparently illogical prohibition.

The Voice of Our Midbrain

The seat of our heedless emotions and ambitions prompted Eve to greatly desire what the serpent had promised, but didn't warn her to stop to think of the consequences:

> When the woman saw that the fruit of the tree was good for food and pleasing to the eye, and also desirable for gaining wisdom, she took some and ate it. She also gave some to her husband, who was with her, and he ate it (Genesis 3:6).

The Voice of Our Forebrain

Suddenly confronted by higher authority, caught red-handed and urgently surveying its options, Adam's forebrain realised its danger and tried to find a way to avoid being held responsible for imminent disaster. It was a classic piece of buck-passing, easily recognisable today. The man blamed not only the woman, but God himself for providing such an unsuitable companion, whereupon the woman blamed the serpent:

> The man said, 'The woman you put here with me—she gave me some fruit from the tree, and I ate it.' … The woman said, 'The serpent deceived me, and I ate' (Genesis 3:12–13).

The Voice of Our Frontal Lobes

This, the truly human part of us, is the only part capable of seeing a higher purpose and a survival tactic even in the aftermath of tragedy: "Adam named his wife Eve, because she would become the mother of all the living" (Genesis 3:20).

When operating together as a disciplined unit, and always kept under control by well-developed frontal lobes, the various components of a human brain can create a fully human mind ready to teach its owner to grow into a mature member of rational, civilised humanity. On the other hand, a brain with only poorly developed higher functions is

less able to avoid the sort of behaviour powerfully prompted by its baser instincts. The personal and social consequences of such incomplete development certainly parallel what conservative theology has always labelled as sinful. But a more informed and compassionate view based on science can remove the burden of ages-worth of guilt and grief.

Surely, no better reason could be found to integrate the insights of science and religion.

Genesis 1

Of the two creation stories in Genesis, the one that has caused the most strident disputes between science and religion is the first presented, although written much later. By contrast with the ancient oral tradition preserved in Genesis 2–3 concerned with all humanity, Genesis 1 is a literary work dated to around 550 BCE and later, written in the style of the Priestly circle of Jerusalem. They and their cultic interests became prominent during the Exile starting in 587 BCE, when most of the population of Israel was deported to Babylon (2 Kings 24) and Solomon's Temple was destroyed (2 Kings 25).

The concern of the Priestly authors was focused on the people of Israel. Their version of the creation story does at least introduce the creatures in roughly the right order, by our standards—vegetation before birds and fish, and land animals before humans. Despite this passing superficial resemblance, nothing prevented certain Christians from using Genesis 1 to contradict science. This is a category error of the worst kind, understandably stimulating multiple defence strategies from both sides. The situation is a perfect trap for the uninformed enthusiasts, each equally outraged by the others' misinterpretation of their own position.

Ironically, much of their endless futile argument could have been muted if the participants had taken more notice of one of St Augustine's lesser known works, entitled *The Literal Meaning of Genesis*. Pointing out that non-Christians already know something of the science of their day, Augustine warns that "It is a disgraceful and dan-

gerous thing for an infidel to hear a Christian, presumably giving the meaning of Holy Scripture, talking nonsense on these topics; and we should take all means to prevent such an embarrassing situation."[23]

The Long Shadow of Ancient Cosmology

Faced with new information, we all search for an explanation that fits with what we already believe, whether or not our idea is what the author intended. When it comes to understanding a part of our world that is too small or too large to be seen with our own eyes, we have to construct a model of it.[24] Misinterpretation of models expressed in authoritative written words is especially easy. The science-religion conflict is too often based on centuries of imposing our own cultural assumptions upon an ancient text, and failing to ask the right questions on what it was originally about.

We live in a materialist culture, and our assumptions of how the universe works (the subject of modern cosmology) colours our thinking in ways we seldom recognise, and which was certainly completely unknown to the authors of Genesis.[25] We leap to the conclusion that Genesis 1 is describing the origin of the material universe, because we can't see how else it could be read. We assume that the obvious contradiction between Genesis 1 and evolutionary science arises because the biblical writers were ignorant of science, and their story can be dismissed as a fable. But those who take the trouble to understand how ancient cultures thought about their world tell us that the real primary concern of Genesis 1 was quite different. Hebrew theologians did not ask, "How was the world made?" But "What is it *for*?"[26] We misread the

23 Saint Augustine, *The Literal Meaning of Genesis*, trans. J. H. Taylor (New York: Newman Press, 1982), 42–43.

24 C. M. King, "Models of Invisible Realities: The Common Thread in Science and Theology," in *Creation and Complexity: Interdisciplinary Issues in Science and Religion*, ed. C. Ledger and S. Pickard (Adelaide: Australian Theological Forum, 2004), 17–48.

25 G. J. Glover, *Beyond the Firmament: Understanding Science and the Theology of Creation* (Chesapeake, VA: Watertree Press LLC, 2007).

26 Walton, *The Lost World of Genesis One*, 26.

whole story because we fail to understand this absolutely crucial difference between our world and theirs.

Genesis 1 Is about the Sovereignty of God, not the Origins of Life

The most accessible and recent guide to help us understand this primary text is John Walton's book, *The Lost World of Genesis One*. It shows how, when we learn to ask the right questions about the original meaning of Genesis 1, any reasonable grounds for the dispute with science disappear altogether. Genesis 1 does not contradict science—it is not *about* science. On the contrary, it is concerned only to assert the Hebrew belief in the authority of God overruling all the ancient cosmologies common to all cultures of 3000 years ago. Pagans saw the universe as created by multiple deities for their own pleasures, and the human population as living in slavery and fear of them. Contrary to that, Genesis 1 is a masterly statement of the Hebrew belief in a world created by one, all-powerful, and loving deity, specifically for the benefit of human creatures capable of enjoying and caring for it.

The logic is very clear when the six days are arranged in two columns of three. Reading down the columns from days 1–3 shows the creation of functional spaces in order. They provide the bases of time (day and night), weather (water and sky), and food (land and vegetation). Reading across the rows shows the sequence of insertion of inhabitants into the functional spaces made ready for them. On day 4, the sun, moon, and stars appear, responsible only to provide the visible markers of time, not light itself. On day 5, the waters and the sky are inhabited by fish and birds, and commanded to fill the earth. On day 6, the land and vegetation are occupied by beasts, whose function is to serve humans, and people, who in turn are responsible for caring for the earth and its inhabitants.

In short, the text insists that the sun, moon, and stars are creatures, not gods, and are certainly not to be worshipped. The dome of the sky was seen as a solid firmament, with windows to let through the

rain, and fixed tracks along which the sun, moon, and planets moved. The heavens and their inhabitants were created to serve humanity, by marking the passing of the days and seasons, and helping us to organise the annual rounds of planting and harvesting. The basic assumption was that things exist, not because they have definable material properties, but because they have a *function* in an ordered system.

Walton draws an illuminating analogy between the sequence of divine actions in Genesis 1, and the building of a new school as summarised in six stages. First, the designers have to set out the structure, so on day 1 they need light on their plans. On days 2 and 3 they need to build all the required functional spaces (classrooms, library, gym, offices, gardens, playing fields, pool). Only when these are ready can those spaces be populated with inhabitants; on day 4, electric lights, power points, clocks, and internet; on day 5, aviaries, terraria for frogs and lizards, aquaria, and fishponds; and finally on day 6, pupils and staff.

More significantly, our materialist world view does not prepare us to appreciate the vital importance of the seventh day. Genesis says that God "rested on the seventh day from all his work which he had done." We get the idea of God being tired out, and sitting back with his feet up. The original readers would have understood the words quite differently.

When Eastern cosmologies talked of their deities "resting" in their own temples, they meant that they took up residence there. So Genesis is declaring that on the seventh day the whole cosmos became God's temple, his residence from where he continued his work of upholding all creation. Hence, in 970 BCE Solomon built a temple for the most visible sign of God's presence, the Ark of Covenant (1 Kings 8:4). The critical point to grasp from Walton's book is that the function of the cosmos is to provide the residence of God, and, since function is the prerequisite for existence, without that function the cosmos would not exist.

Genesis 1 as the Text of a Communal Festival Celebrating the Cosmos

Read with understanding of its original intent, Genesis 1 does not contradict science at all. On the contrary, it is set out as a text for congregational participation in a joyful annual festival. It has rhythmic wording suitable for group speaking; it has a strong emphasis on the world designed as home for people; and is regularly punctuated by choruses proclaiming that "it was good." In this context, "good" means fit for purpose, not morally good. For example, the arrival of Eve was good because the human condition is not functionally complete without both genders.

Walton argues cogently that all these features make the most likely original context of Genesis 1 as providing the text for a regular reenactment of a literal seven-day festival.[27] Important events, like the inauguration of Solomon's temple, were often celebrated in public festivals running for several days, as described in 2 Chronicles 7:8. The inauguration ceremony for the cosmic temple, celebrating the Hebrew vision of the functional origins of the cosmos, would certainly deserve a really special annual ritual.

Genesis 1 does not describe the material origins of the earth, because everything was simply assumed to have been made by God. The questions we ask of the text, such as, how could there have been light on the first day when the sun did not appear until the fourth day, would have been pointless and incomprehensible to those for whom it was written. Walton's analysis shows that Genesis 1 is not and never was intended to explain the material origins of the universe in terms that have any relevance to our scientific knowledge. Only much later did philosophers begin to suspect there could be more to see behind the solid firmament of the sky.

It takes a deliberate effort for us to cast off our materialist assumptions and step out of our world into that of 3000 BCE. But if we do, we discover that Genesis 1 does *not* require us to choose between

27 Walton, *The Lost World of Genesis One*, 90–162.

loyalty to an ancient religious belief versus intellectually acceptable contemporary science for explanations of the world around us. More importantly, it does *not* deny a religious assertion that God made material creation, it says only that Genesis 1 is not about that story.

The critical point to grasp is that Genesis 1 does not deny evolution, or that the material universe evolved long before humans; rather, it assumes that the long procession of prehuman creatures appearing on Day 5 helped to prepare the earth for beasts and humans. (Yes, evolutionary science can confirm that fish and birds appeared on earth long before modern mammals and humans.) They were like the necessary rehearsals before the performance of a play, but the rehearsals are not the play, says Walton.[28] Rather, the cosmic play finds its meaning when the audience is present, because the play exists for them. Science can find meanings too, but different ones. Since Genesis 1 never was about material origins, there is no conflict with science. The science-religion war was *never necessary*. On the contrary, science owes much to the Hebrew (not literalist) theology of creation.

Historic Creationism Is the Most Ancient Basis of Science

Unlike most other cultures of their time, the Hebrews insisted that trees, rivers, and rocks did not have their own resident spirits, but that all matter was merely matter, open to human use and investigation. Western technology has inherited this attitude, and is therefore seen to have been responsible for a systematic, historic campaign to demythologise nature. One unfortunate consequence is that any protection that superstition had once afforded the natural world was removed, opening the way to the unrestrained exploitation that has produced the modern ecological crisis.[29] Yet that very same demythologising doctrine also laid the foundations of modern science.

The Hebrews' understanding of the natural world was not "scientific" in any respect; they had no concept of "nature" as a separate en-

28 Walton, *The Lost World of Genesis One*, 97.

29 L. White, "The Historic Roots of Our Ecologic Crisis," *Science* 155:3767 (1967): 1203–1207.

tity. But they assumed the total obedience of nature to the universal rational laws laid down by a rational creator. More importantly, humans are also rational, therefore confidence in human rationality allowed us the intellectual freedom to explore the world, free of all the old fears of retribution from angry pagan deities. The same assumptions were taken up by the Arab astronomers and mathematicians who contributed so much to the science of non-Christian cultures and the preservation of ancient Greek philosophy during the Middle Ages.[30]

The three main themes of the historic creationist tradition assert that the universe reflects the goodness, rationality and freedom of God, and therefore creation itself must be good, rational, and contingent. These assumptions were in due course incorporated within Christian faith. Christianity was therefore open to science from the beginning, and this indeed is one of several reasons why the roots of modern science are deepest in the Christian west.[31] But that is only part of the story.

Modern science also owes much to early-modern Renaissance and to medieval philosophies of nature, which were strongly influenced by Arabic natural philosophy derived at least in part from Greek, Egyptian, Indian, Persian, and Chinese texts. These rested, in turn, on the wisdom generated by other, still earlier cultures. One historian has called this twisting braid of lineage "the dialogue of civilizations in the birth of modern science."[32] Recognising that modern science grew out of the give-and-take among many cultures over centuries does not disparage the crucial role of early- modern Protestants and Catholics in casting the moulds within which modern science grew. But the Christian vision contributed much to the rich diversity of the cultural and intellectual soil into which the roots of science extend.

30 J. H. Brooke, "Contributions from the History of Science and Religion," in *The Oxford Handbook of Religion and Science*, ed. P. Clayton and Z. Simpson (Oxford: Oxford University Press, 2006), 293–310.

31 I. G. Barbour, *Religion and Science: Historical and Contemporary Issues* (New York: HarperCollins, 1997), 28.

32 N. J. Efron, "Myth 9: That Christianity Gave Birth to Modern Science," in *Galileo Goes to Jail and Other Myths About Science and Religion*, ed. R. L. Numbers (Harvard University Press, 2009), 79–89.

The three concepts of goodness, rationality, and contingency are all vital for science. If the universe is functionally good, it is worthy of careful study; if it is rational, it is predictable and reliable; and if it is contingent it could have been otherwise than it is, so the state of things has to be studied by experiment, not deduced from pure reasoning. Moreover, the ancient tradition insisted that there had to be a fruitful balance between the rationality and the freedom of God in creation: if rationality is overemphasised, the universe becomes fixed and uninteresting, whereas if freedom is overemphasised, the universe becomes incoherent, unpredictable, and impossible to study. In a nutshell, if the world is not rational, science is not possible; if the world is not contingent, science is not necessary. Thus, the historical relationship between theology and science in the western world has been very much more long-standing, complex, productive, and positive than many participants in the present debate may realise.

On the other hand, Christianity should not, and does not need to, defend itself by claiming credit for having contributed to the rise of science, which would expose it to the developing contemporary backlash against the excesses of scientific technology. The most it need claim is that true Christianity is not, and never has been, incompatible with true science.[33] C. S. Lewis neatly illustrated this compatibility when he put into Screwtape's mouth the advice (to a young devil attempting to ensnare an unsuspecting human soul),

> Above all, do not attempt to use science (I mean, the real sciences) as a defence against Christianity. They will positively encourage him to think about realities he can't touch and see. There have been sad cases among the modern physicists. If he must dabble in science, keep him on economics and sociology.[34]

33 A. Peacocke, *Theology for a Scientific Age*, enlarged edn (London: SCM Press 1993), 76.

34 C. S. Lewis, *The Screwtape Letters* (London: Geoffrey Bles, 1942), 14.

Sound advice indeed—and in view of the diabolical consequences of modern market economics, one might deduce that Screwtape's pupil has been remarkably successful in following it.

Layers of Explanation

The simplistic use of Genesis to set science against religion or vice versa falls into an ancient intellectual error, invisible to most modern writers unfamiliar with the logic of inference. They do not see the dangers of imposing their own one-dimensional cultural assumptions upon a classic text originally conveying a quite different message. As John Haught explains:

> Everything in our experience can be explained at multiple layers of understanding, in distinct and non-competing ways … [This idea] is an ancient one, endorsed by Socrates, Plato, Aristotle, Augustine, Aquinas, Kant, and many other great thinkers … a page of a book exists because a printing press stamped letters in black ink on white paper … [and] because an author is trying to get some ideas across to his readers . . [and] because a publisher [published it]. These are not competing explanations.[35]

> [Dawkins] keeps asking, where is the evidence—and here he clearly means scientifically available evidence—of any divine principle of meaning and directionality in life … [But] meaning and purpose cannot show up at the level of scientific analysis. As far as he is concerned, science is powerful enough in its intellectual sweep to answer every conceivable question about the natural world. But this is a belief … that demands from science a kind of insight that it cannot in principle provide … Layers of causality are not mutually exclusive … [The chemistry of printing tells us nothing about the author's intention] … The rules of grammar are essential, but meaning is not determined by them.[36]

35 J. F. Haught, *Making Sense of Evolution* (Louisville, KY: Westminster John Knox Press, 2010), 23.

36 Haught, *Making Sense of Evolution*, 70–71.

In some respects, the distinction between the two creation stories in Genesis parallels the idea of the evolution of religion as proposed by Fraser Watts.[37] Watts suggests that Genesis 2–3 represents the older, intuitive, oral tradition, to which was later *added* the more conceptual, rational doctrine propounded by the Priestly authors of Genesis 1. Biologists see a comparable additive process in the physical evolution of brain functions, whereby the new capabilities of the mammalian brain have been built up on the original basic structure inherited ultimately from Devonian fish. There is therefore no contradiction between evolutionary biology and Watts (or Robin Dunbar, who suggested a similar distinction), that this evolutionary process is a matter of *adding to* earlier religious insights, *not* replacing them with later ones.

Consequences for Science Education

The net result is double jeopardy for our young people. Like all of us, they search for ideas that explain the world around them and give meaning to their personal lives. Students often reject the idea of evolution because they do not understand it, not because they understand it and find it wrong. I can confirm this from my own teaching experience. Likewise, unbelievers often reject the idea that Christianity could be rational or relevant to this age because they do not know there is any such thing as serious, critical theology, or because their view of what the church stands for has been coloured by the failings of its members.

If there really is no fundamental conflict between science and religion, we need to end this tragic and unnecessary situation as soon as possible. If our young people are to defend themselves against irrational beliefs bombarding their social media feeds daily, from both aggressive secularism and outdated preaching, they need to be equipped with a more realistic understanding of both science and faith. It *is* possible to do that: there are many thought-provoking articles and books on the in-

37 F. Watts, "The Evolution of Religious Cognition," *Archive for the Psychology of Religion* (2020): 42, 93.

terface between science and religion, and even tertiary courses (some of them available on the internet) on the science-religion dialogue.

To paraphrase a well-known saying: All that is required for irrationality to triumph is that those who can think remain silent. Now is the time for thinkers to speak out.

The author reports there are no competing interests to declare.
Received: 16/03/22 Accepted: 09/08/22 Published: 13/08/22