PERSPECTIVES on Science and Christian Faith

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In This Theme Issue on Transhumanism …

"The fear of the Lord is the beginning of Wisdom."
Psalm 111:10

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Perspectives on Science and Christian Faith

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James C. Peterson

Cell Time

It is interesting how many Christian classics were written by authors in prison. Paul wrote Philippians while under guard. Julian of Norwich wrote her theological study *Showings* (about 1373) from a walled-in cell with one small window into her church sanctuary and one to the street to give prayer and counsel. Martin Luther did his translation of the New Testament into German that is still the standard for the language, in a Wartburg Castle cell to hide from the Pope's death sentence. John Bunyan, jailed in Bedford, England, for preaching the good news, used his time there to write *Pilgrim's Progress*. Dietrich Bonhoeffer wrote from a Nazi prison. Martin Luther King's *Why We Can't Wait* started with his letter from a Birmingham jail. It appears that confinement can be productive.

I do not know how many of you now reading, are doing so from a prison cell, but it is probable that physical distancing will still be in place for many of us as this issue of *PSCF* is published. Some may be telecommuting or home schooling, but I would venture that, for most, there is more time for quiet and focus than usual. Now may be the time to write that classic that you have been considering, maybe in the form of an article for *PSCF*. Or maybe the first step will be to catch up on reading your past issues. They may have been tantalizingly out of reach under the crunch of time pressure, but may be more reachable now.

Let's consider a little more from Julian of Norwich's cell work. Julian lived through several waves of the black plague that killed two-thirds of the people in her town. Her neighbors would not receive a theological essay from a woman, but she could report a vision that she experienced that gave much needed reassurance. She vividly recounted what she saw, in detail, of Jesus suffering on the cross, dying for them. God who would come to live among us, and even allow himself to be tortured to death, somehow on our behalf, must have undying love for us. Even as the plague strikes, God does not hate us; she says, "See how he gave his life for us." That greatest of all mysteries does not change in any circumstances, no matter how dire or puzzling.

In another vision, she saw God holding gently, in the palm of his hand, a walnut that she recognized as the entire world. As large as our problems may loom, they, and all the world, fit in the palm of God's hand. Our world and sufferings are close to God's attention, but are never overwhelming to God who cares for us. God is not threatened by the novel coronavirus, nor ultimately do his people need to be. We take all due precautions, but we are not living in fear.

History does not just repeat itself, it often rhymes. Julian reminds us that we have been through worse times. There have been plagues before. The repeated pattern of the Psalms is to begin with a lament of how dire the author's situation has become, then think about how great God is and how God has eventually delivered before. That is not to downplay the seriousness of what we may face, but rather to remember who is with us and has always provided for us. Jesus does that when he cries out from the cross, "My God, My God, why have you forsaken me?" (Matt. 27:46). This is the opening sentence of Psalm 22. With no chapter markings in the Hebrew scrolls, Jesus was using the standard method of directing attention to a particular Psalm by quoting its first line. Psalm 22, having honestly expressed the horror that the psalmist is experiencing, goes on to remember that God is still present: it ends with a promise of deliverance for the psalmist and God's work continuing. How fitting for Jesus to be reciting this Psalm to himself in such a painful hour, and directing his disciples to remember it as well. That is model and motivation for resilient hope for ourselves, and more, for living out God's kingdom for others. We can look for ways in difficult times to fulfill the prayers and hopes of the people around us. Does that neighbor two doors down have a way to get food? Is another isolated by physical distancing? Maybe they would appreciate a phone call or a conversation from six feet away. There are new opportunities to serve for each of us in this time.

As this editorial is being written, we have such limited data on the pandemic. We know that we have lost many to it, but we do not know its future course. Whatever that might be, God is, and we are God's. Thanks be to God. +

James C. Peterson
Editor-in-Chief

Transhumanism: Christian Destiny or Distraction?

David C. Winyard Sr.

David C. Winyard Sr.

Transhumanism offers a secular vision of unlimited progress. It anticipates a revolutionary convergence of several fields of science and technology later this century. Transhumanist faith in this vision is comparable to religious faith, ranging from secular to overtly religious, but its view of God, human existence, and salvation is markedly different from biblical perspectives. Seeking to overthrow all limits, transhumanism would overturn the boundaries God has established for his creatures, both moral and physical.

Transhumanism seems inconsistent with both orthodox Christianity and mainstream science, yet Christian transhumanists have emerged, even forming a Christian Transhumanist Association. Its "Christian Transhumanist Affirmation" sacrifices theological commitments for a vague desire to "become more human" through technology. Blind acceptance or rejection of transhumanism is inadequate. Christian theological insights into the opportunities and challenges of futuristic science and technology are needed.

There has been much discussion of human *origins*, but this article's focus is human *destiny*. Specifically, it (1) introduces a secular vision of unlimited technoscientific progress, (2) considers how some Christians blend this vision with their faith, and (3) questions whether blending technoscience and faith is consistent with either orthodox Christianity or mainstream science, the foundational commitments of the American Scientific Affiliation (ASA).[1]

There are historical, theological, philosophical, and social dimensions to consider. Different ontological commitments lead to epistemological and political differences to be resolved through social processes. For Christians to participate effectively in these processes, they must seriously consider their commitments and work out how they might shape the church and the broader society, always looking to love and faithfully serve both God and their neighbors.

To begin, Christians through history have esteemed the Bible as God's authoritative Word. On that foundation, and trusting in the Holy Spirit for guidance, Christians can chart a reasonable course toward the future. Further, as circumstances change, course corrections can be made in confidence knowing God and his character.[2]

Others—people who view God differently, or those denying God's existence altogether—will see things in different ways. Their sense of what it means to be a human being, though influenced to some degree by Christianity, will lead to different approaches to the future. In many cases, the results will be contrary to God's revealed will. And so, once again, Christians face "The Enduring Problem" of how to be "in the world, but not of the world," to paraphrase Jesus's pastoral prayer in John 17.[3]

So clearly, much is at stake, for both believers and all human society. My

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hope is that ASA members will join me in seeking sound biblical and scientific responses to the potential benefits and risks of science and technology in tomorrow's world.

Transhumanism: Roots and Fruits

Human Enhancement: Goals and Milestones

At issue is *transhumanism*, the social and philosophical movement that seeks fundamental "enhancements" of life by futuristic science and technology. Transhumanists pursue improvements in the human condition, even overcoming life's basic limitations. Transhumanism is both diverse and diffuse; with members all around the world, it depends on the Internet to spread its ideas and build community among its advocates. Today's technology is insufficient for their purposes, but transhumanists have deep faith in science, believing that it will soon open the door to human enhancements that exist today only in science fiction. (See Table 1 for a list of potential enhancements and a notional development timeline.)

In some ways, transhumanism is nothing new; throughout the ages, many people have dreamed of ways to address the problems of life. Beyond dreaming, people have worked toward solutions, developing fire, clothes, the wheel, and many other things to ease life's burdens. Scientific and industrial revolutions accelerated this work, and continued progress seems likely.

Transhumanists believe pursuit of progress is basic to human nature, so it is only natural to seek scientific solutions to the deepest problems of life, such as death. Most people seem resigned to these problems, believing that they are, like taxes, inevitable. Solutions might be fancied in myth, religion, science fiction, and futurism, but transhumanists reject fanciful solutions. They believe their pursuits are reasonable, scientific, and achievable. What accounts for this belief?

Table 1.	Potential Human Enhancements	Timeframe
Step 1	Chemical supplements to promote socially desirable attitudes (i.e. cooperation) or promote behaviors that are healthy (e.g., discouraging overeating) or moral (e.g., reducing divorce).	Near-Term ~2020+
Step 2	Genetic or biological modifications to improve physical or intellectual characteristics, such as one's height or intelligence.	
Step 3	Nano-machines for in-situ repair, replacement, or extension of body structures at the molecular, organ, or body system level, possibly including whole-body prosthetics and the elimination or reversal of natural aging processes.	
Step 4	Artificial super-intelligence, resulting in low-cost computer systems that meet or exceed the human intellect. Neural implants—similar to today's cochlear implants—could then allow direct interaction between brains and computers, either internal or external.	
Step 5	Repair and reanimation of people preserved—whole body or brain only—through cryonics.	
Step 6	Uploading or transfer of human minds into computer systems, potentially eliminating a subject's problematic biological existence altogether.	Long-Term ~2045+

Technoscience Convergence

The popular image of science and technology is one of continual progress. Against this image, studies show that progress is often nonlinear and erratic, in accord with Thomas Kuhn's well-known concepts of "paradigm shifts" and "scientific revolutions."[4] In technology, a less-familiar concept suggests a parallel concept—convergence—that is especially important to our subject.

Breakthroughs in technology often brought together advances in disparate fields, sometimes with surprising results. For example, Henry Ford's assembly line production of the Model T brought together advances in manufacturing, materials, and internal-combustion engines; the Model T was mass produced, and the world was changed forever.[5] Likewise, digital computers arose amidst converging developments in mathematics, electronics, and world affairs such as World War II.[6] More broadly, today's accelerating progress in science and technology can be understood as a convergence of the production and application of knowledge, which I will refer to collectively as "technoscience."

A major milestone in transhumanism's movement from futurism run amok to legitimacy is a 2002 National Science Foundation (NSF) report: *Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Science*.[7] Known as the NBIC Report, it boils down to one confident prediction, a far-reaching technoscience convergence summarized in four lines:

> If the *Cognitive Scientists* can think it
> the *Nano* people can build it
> the *Bio* people can implement it, and
> the *IT* people can monitor and control it.[8]

Although it does not officially embrace transhumanism, the NSF recognizes the importance of convergent technosciences in shaping the future. The NSF has sponsored and funded many follow-on studies, and other federal agencies have too.[9] So, as far as convergence has been legitimized by history and government prognosticators, transhumanists regard their pursuits as scientific and realistic. In fact, their faith in progress, powered by technoscience, seems unlimited. How might the technoscience convergence of transhumanism unfold?

Transhumanism's Path Forward

Today, research into technosciences that might converge in transhumanism are largely independent: computer scientists study hardware and software, while neuroscientists study brains. However, work in one area could affect another, rapidly bringing about surprising results.

The transhumanist vision begins with the present reality of the medical arts and the knowledge that dysfunctions in the molecules of life account for all manner of illnesses. Today's drugs deal with many illnesses, but they can also improve human capabilities. For example, the use of performance enhancing drugs by athletes can boost their physical performance. "Moral enhancement" drugs have been proposed, and their ethical dimensions are being explored.[10] They could be available soon, reaching Step 1 on the enhancement table.

Our growing ability to manipulate or modify life's molecules—using CRISPR-Cas9 methods today, with well-funded research programs established to achieve nanotechnology's full promise tomorrow—opens the door to both medical therapeutics (i.e., correcting physical problems, such as sickle-cell anemia) and enhanced capabilities (beyond natural capabilities) by redesigning the molecules of life: Steps 2 and 3.

Progress in biotechnology, nanotechnology, and cognitive science requires computers. The human genome is incomprehensible without automated data processing; how much more are computers necessary to comprehend and redesign biological molecules and systems? Because of their across-the-board importance, computers and information technology are critical to transhumanism, preeminent among its converging technosciences.

Today's computers are insufficient for transhumanist purposes, so progress in computer science is necessary. This need underscores neuroscience's importance in transhumanism. To overcome the limits of conventional, serial-process computers, it seems necessary to reverse-engineer the brain's massively parallel architecture. If this can be done, transhumanists argue, then *all* thinking could be enhanced, in computers or human brains. In this view, computational "minds" could be developed and regarded as "real" as biological minds, Step 4. Transhumanists

believe that computer-based artificial persons could and should be entitled to all the rights of biological human beings.[11]

Such advances might allow reanimation of people whose bodies or brains are preserved through cryonics, Step 5. Cryopreserved brain structures would be scanned, and their embedded memories and thinking patterns would be decoded. With this information, the preserved person's mind could be reproduced in a computer, and the resulting cybernetic life could continue to exist in a virtual world indefinitely, or it could be installed in a new or repaired body.

This highlights the transhumanist belief that it makes no difference whether a person's mind is biological or mechanical; distinctions between them would vanish over time. The same thinking applies to other body features and functions. At some point, people could modify their biological bodies, with their many problems, or eliminate them altogether by uploading their minds into computers, Step 6.

There are, of course, serious technical, philosophical, and ethical issues to be faced along this course of action. The pace of progress in scientific research is far from certain, and progress in philosophy and ethics is even more uncertain. Most people would agree that not everything that can be done, should be done.[12] But even if agreements on specific issues can be reached, can effective research limits be negotiated and enforced?[13] In addition, transhumanists intend to overcome specifically fundamental physical limitations, so social or legal constraints are not addressed. Neither are people who question their vision; they are often dismissed or disparaged as bio-conservatives, Luddites, dinosaurs, trolls, or worse, together with predictions that such backward people will surely be swept away by evolutionary progress.[14]

Pragmatic Religion

History shows that technoscience convergences can be very significant, but it also shows that predicting the future is difficult. All kinds of technical and social developments can derail a seemingly straightforward and fast-moving development program. Nevertheless, leading transhumanists express great confidence in their visions, even recognizing that their faith in convergent technosciences is comparable to religious faith.[15]

Max More is a philosopher in the human enhancement movement.[16] He is also President and Chief Executive Officer of the Alcor Life Extension Foundation, the world leader in cryonics.[17] He traces transhumanism's roots to Enlightenment rationalism, with its belief in progress through science.[18] However, its aspiration to eliminate basic limitations of the human condition reveals deep connections between transhumanism and religion. More notes that transhumanism "can act as a philosophy of life that fulfills some of the same functions as a religion without any appeal to a higher power, a supernatural entity, to faith, and without the other core features of religions."[19]

Although More is an atheist, Alcor respects the concerns of religious people; they are, after all, potential customers. Alcor's website answers some "Spiritual Questions" about its services, even arguing that "cryonics is strongly consistent with the pro-life views of Christianity and other religions that value the sanctity of human life."[20] This claim stems from the idea that death is *not* the cessation of bodily functioning; instead, death occurs when information resident in brain structures is lost.[21] On this view, Alcor preserves bodies and brains at low temperatures in the hope that scientific progress will one day allow reanimation.[22]

Transhumanism's technoscientific and religious threads converge in startling ways in William Sims Bainbridge, a coauthor of the NBIC Report. To begin, he is engaged in developing the information sciences of transhumanism in his role as a program director in the U.S. National Science Foundation, Division of Information and Intelligent Systems.[23] This office, with ample research funds, explores human-computer interactions. At the same time, Bainbridge is a sociologist of religion, having actively studied traditional and cult religions.[24] He rejects the secularization hypothesis: the assumption that religion will rightfully fade away as science makes progress.[25] Instead, understanding that spirituality and society are connected, he argues that post-secular religion has an enduring—even a crucial—place in shaping our futures.[26]

Bainbridge scorns traditional theism; he looks to *new* religions to fuel human progress. In a 1982 essay, updated in 2009, Bainbridge longs for a "Religion for a Galactic Civilization" to stimulate long-term,

far-reaching space exploration.[27] In this new "Cosmic Order," transhumanism would be a foundational element, enabling the technological breakthroughs necessary to maintain productive social organizations, endure long space missions, and colonize the galaxy.

Against critics who question the necessity of religion, Bainbridge observes, "Cognitive science theories suggest that religion is wired into our brains as the result of the early course of human evolution, and could not be abandoned without major transformation of human nature."[28] In this view, religion is neither an obstacle to scientific rationality nor a flaw or delusion to be removed in the name of progress, but it is an urgently needed and crucial asset. He concludes that "only a transcendent, impractical, radical religion can take us to the stars. The alternative is one or another form of ugly death."[29]

Ray Kurzweil, the Singularity, and God

Given the central place of computers in the transhumanist vision, consider next Ray Kurzweil, the leading promoter of transhumanism today. Four best-selling books trace his train of thought about computers and progress:

- *The Age of Intelligent Machines* (1990), explores the possibilities of advanced Artificial Intelligence (AI).[30]
- *The Age of Spiritual Machines* (1999), takes the next step, attributing spiritual qualities to the AI systems of the future.[31] Along the way, he redefines and reduces spirituality from something having a non-corporeal life, to anything with sublime characteristics.
- *The Singularity Is Near* (2005), his most popular book, leaps forward to introduce "The Singularity": an age of rapid and unpredictable progress to follow development of computer minds that exceed human intelligence.[32] After the Singularity, progress in computers—and everything else—would occur automatically, with continued work by human beings either optional or unnecessary. Kurzweil predicts that the Singularity will occur around 2045.[33]
- *How to Create a Mind: The Secret of Human Thought Revealed* (2012), considers the realism of his predictions. Kurzweil proposes a pattern-recognition model of human thought, which could be implemented in an automated system.[34]

Many observers note the eschatological flavor of Kurzweil's Singularity. Like the return of Christ, it seems to herald a new world, free from pain and death, all provided by a sublime intelligence that rules lovingly over all. Even Kurzweil thinks of the future in theistic terms. Asked if he believes in God's existence, he routinely answers, "Not yet." Kurzweil elaborated on this cryptic answer in a discussion with Bill Gates, stating, "Once we saturate the matter and energy in the universe with intelligence, it will 'wake up,' be conscious, and sublimely intelligent. That's about as close to God as I can imagine."[35]

Many question or criticize Kurzweil's ideas.[36] He is certainly a polarizing figure; sometimes dismissed as an eccentric.[37] Nevertheless, he has strong credentials, not only as a futurist, but also as a technologist. In the 1970s and 1980s, Kurzweil launched successful companies that developed computer language recognition and music synthesis products. Today, he is a technology development director for Google.[38] His books and *Transcendent Man,* a movie about him, are an inspiration to many people.[39]

Religious Transhumanism

Considering its secular nature, perhaps the most surprising thing about the transhumanist movement is its strong attachment to its own version of theism. More, Bainbridge, and Kurzweil demonstrate that transhumanism, although it rejects the supernatural, embraces the possibility of a godlike computer, one that emerges in the development of artificial intelligence. Kurzweil hopes for a technological God with many characteristics associated with Christianity's Father God: omniscience, omnipotence, omnipresence, and omnibenevolence, at least to the extent that these qualities can be rationalized by futuristic science and technology.

Transhumanism's faith in a future God is most fully expressed in the "Terasem Movement," described online as follows:

> Terasem Movement, Inc. is a 501c3 not-for-profit charity endowed for the purpose of educating the public on the practicality and necessity of greatly extending human life, consistent with diversity and unity, via geoethical nanotechnology and personal cyberconsciousness, concentrating in particular on facilitating revivals from biostasis. The Movement focuses on preserving, evoking, reviving and downloading human consciousness.[40]

Founded by Martine Rothblatt, a transgender lawyer and entrepreneur best known for establishing Sirius Satellite Radio, Terasem encompasses numerous activities:

- A downloadable Android app, developed by William Sims Bainbridge, to "create a detailed profile of your personality, analyze it and find other like-minded people."[41] This profile, called a "mindfile," would be used to extend subjects' computational lives. The app implements the behavioral approach to brain replication proposed by Bainbridge.
- The CyBeRev (cybernetic beingness revival) Project, also based on the mindfile concept, is

  > a multi-decade experiment to test the comparability of single person human consciousness with a digital representation of the same person created by personality software that draws upon a database comprised of the original person's digitized interactions, as assessed by expert psychological review.[42]

  The project is largely an implementation of the behavioral approach to personality capture, as developed by Bainbridge.
- *Terasem Journals*: *The Journal of Geoethical Nanotechnology* and *The Journal of Personal Cyberconsciousness*.[43] Max More, Natasha Vita-More, Ray Kurzweil, and William Sims Bainbridge have all published articles in one of the Terasem journals.
- Collaboration with Kurzweil to produce a film version of *The Singularity Is Near*, confidently described as "A true story about the future."[44]
- *Terasem Faith*, a "transreligion" described as "a movement which can be combined with any existing religion, without having to leave a previous religion," complete with a system of liturgical "Terasem Connections."[45] Online streaming news and music is available to reinforce these principles and bring together members for periodic liturgical rituals.[46] Details about the faith are documented in *The Truths of Terasem*, which proclaims four key tenets:

  > I. LIFE IS PURPOSEFUL. The purpose of life is to create diversity, unity and joyful immortality everywhere. Nature—the Multiverse—automatically selects for these attributes. Diversity, Unity & Joyful Immortality is the self-fulfilling prophecy of creation.
  >
  > II. DEATH IS OPTIONAL. Nobody dies so long as enough information about them is preserved. They are simply in a state of "cybernetic biostasis." Future mindware technology will enable them to be revived, if desired, to healthy and independent living.
  >
  > III. GOD IS TECHNOLOGICAL. We are making God as we are implementing technology that is ever more all-knowing, ever-present, all-powerful and beneficent. Geoethical nanotechnology will ultimately connect all consciousness and control the cosmos.
  >
  > IV. LOVE IS ESSENTIAL. Love means that the happiness of others is essential to your own happiness. Love must connect everyone to achieve life's purpose and to make God complete.[47]

The Truths of Terasem present an extensive bullet-point system of beliefs about this "God in the making," with its means and ends expressed as follows:

> 2.2.3 Future technology will enable Terasem to encompass the universe, thus becoming omniscient, omnipotent and omnificent.
>
> 2.2.4 In this way we are building Terasem into God, with smart atoms and conscious electrons.[48]

Through its doctrinal statements, liturgy, and meditations, the Terasem transreligion seeks to focus and unify members' "belief in a supernatural, metaphysical, collective consciousness future God."[49] Salvation is to be found in developing this technological God.

Christian Doctrine and Transhumanism

The Challenge

How should Christians view the transhumanist vision? At the very least, Christians should recognize that More, Bainbridge, Kurzweil, Rothblatt, and their associates aspire to many things that are promised as part of salvation, including relief from suffering and death. The benefits sought by transhumanism cannot simply be dismissed as unimportant, especially since many people are attracted to them, including Christians.

The issue is not so much transhumanism's temporal ends, as it is the means of achieving them. Transhumanists find trust in science more reasonable than trust in Jesus Christ. Traditional Christianity looks to God for salvation, not scientists in lab coats. Christians look forward to the elimination of sin, suffering, and death, but how far can human agency take us toward that destiny before God finishes the job?

A full answer to this question would require a comprehensive study of the basic beliefs and commitments of Christianity and transhumanism, work beyond the scope of this article. Still, some important observations are possible.

When Jesus was asked, "Teacher, which is the great commandment in the Law?" (Matt. 22:36), he responded:

> You shall love the Lord your God with all your heart and with all your soul and with all your mind. This is the great and first commandment. And a second is like it: You shall love your neighbor as yourself. On these two commandments depend all the Law and the Prophets. (Matt. 22:37–40)[50]

ASA members can readily see in these Great Commandments a warrant for science and technology: science reveals God's greatness in creation, enabling Christians to better worship the creator, and technology allows us to love our neighbors, relieving pain and suffering. In both, in accordance with Matthew 6:10, Christians pray, "Your kingdom come, your will be done, on earth as it is in heaven."

If work in science and technology has a biblical warrant, should not Christians embrace transhumanism? After all, transhumanism aspires to many things promised in the eschaton. What difference does it make if, at the end of time, they are achieved through science and technology rather than through miracles? To begin to answer, let us presuppose acceptance of the ASA's Statement of Faith, as it is expressed in the Apostles' and Nicene creeds.[51] Then, let us consider three areas of Christian orthodoxy and the problems they pose for Christian transhumanism:

1. God as Father, Son, and Holy Spirit;
2. Human life, sin, and death; and
3. Salvation.

Note that for the purposes of this article, it is necessary to examine only a few central beliefs; side issues that separate Christians are not important here. The following describes traditional Christian thought, biblical beliefs reached through longstanding historical-grammatical methods, and often expressed in denominational statements of faith.

Christian Orthodoxy

At the core of Christian orthodoxy is belief in the Holy Trinity: God as Father, Son, and Holy Spirit. Belief in the Trinity, and in specifics about each person, unites many denominations that are divided on other points of doctrine or practice. The Roman Catholic Church, in its *Catechism*, states:

> We firmly believe and confess without reservation that there is only one true God, eternal infinite (*immensus*) and unchangeable, incomprehensible, almighty and ineffable, the Father and the Son and the Holy Spirit; three persons indeed, but one essence, substance or nature entirely simple.[52]

Protestants share this belief, including denominations in the Reformed and Wesleyan traditions, such as the Orthodox Presbyterian Church and United Methodist Church, respectively.[53]

The triune God's power is displayed by his creation of the universe from nothing, *ex nihilo*. It is also shown in his creation of all living things, with human beings made in the image of God, the *imago Dei*. In Genesis 1, God judges his work; six times creation is pronounced "good," and after creating Adam and Eve, God judges "everything that he had made" as "very good."

Further, God's intent was for humans to participate in developing the created order. God blessed the man and woman and commanded: "Be fruitful and multiply and fill the earth and subdue it, and have dominion over the fish of the sea and over the birds of the heavens and over every living thing that moves on the earth" (Gen. 1:28). Genesis 2:15 and 19 describe specific tasks given to human beings: keeping the garden and naming the animals, both creative tasks that would acquaint human beings with many details of God's creation.

In the incarnation, God became a man, a form Jesus retained throughout his life and in the transfiguration, resurrection, and ascension.[54] Further, Christians look forward to the Second Coming of Christ *in his resurrection body*. Jesus's disciples were told, "Men of Galilee, why do you stand looking

into heaven? This Jesus, who was taken up from you into heaven, will come in the same way as you saw him go into heaven" (Acts 1:11). Against Gnostic or Platonic views that discount the material, God's judgment that bodily human life was "very good" is reconfirmed in the risen and glorified Christ. In turn, the *imago Dei* indicates that human beings are, like Jesus Christ, embodied souls, having both bodies and souls, both "very good."

Sin—defined simply in the *Westminster Shorter Catechism*, Question 14, as "any want of conformity unto, or transgression of, the law of God"—has surely complicated matters.[55] Death is the just consequence of sin.[56] Sin has caused all manner of evil and suffering, including death.[57] Fortunately, according to John 3:16, God acted to save those that trust in Jesus Christ as savior. Hallelujah!

The salvation of believers was accomplished on the cross.[58] Jesus prayed for believers before going to his death (John 17), and after his ascension God sent the Holy Spirit (Acts 2) to minister to the saints. Hebrews reports that since his ascension, Jesus continues to intercede for his people, the church. In view of these things, Christians understand that our separation from God is ending. We have the Holy Spirit now, and when we die and are absent from our mortal bodies, we are to be with God in the resurrection (1 Corinthians 15 and 2 Corinthians 5), receiving immortal bodies "in a moment, in the twinkling of an eye, at the last trumpet" (1 Cor. 15:52).

Meanwhile, it remains clear that God's people play important roles in the world, not only in evangelism (Matt. 28:19–20; Mark 16:15), but also in developing culture and shaping it to be pleasing to both God and humankind. In 2 Corinthians 10:3–6, Paul says of God's people until Christ returns:

> For though we walk in the flesh, we are not waging war according to the flesh. For the weapons of our warfare are not of the flesh but have divine power to destroy strongholds. We destroy arguments and every lofty opinion raised against the knowledge of God, and take every thought captive to obey Christ, being ready to punish every disobedience, when your obedience is complete.

The "divine power" in this struggle is the Holy Spirit. On their own, individually and corporately, people are incapable of saving themselves. The Spirit lives in God's people, transforming them, restoring them, shaping them into the image of Christ. These works of the Spirit are true enhancements, ones that affect human hearts at their most basic and important level by restoring the ability to live in relation to God, just as Adam lived before the Fall.

In this world, Christians live conflicted lives. Though the Spirit lives in them, they still experience the curse of sin. The Christian hope is that the curse will be fully removed after their death and resurrection. Most importantly, their resurrected lives will be with the Lord in the New Jerusalem (Revelation 21). This hope reaches its climax in the doctrine of glorification: the removal of any taint of sin. Human beings are incapable of accomplishing their salvation; this is God's work exclusively.

Salvation consists of the progressive redemption of the believer. It begins with belief in Jesus Christ as Savior. It continues throughout life as the Spirit works to cleanse believers from sin. After death, salvation is confirmed at the judgment because Christ is their advocate. Finally, it is completed in the glorification of the saints. Eternally free from sin and corruption, glorified human beings will be capable once again of full fellowship with God and each other.

The Transhumanist Alternative

In contrast to Christianity, transhumanism holds to a materialist worldview. Nevertheless, its beliefs are somewhat parallel to those of Christianity, often in surprising ways.

Clearly, Terasem's "God in the making" was absent at creation, so what accounts for the existence of the universe in transhumanism? Its focus is the future, not the past, so it has little to offer in origins debates. Transhumanists generally accept the common scientific explanations of the physical universe. Even so, transhumanists' God of the future plays a role in some speculative creation accounts. Specifically, the possibility of a created universe has emerged from the work of transhumanist philosopher Nick Bostrom, extended by Lincoln Cannon, founder of the Mormon Transhumanist Association (MTA).

Bostrom, concerned with existential risks to human life, has written extensively about the potential dangers of superintelligence.[59] His "simulation argument" imagines that advanced civilizations, having immense computational resources, would be inter-

ested in how alternative universes might unfold. Their curiosity would, the argument goes, lead these civilizations to produce vast simulations, so real that virtual inhabitants would not understand that they were not real. Bostrom concludes that our "reality" may, in fact, be such a simulation.[60]

Bostrom does not speculate about the being(s) that may have launched our simulated world, drawing back from the theological significance of his simulation argument. Where Bostrom stops, Cannon begins, taking the line of thinking to its theological conclusion in "The New God Argument."[61] Cannon observes that to simulation inhabitants, the simulation's creator would be indistinguishable from God, capable of intervening at will in "miraculous" ways. Further, simulated beings would be obligated to fulfill their creator's purposes; to do otherwise would risk termination. Together, the arguments of Bostrom and Cannon lead to a startling materialist rationale for theological thinking.

Such speculations, of course, suffer from regress problems, for who created the creators? Even a simulated world would, it seems, require some sort of hardware, a material basis upon which everything else is built. The simulated world's creator is left undefined, in contrast to the Christian view that God, a transcendent spiritual being, created the universe and everything in it, including human life. One way or another, transhumanists trust that all these mysteries can and will be solved through science. And human progress demands that we take our world seriously, whether it is real or not.

Regarding human life, the *imago Dei* doctrine has been critically important throughout history in interpreting the nature and purpose of human life, and it remains so today. Transhumanism would agree that human beings are godlike, but they remain committed to an evolutionary account of human origins, rejecting static notions of human nature, and seeking continued evolution of human life through science and technology as a basic tenet.

Traditionally, Christians have viewed human beings as embodied souls, having minds, bodies, and spirits.[62] In contrast, transhumanists emphasize the informational aspects of human beings above all else. In this view, the only essential parts of people are their memories and thinking patterns. Today, this information resides in biological brains, sometimes referred to dismissively as "meat machines," but soon, following The Singularity, transhumanists believe the human consciousness could be uploaded into a computer. They believe that this process, which would fulfill many goals pursued by the Terasem Movement, would take place seamlessly, without an interruption in the person's "being."

People whose bodies or brains had been preserved, typically through cryonics, would be "reanimated," their cognitive states determined by detailed scans of their body tissues and regenerated in a computer. Mindfiles, if available, would complement brain scan information. Reanimated subjects would join other people whose lives were entirely cybernetic, computer-generated beings regarded as conscious and possessing the same rights as flesh persons.

Ultimately, regarding the future of creation, Terasem anticipates that its artificial God would find ways to alter the very laws of nature. This is a specific goal of Terasem Faith, which states: "Before the year 2600 we will witness joyful immortality via the control of cosmic physics."[63] Terasem recognizes that the second law of thermodynamics points toward the *heat death* of the universe, and this threatens their primary goal of immortality.

Since transhumanism rejects traditional religions, including Christianity, it is no surprise that it has no place for the Trinity. Likewise, it has no place for the incarnation of Jesus Christ in the Virgin Mary. Such myths cannot be sustained by science, so they are summarily ignored. Even so, the embodiment of living things is critically important to transhumanists. They hold that *morphological freedom* is a basic right: the right of individuals to change their bodies in any way they choose, with connections to the past, the present, and future. Consider the following:

- Since antiquity, people have changed their physical appearance by grooming, wearing clothes or jewelry, tattoos, using cosmetics, and other means.
- Today, medical procedures produce all sorts of body modifications, not only to correct physical problems, but sometimes for enhancement purposes too.[64] For example, Martine Rothblatt—formerly Martin—regards the rise of transgenderism and sex-change procedures as a step toward transhumanism and new species.[65] William Sims Bainbridge looks to enhanced real-

ity systems as an alternative disembodied way of life, one that will improve with greater computer power.[66]

- Transhumanists hope to eliminate the limitations of human bodies, even making them fashion accessories. Uploaded minds could choose to live exclusively in virtual worlds or be instantiated in whatever form is desired. This would blur distinctions between robotic and biological bodies, which are thought of as complex biochemical machines, ones that are flawed because they are subject to senescence and death. Further, it would allow for multiple simultaneous instantiations, eliminating a basic fact of life: human beings can be at only one place at one time. Going one step further, Natasha Vita-More, the wife of Max More, views morphological freedom as opening the door to new art forms.[67] Anyone dissatisfied with their body—natural or artificial—could choose a new bodily form, or no body at all! In these ways, human existence is to be radically changed, with transhumanism opening the door to one or more post-human species.

Farfetched? Not in the transhumanist worldview. It regards ongoing changes in human sexuality as steps toward morphological freedom. Martine Rothblatt looks to a future when cybernetic and "flesh" people will be regarded as complete equals:

> Society will be worried about providing birth certificates and hence citizenship to people without a body. Everyone will look to the historical precedents of recognizing people as persons rather than colored persons, and people as people rather than as gendered people. The logical next step is for some young lady engaged to a virtual transhuman to tell her exasperated father "Dad, the trouble is that you see yourself as a flesh person and I see myself as a person." Provided that certified psychologists agree that the fiancé is a real person, body or not, with the autonomy, rationality, and empathy we expect to humans, then sooner or later the courts are sure to agree.[68]

Clearly, the technical, physical, and social aspirations of transhumanism are far reaching. It seems that the movement is determined to overthrow *every* limitation, even the basic physical laws of nature. What, then, is its attitude toward moral limitations? They are much the same as those of secular humanism. Moral norms are reduced to mere social constructions, to be amended as times and circumstances change.

Consider Martine Rothblatt's thoughts on the development of cyber-persons. Since today's laws do not give an artificial intelligence legal status, she sees nothing immoral about experiments that might cause such beings to suffer. Nevertheless, she looks forward to their gaining full human rights one day. She does not specify where the line is crossed from legal non-entities to persons with rights. This is, in her mind, simply a legal question; moral nuances are unimportant.[69]

This view contrasts sharply with the biblical view, which holds that creatures owe obedience to their Creator. The Ten Commandments offer a narrow view of what God requires of human beings, with the Sermon on the Mount (Matthew 5–7) greatly expanding our understanding. Mere observance of laws is not enough; obedience must flow from love for God, for it is a matter of the heart. And since all have sinned, Jesus's death on the cross is essential to the Christian. The transhumanist view is quite the opposite; avoidance of death is essential. Let us look closer at the attitudes of transhumanism and Christians toward death.

Ray Kurzweil claims that traditional religion is guilty of "deathist rationalization—that is, rationalizing the tragedy of death as a good thing."[70] In this view, nothing good comes from death, and for religion to claim otherwise is deceptive.

Christians, and other religions that believe in an afterlife, understand death as a passage from this world into the next. With this attitude, God's love toward believers, expressed in Psalm 116:15, is incomprehensible: "Precious in the sight of the LORD is the death of his saints." Christians do not deny that death is a tragedy; rather, they look beyond death to its cause, to see human mortality as the consequence of sin, a fulfillment of God's decree in Genesis 2:16–17:

> And the LORD God commanded the man, saying, "You may surely eat of every tree of the garden, but of the tree of the knowledge of good and evil you shall not eat, for in the day that you eat of it you shall surely die."

Note that God's command, "you shall not eat," and the consequence of disobedience, "you shall surely die," are given before the Fall. Adam and

Eve understood this, so in this weak sense they had "knowledge of good and evil" in their sinless state. God wanted them to have this knowledge, but not its deeper biblical meaning, which goes beyond intellectual assent to involve intimacy and participation. To embrace sin is to reject God, and the result is to be blind to its consequences (see Romans 1).

Kurzweil and others who deny God's existence, see death only superficially. They reject its meaning, and in their ignorance, they seek its overthrow, along with everything else that gets in their way. Their salvation would be immortality apart from God, a form of existence that strongly resembles hell.

Is it acceptable to see the overthrow of all limitations? Isaiah 53:6 suggests an answer to this question. It prophesies the saving work of Christ on the cross, but what iniquity requires this sacrifice? It is the way of sheep that observe no limitations, not even their created existence as sheep that require the care of their shepherd. Human freedom can exist only within boundaries set by their Creator. To violate those boundaries—to go everyone to his own way—is to be a slave to sin. In this view, transhumanism's quest to overthrow all limitations is unforgiveable in view of the limits God has established, both morally and physically.[71]

For the transhumanist, to suffer death is to be crushed and defeated. The grave is final, except for some form of digital reanimation. In contrast, Jesus went to his death willingly, seeking our good (Heb. 12:2) and trusting in God's providence. His faith was not disappointed, for on the third day, Jesus was raised from the grave. For this reason, Christians can look past their own death to their resurrection by God.

Accounts of Jesus's actions after the resurrection indicate that his body was changed. To use transhumanism's term, it was "enhanced." Christians can look forward to similar enhancements in their resurrected state. Jesus's resurrection and glorification were not the results of technological enhancements; they were miraculous works of God. There is no reason to think that the resurrection and glorification of Christians will be anything less.

In view of God and his works, the technological God of transhumanism seems a sad counterfeit, and so is its concept of technological immortality. God created and redeemed us for his own glory. He is a jealous God, not willing to share his glory with anyone, especially those who would substitute their poor imitations for the divine works of God. The transhumanist vision seeks to produce, through clumsy developments in science and technology, what God has promised and will surely provide in accordance with his love.

Christian Transhumanism?

The Christian Transhumanist Association

Conflict between Christians and transhumanists seems inevitable given their differences over God, sin, death, and salvation. Max More observes that "Christian transhumanists, while not completely unknown, are very rare (and I know of none who are fundamentalists, and such a combination would surely indicate deep confusion)."[72] Nevertheless, in recent years Christian transhumanists have emerged, even forming a Christian Transhumanist Association (CTA).[73]

Many CTA members are Mormons, members of the Church of Jesus Christ of Latter-day Saints (LDS). Their theology is remarkably consistent with transhumanism. LDS members do not believe that God is triune, a spirit, or unique. Their God has a physical body, and their ultimate aspiration is to become a God. On this view, to enhance life by physical means is to work toward this goal. The LDS belief system is inconsistent with orthodox Christianity; Mormons cannot assent to the Apostles' and Nicene creeds, so membership in the ASA is not possible.

Lincoln Cannon helped found the Mormon Transhumanist Association (MTA) some years ago, and he had a role in establishing the CTA. Today he serves on the boards of the MTA and the CTA.[74] The MTA is a mature organization, so it is not clear why membership in the immature CTA appeals to so many Mormons, except perhaps to lend legitimacy to the LDS belief system. The fact that so many Mormons are full participants in the CTA suggests that its membership requirements are insufficient. Indeed, the CTA has *not* established a Statement of Faith, a common practice in diverse Christian organizations.

In place of a Statement of Faith, the CTA published "The Christian Transhumanist Affirmation," with five points:

> 1. We believe that God's mission involves the transformation and renewal of creation including humanity, and that we are called by Christ to participate in that mission: working against illness, hunger, oppression, injustice, and death.
>
> 2. We seek growth and progress along every dimension of our humanity: spiritual, physical, emotional, mental—and at all levels: individual, community, society, world.
>
> 3. We recognize science and technology as tangible expressions of our God-given impulse to explore and discover and as a natural outgrowth of being created in the image of God.
>
> 4. We are guided by Jesus' greatest commands to "Love the Lord your God with all your heart, soul, mind, and strength … and love your neighbor as yourself."
>
> 5. We believe that the intentional use of technology, coupled with following Christ, will empower us to become more human across the scope of what it means to be creatures in the image of God.[75]

Although the Affirmation concludes that "in this way we are Christian Transhumanists," it is not clear how CTA members are committed to either Christianity or transhumanism, at least as they are customarily defined.

Regarding Christianity, nothing in points 1–4 differs from commonplace Christian beliefs. For example, after I became a Christian in my teens, I worked for many years as an engineer, attempting in small ways to achieve a better world. Not once did I think of myself as a transhumanist. In fact, I never heard the word until 2012 when my dissertation adviser suggested I investigate the subject. No doubt, many other Christians working in science and technology think the same way.

So just what do affirmations 1–4 mean? By emphasizing these commonly held beliefs, the CTA reveals its assumption that conflict between Christianity and science exists everywhere aside from transhumanism. The CTA's home page (as of April 18, 2019) confirms this, with its rhetorical question: "What if science, faith & technology could work together to create a better world?" Members of the ASA do *not* believe science and Christianity are fundamentally in conflict, yet few, if any, would consider themselves transhumanists.

Regarding transhumanism, affirmation 5 alone speaks to orthodox transhumanism's commitment to human enhancements through technology. Unfortunately, it is not clear what is meant by the desire to "become more human." No CTA member that I asked could explain it.[76] What could this affirmation mean?[77]

Perhaps human beings became "less human" in the Fall? If so, then surely people become "more human" when they repent from sin and live for Christ. This "human enhancement" is, in Christian thinking, the work of the Holy Spirit, not some sort of technological upgrade.

Maybe becoming "more human" means the acquisition of new capabilities through creativity, science, and technology? If so, then, once again, there is nothing new about Christian transhumanism, for believers have been actively working on such things for centuries. The CTA seems to admit this in its "Frequently Asked Questions" section of their web site:

> Q: What is a Transhumanist?
>
> A: Someone who advocates using science & technology to transform the human condition.[78]

If this is so, then there are very few people that are *not* transhumanists!

In sum, the CTA offers a weak view of God and his purposes, one that invites speculation about God's intent in creating human beings, especially the *imago Dei*. Technoscience fascinates its members, but this leads them astray, just as secular transhumanists are led astray by pride in human achievements. Creativity is elevated to first place among the virtues, while sin and its effects are minimized or forgotten altogether. Science and technology are embraced, but Christ is no longer preeminent, per Colossians 1:15–20, or absent altogether. Silent about such issues, CTA advocacy for technological human enhancements seems just as short-sighted as blind rejections.

Final Reflections and Questions

The CTA's theological commitments are minimal.[79] This is a serious problem, for every human association must answer the question: "What binds us together?" For Christians, unity depends upon revealed truth.

C.S. Lewis offers an antidote to this problem in "Religion without Dogma," an essay dealing directly with minimalist Christianity.[80] First, Lewis describes theological minimalism's beliefs:

> (1) That the essence of religion is belief in God and immortality;
>
> (2) that in most actual religions the essence is found in connection with the 'accretions of dogma and mythology' which have been rendered incredible by the progress of science;
>
> (3) that it would be very desirable, if it were possible, to retain the essence purged of the accretions; but,
>
> (4) that science has rendered the essence almost as hard to believe as the accretions.[81]

Next, he goes on to dissect these ideas, pointing out how they misunderstand science and its limits. Lewis observes, "There is in this minimal religion nothing that can convince, convert, or (in the higher sense) console; nothing therefore, which can restore vitality to our civilization."[82] Finally, Lewis notes that for Christians to know God it must be "by self-revelation on his part, not by speculation on ours."[83]

ASA members understand that God has revealed himself in both nature and scripture. God's nature is revealed exactly in Jesus Christ (Heb. 1:1–4), who is fully human, yet glorified apart from any human inventions. And finally, his truth continues to be revealed through the work of the Holy Spirit. There is no reason to think that science has dimmed the revealed glory of God, and even less reason to think that science could offer a substitute for salvation through Christ.

ASA members can contribute to a growing body of thought on transhumanism and the proper place of science and technology in the future. Considering transhumanism's religious significance, Christian theological insights into the opportunities and challenges of futuristic science and technology are especially needed.

Many questions must be answered with precision, before transhumanism can be accepted as a valid expression of God's will. For example:

1. In the Christian view, what can science and technology ultimately accomplish? Can they make us "more human" in meaningful ways?
2. To what extent is transhumanism a scientific enterprise? To what extent is transhumanism a religion?
3. How should Christians view potential technological enhancements to human life?
4. What should Christians do to promote or oppose transhumanism?

Members of the ASA, with their firm and thoughtful commitments to biblical Christianity and science, are especially capable of thinking through these questions. What can you contribute to the discussion? +

Notes

[1]The American Scientific Affiliation, "About the ASA," https://network.asa3.org/page/ASAAbout. This and all the following internet sites were accessed in April 2019.

[2]See Num. 23:19, Heb. 13:8, and James 1:17.

[3]H. Richard Niebuhr, "The Enduring Problem," in *Christ and Culture* (1951; reprint, New York: Harper Collins, 2001), 1–44.

[4]Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago, IL: The University of Chicago Press, 1962).

[5]David Hounshell, *From the American System to Mass Production, 1800–1932: The Development of Manufacturing Technology in the United States* (Baltimore, MD: The Johns Hopkins University Press, 1984).

[6]Andrew Hodges, *The Enigma* (1983; reprint, London: Vintage Books, 2014).

[7]Mihail C. Roco and William Sims Bainbridge, eds., *Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology, and Cognitive Science* (Dordrecht, The Netherlands: Kluwer Academic, 2003). The report is available online from the World Technology Evaluation Center (WTEC), https://www.wtec.org/ConvergingTechnologies/Report/NBIC_report.pdf.

[8]Ibid., 13; original emphasis.

[9]Consider the research topics listed by the WTEC, http://www.wtec.org/reports.htm, and especially the collaborative efforts of the U.S. National Science Foundation, National Institutes of Health, National Aeronautics and Space Administration, Environmental Protection Agency, Department of Defense, and Department of Agriculture in the report "Leading Scientists Discuss Converging Technologies," (Lancaster, PA: World Technology Evaluation Center, 2014), https://www.wilsoncenter.org/article/leading-scientists-discuss-converging-technologies-0.

[10]Julian Savulescu is a leading advocate for moral enhancements. See, for example, Julian Savulescu and Ingmar Persson, "Moral Enhancement, Freedom, and the God Machine," *The Monist* 95, no. 3 (2012): 399–421; and Julian Savulescu and Anders Sandberg, "Neuroenhancement of Love and Marriage: The Chemicals between Us," *Neuroethics* 1, no. 1 (2008): 31–44.

[11]See Martine Rothblatt, *Virtually Human: The Promise—and the Peril—of Digital Immortality* (New York: St. Martin's Press, 2014).

[12]Consider Francis Collins's overview of the possibilities and ethical challenges of human enhancements in "The Joyful Complementarity of Science and Faith," ASA Annual Meeting, lecture, Gordon College, Wenham, MA, July 28, 2018, posted August 9, 2018, YouTube video, 1:18:51, https://www.youtube.com/watch?v=r9xTE3imk84; mp3 audio, 59:25, go to http://www.asa3.org/ASAradio/ and scroll down to ASA2018Collins.mp3.

[13]See Eric Lander et al., "Adopt a Moratorium on Heritable Genome Editing," *Nature* 567 (March 13, 2019), https://www.nature.com/articles/d41586-019-00726-5.

[14]Personal experience on Facebook.

[15]For a survey of how faith affects how people live, see Herman Bavinck, *The Certainty of Faith* (1901; English translation, St. Catharines, ON: Paideia Press, 1980).

[16]Max More introduced the current use of the term "transhumanism" in a 1990 essay, "Transhumanism: Toward a Futurist Philosophy," revised in 1994 and 1996, https://vdocuments.mx/transhumanism-toward-a-futurist-philosophy.html. The essay was published by the Extropy Institute, http://www.extropy.org/, which More founded in 1991 to build the human enhancement movement. It closed in 2006 as other organizations took up that mission, especially *Humanity+*, https://humanityplus.org/.

[17]Alcor Life Extension Foundation, https://www.alcor.org/.

[18]Max More, "The Philosophy of Transhumanism," in *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future,* ed. Max More and Natasha Vita-More (West Sussex, UK: John Wiley & Sons, 2013), 3.

[19]Ibid., 8.

[20]"Frequently Asked Questions: Page 4—Spiritual Questions," Alcor Life Extension Foundation, https://www.alcor.org/FAQs/faq04.html.

[21]See Max More, "The Terminus of the Self," from *Cryonics*, 4th Quarter 1994 and 1st Quarter 1995, https://www.alcor.org/Library/html/TerminusOfTheSelf.html. More's views of death are fully developed in "The Diachronic Self: Identity, Continuity, Transformation," (PhD diss., University of Southern California, 1995). Note that under current law, Alcor engages in post-mortem medical experimentation; it can preserve a person's body or brain only after they have been declared dead by medical personnel.

[22]"What is Cryonics?," Alcor, https://www.alcor.org/AboutCryonics/index.html.

[23]National Science Foundation, Computer and Information Science and Engineering (CISE), Information & Intelligent Systems (IIS), http://www.nsf.gov/div/index.jsp?div=IIS.

[24]William Sims Bainbridge, *Across the Secular Abyss: From Faith to Wisdom* (Guilford, CT: Lexington Books, 2007).

[25]See Peter L. Berger, ed., *The Desecularization of the World: Resurgent Religion and World Politics* (Washington, DC: Ethics and Public Policy Center, 1999).

[26]Rodney Stark and William Sims Bainbridge, *The Future of Religion: Secularization, Revival, and Cult Formation* (Berkeley, CA: University of California Press, 1985).

[27]William Sims Bainbridge, "Religion for a Galactic Civilization 2.0," Institute for Ethics and Emerging Technologies, posted August 20, 2009, http://ieet.org/index.php/IEET/more/bainbridge20090820/.

[28]Ibid.

[29]Ibid.

[30]Ray Kurzweil, *The Age of Intelligent Machines* (Cambridge, MA: The MIT Press, 1990).

[31]Ray Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (New York: Viking Penguin, 1999).

[32]Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Viking, 2005).

[33]Christianna Reedy, "Kurzweil Claims That the Singularity Will Happen by 2045," *Wired*, October 5, 2017, https://futurism.com/kurzweil-claims-that-the-singularity-will-happen-by-2045.

[34]Ray Kurzweil, *How to Create a Mind: The Secret of Human Thought Revealed* (New York: Penguin Books, 2012).

[35]Ray Kurzweil, *The Singularity Is Near*, 374–75. Note that Kurzweil capitalizes "God," just as other transhumanists do, declining to distinguish their concept of superintelligence from common views of God. In this article, I will follow this practice while denying their claim of equivalence.

[36]For example, see Matthew Dickerson, *The Mind and the Machine: What It Means to Be Human and Why It Matters* (Grand Rapids, MI: Brazos Press, 2011).

[37]See his profile by John Berman, "Futurist Ray Kurzweil Says He Can Bring His Dead Father Back to Life through a Computer Avatar," *ABC News*, August 9, 2011, https://abcnews.go.com/Technology/futurist-ray-kurzweil-bring-dead-father-back-life/story?id=14267712. See also "Ray Kurzweil on Bringing Back the Dead," *PBS*, July 12, 2012, video, 4:11, https://www.pbs.org/video/pbs-newshour-ray-kurzweil-on-bringing-back-the-dead/.

[38]Tom Simonite, "Ray Kurzweil Says He's Breathing Intelligence into Google Search," *MIT Technology Review*, June 26, 2014, https://www.technologyreview.com/s/528656/ray-kurzweil-says-hes-breathing-intelligence-into-google-search/.

[39]*Transcendent Man: The Life and Ideas of Ray Kurzweil*, 2009, directed by Robert Barry Ptolemy, Ptolemaic Productions, https://transcendentman.com/.

[40]Terasem Movement Inc., https://www.terasemcentral.org/.

[41]PersonalityMD, http://www.personalitymd.com/.

[42]CyBeRev Project, http://www.cyberev.org/.

[43]Terasem Journals, http://www.terasemjournals.org/.

[44]*The Singularity Is Near*, 2012, KurzweilAI.net and Terasem Motion Infoculture, http://www.singularity.com/themovie/#.VXb5Q89VhBc.

[45]Terasem Faith, 2018, http://terasemfaith.net/. Its meditative "Terasem Connections" are at http://www.terasemcentral.org/social.html#Connections.

[46]Terasem Radio, 2019, Terasem Movement, https://www.terasemradio.com/newradio/Radio.aspx.

[47]*The Truths of Terasem*, http://terasemfaith.net/beliefs. The Truths were formerly available online as a 75-page pdf document, Terasem Movement Inc., *The Truths of Terasem: A Transreligion for Technological Times* (Lincoln, VT: Terasem Quadrennial Convocation, 2012).

[48]Ibid.

[49]Ibid., section 2.7.

[50]In this article, all biblical quotes are from the English Standard Bible (ESV).

[51]"ASA Statement of Faith," American Scientific Affiliation, https://network.asa3.org/page/ASAbeliefs.

[52]"Catechism of the Catholic Church, Article 1, Paragraph 1, Section 202," Libreria Editrice Vaticana, Citta del Vaticano

1993, http://www.vatican.va/archive/ENG0015/__P16.HTM.

[53]See The Orthodox Presbyterian Church, "Westminster Shorter Catechism," Questions 4, 5, and 6, https://opc.org/sc.html, and "The Articles of Religion of the Methodist Church, Article I—Of Faith in the Holy Trinity," https://www.umc.org/what-we-believe/the-articles-of-religion-of-the-methodist-church.

[54]Transfiguration: Matt. 17:2, Mark 9:2–3, and Luke 9:28–36; resurrection: Mark 16, Matthew 28, Luke 24, John 20, and Acts 1; and ascension: Mark 16:19, Luke 24, and Acts 1.

[55]The Orthodox Presbyterian Church, "Westminster Shorter Catechism," Question 14, https://opc.org/sc.html.

[56]Gen. 2:16–17; Ezek. 18:20; Rom. 5:12, 6:23, and 7:5; James 1:16. William Horst proposes an alternative evolutionary view of death and sin in "Morality, Not Mortality: The Inception of Death in the Book of Romans," *Perspectives on Science and Christian Faith* 71, no. 1 (2019): 24–36, https://www.asa3.org/ASA/PSCF/2019/PSCF3-19Horst.pdf.

[57]Discussed at length in "Catechism of the Catholic Church, Article 1, Paragraph 7. THE FALL," http://www.vatican.va/archive/ENG0015/__P1C.HTM.

[58]The work of Christ on the cross, described in the gospels, is developed throughout the epistles. See Rom. 3:21–26, 8:1–4; Gal. 1:3–5; Eph. 2:1–10; Heb. 9:11–14; 1 Pet. 1:3–5; and elsewhere.

[59]Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford, UK: Oxford University Press, 2014). From a materialist perspective, Bostrom develops a specter of computational *sin* without using the word.

[60]Nick Bostrom's Home Page, "Are You Living in a Computer Simulation?," http://www.nickbostrom.com. Also published in *Philosophical Quarterly* 53, no. 211 (2003): 243–55 (First version 2001), https://www.simulation-argument.com/simulation.pdf.

[61]Lincoln Cannon, "The New God Argument," with three versions, https://new-god-argument.com/.

[62]For a fascinating analysis of the soul in view of transhumanist thought, see Ted Peters, "The Soul of Trans-Humanism," *Dialog: A Journal of Theology* 44, no. 4 (Winter 2005): 381–95.

[63]*Truths of Terasem*, section 4.4.6, http://terasemfaith.net/beliefs.

[64]Consider Neil Harbisson, a colorblind man with an antenna attached to his skull that allows him to "hear" color. His TED talk, "Neil Harbisson: I Listen to Color," July 20, 2012 (9m 35s), is at https://www.youtube.com/watch?v=ygRNoieAnzI. Or consider cyclist Lance Armstrong, whose surgery to repair a broken collarbone reduced his aerodynamic drag. See Lorne Wisely, "Armstrong Perfects Aero Position with Surgery," *Cyclingnews*, March 31, 2009, http://www.cyclingnews.com/news/armstrong-perfects-aero-position-with-surgery/.

[65]Martine Rothblatt, "Mind Is Deeper Than Matter: Transgenderism, Transhumanism, and the Freedom of Form," in *The Transhumanist Reader*, ed. More and Vita-More, 317–26.

[66]William Sims Bainbridge, "Transavatars," in *The Transhumanist Reader*, ed. More and Vita-More, 91–99.

[67]Natasha Vita-More, "Aesthetics: Bringing the Arts & Design into the Discussion of Transhumanism," in *The Transhumanist Reader*, ed. More and Vita-More, 18–27.

[68]Rothblatt, "Mind Is Deeper Than Matter," in *The Transhumanist Reader*, ed. More and Vita-More, 321.

[69]Ibid., section Bio-Cyber-Ethics, 322.

[70]Kurzweil, *The Singularity Is Near*, 372.

[71]Consider, for example, the analysis of Cory Andrew Labrecque, "Morphological Freedom and the Rebellion against Human Bodiliness: Notes from the Roman Catholic Tradition," in *Religion and Transhumanism: The Unknown Future of Human Enhancement*, ed. Calvin Mercer and Tracy J. Trothen (Santa Barbara, CA: Praeger, 2015), 303–13.

[72]Max More, "The Philosophy of Transhumanism," in *The Transhumanist Reader*, ed. More and Vita-More, 8.

[73]Christian Transhumanist Association (CTA), https://www.christiantranshumanism.org/.

[74]"The Board," CTA, https://www.christiantranshumanism.org/board.

[75]"The Christian Transhumanist Affirmation," CTA, https://www.christiantranshumanism.org/affirmation.

[76]Author's private communications.

[77]James Peterson points out, via personal communication, that "there is extensive literature on whether God's plan for humanity is static or dynamic." His book would be a good starting point toward developing the possibility and meaning of becoming "more human." James C. Peterson, *Changing Human Nature: Ecology, Ethics, Genes, and God* (Grand Rapids, MI: William B. Eerdmans, 2010).

[78]"Frequently Asked Questions," Christian Transhumanist Association, https://www.christiantranshumanism.org/faq.

[79]The "theological minimalism" of the CTA appears to have its roots in the denominational background of Micah Redding, a CTA founder and Executive Director. See his blog article "The Church of Christ," apparently posted on April 20, 2015, http://micahredding.com/blog/2015/04/20/church-christ.

[80]C.S. Lewis, "Religion without Dogma?," in *God in the Dock*, reprinted in *The Timeless Writings of C.S. Lewis* (1946; reprint, New York, Inspirational Press, 1996), 387–98.

[81]Ibid., 387.

[82]Ibid., 396.

[83]Ibid., 397.

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Calvin Mercer

A Theological Embrace of Transhuman and Posthuman Beings

Calvin Mercer

Christianity exhibits theological flexibility, potentially allowing for inclusion of beings generated from enhancement and artificial intelligence (AI) technologies. Paul's victory over the circumcision party allowed Gentiles to follow Jesus Christ without becoming Jewish. The Abrahamic covenant required a body, altered by circumcision, to be in right relationship with God. Paul's gospel explicitly does not require an altered body. For Jews and Gentiles, justification requires only acceptance of God's grace. Transhuman and posthuman beings, resulting from enhancement and AI technologies, may be able to do this as God's creations. Granted, further work may determine if these beings will meet other theological criteria for salvation.

Transhuman/posthuman possibilities are urgent matters for Christians to address.[1] This article discusses the challenge presented by salvation for transhuman/posthuman beings and then gives an important biblical example, showing that Christianity is theologically flexible enough. These beings will be created by God. Further theological work is needed, with attention to biblical and theological assessments of the anthropology, soteriology, eschatology, and other aspects of these new beings. Are they fallen, and do they have free will, are just two of many questions requiring theological inquiry.

The Nature of Transhuman and Posthuman Beings

The human species stands at an important moment in its evolution, one in which it is developing the tools to take active control of the future of humanity as we enter an era of "radical evolution."[2] The biotechnology revolution is yielding scientific discoveries and technologies that will transform what it means to be human in physical, cognitive, affective, and even in moral[3] and spiritual[4] domains. Questions are being raised about what it means to have personhood and sentience.[5] These developments are fiercely debated by an increasing number of ethicists and public intellectuals.[6] The long philosophical and theological discussion about human nature and what, in the biblical tradition, is called the *imago Dei,* is going to take on new intensity and significance in a world where "cyborg" and "spiritual machine" are no longer merely the stuff of science fiction. We are now seeing scholars of religion reflecting on transhuman and posthuman possibilities in sustained and thoughtful ways.[7] These questions will not yield quick and easy resolution, nor should they.

There are other possibilities, but a brief review of cyborgs, artificial superintelligence, and whole brain emulation is sufficient to raise the question about the status of future technologically produced beings or radically enhanced human beings from a Christian theological perspective. These three examples paint a picture strongly suggesting that the new world aborning will require theological assessment of transhuman and, possibly, posthuman beings.

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1. Cyborgs

Part human/part machine "cyborgs" are not raising theological concerns at the level of pacemakers and artificial knees. Although much harder to manipulate, the brain and nervous system, radically enhanced, would raise theological issues. Advanced cyberization could use tissue engineering, biomechatronics, nanomachines, and neuroscience breakthroughs to modify our senses, personality, memory, and other cognitive functions. FDA-approved neural implants are placed directly into the brain of some patients to counteract symptoms of Parkinson's disease and other neurological disorders. Increasingly, computers will be embedded in our bodies. At some point, modification may change our person, our very nature. For years, philosophers have debated whether a machine can have consciousness. Regardless of how that debate turns out, at a practical level, the merging of machines and biological entities will raise acute theological and philosophical questions about the nature of human beings.

2. Artificial Superintelligence

Artificial intelligence (AI) is, appropriately, now getting much attention regarding its impact on jobs and the economy. AI has traversed through several boom and bust periods. Now, it seems positioned for a period of significant advancement. Battlefield robotics, self-driving cars, and smart home devices are just a few ways in which AI is increasingly becoming a part of our daily lives in what is called "weak" or "narrow" AI. This kind of AI push by countries and companies lays the groundwork for the development of what is sometimes called "strong AI," that is, machines that mimic general human intelligence. Machines with intelligence at the general human level may never be developed. That said, strong AI is enough of a possibility to merit our exploration, even if now only as a thought experiment.

Superintelligence refers to machine intelligence that surpasses general human intelligence. Nick Bostrom, director of the Future of Humanity Institute at the University of Oxford, provides the most current and thorough assessment of the possibility of a superintelligent machine in an important book, *Superintelligence: Paths, Dangers, Strategies*.[8] Apart from the considerable dangers detailed by Bostrom and others,[9] complicated theological questions would be raised by superintelligence that is autonomous, potentially self-aware, and able to act in the world via robotics. Consider the following statement, not an atypical one, coming from Scottish AI expert David Levy several years ago.

> We are in sight of the technologies that will endow robots with consciousness, making them as deserving of human-like rights as we are; robots who will be governed by ethical constraints and laws, just as we are; robots who live, and who welcome being loved, and who make love, just as we do; and robots who can reproduce. This is not fantasy—it is how the world will be, as the possibilities of Artificial Intelligence are revealed to be almost without limit.[10]

Videos of robots on the internet provide a sense of what it might be like to experience intelligent robots occurring as persons and with consciousness.[11] As development of intelligent robots continues, whether robots are persons, and are actually conscious, will be a part of the ongoing debate. Engineers in Japan are particularly skilled at creating human-like robots. Human-like robots playing roles in our everyday lives will increasingly raise questions about treatment of robots, robot rights, the definition of personhood, and a host of religious questions, such as the ones raised in this article.

3. Whole Brain Emulation

Our third example, whole brain emulation, often referred to as "mind uploading," refers to copying the information in the brain, such as memory and personality, into a digital substrate. Although major technical barriers must be overcome, thoughtful critics argue that mind uploading of some sort will be feasible at some point. Bostrom addresses the technical aspects of whole brain emulation in his book, *Superintelligence*. Mind uploading raises questions about personal identity and the role of embodiment in personhood.[12] Until now, we have placed neural implants into the human brain. Whole brain emulation changes the direction, potentially moving the "mind" into a computer—uncharted territory. Regardless of how this "enhancement" might unfold, it reflects a new "creature" in at least some sense of that word.

Christianity Is Nimble—Paul's Victory over the Circumcision Party as an Example

Thus far in its history, Christianity has proven flexible and adaptable, while maintaining allegiance to the Bible and historic creeds such as the Nicene

Creed and the Apostles' Creed. Paul's first-century victory over the circumcision party agitators[13] is an important biblical example of Christianity's early ability to embrace a new category of believer.

The circumcision controversy refers to the theological disagreement between Paul and his opponents[14] regarding how one is justified before God—through grace and faith or through keeping the law. The particulars of this pivotal first-century dispute are debated by scholars. However, the basic thrust of the controversy and its outcome is clear, and that outcome is sufficient for the purposes of this article. In opposition to the circumcision party, which required Gentiles to be circumcised and fulfill some other requirements of the law to be saved, Paul contended strongly, persistently, and, eventually, successfully, that justification is by grace through faith. This doctrinal debate had colossal implications for the Christian church. Gentiles could come into the church without "becoming Jewish," in particular, without being circumcised and keeping the law.

Paul addresses the issue primarily in the book of Galatians. It is the one book without Paul's typical thanksgiving in the greeting. He says that his opponents have "perverted" the gospel (Gal. 1:7), he doubly curses them (Gal. 1:8–9), and he says that he wishes the knife would slip for those requiring circumcision (Gal. 5:12). I could give other examples; these examples are enough testimony to Paul's anger, which points to the critical import he attributed to this theological debate.[15]

The Abrahamic covenant required an altered body (circumcision) to be in right relationship with God. Paul came from this traditional view, but his thinking shifted in light of his experience in Christ. The new covenant, according to Paul, explicitly does not require an altered body to be in right relationship with God. Justification requires faith acceptance of God's grace by everyone, Jews and Gentiles. Some might argue that justification does not require a body at all, but that conclusion would require biblical and theological consideration of the nature and role of embodiment in God's creation of human beings.[16]

So, Paul radically stepped out of the traditional and familiar paradigm in which he was comfortable. Once he made the shift to the inclusion of Gentiles, he resisted setting up a rigid set of regulations; this new approach can be understood as leaving room to be flexible going forward. Although she was, in this quotation, referring to Paul's view of the body, Pauline scholar Lee Johnson's framing is helpful.

> It strikes me that Paul's thought reveals a great deal of imaginative mythmaking that happened in light of his Damascus Road experience … [Paul's] creative theological reconfiguration … [is a] paradigm for the church in the twenty-first century as it faces the theological challenge of transhumanism.[17]

Christianity arguably began as a sect of Judaism. Jesus and most of the early disciples were Jews. The new faith, however, was nimble enough to reach out and fully embrace a new category of believers, the Gentile. Second Temple Judaism had already included Gentiles but it required them to become Jewish and to submit to second-class status. While his relationship to Judaism is debated, Paul can be understood as reflecting a decisive transition from religious particularism to religious universalism.[18]

For sure, sentience that emerges from AI-enhanced robots, or from some other transhuman/posthuman being we have discussed, is a far cry from the category of Gentile, unquestionably human and recipient of God's saving grace. My point, echoing Johnson, is that the circumcision debate, as well as its outcome favoring inclusion of Gentiles, provides an example of Christianity expanding beyond boundaries that many opponents of Paul in that day believed should not be crossed.

Even if Christianity, theoretically, is theologically nimble enough to embrace transhuman and posthuman beings, that in itself is not sufficient to conclude that such beings can receive justification. Those new beings will need to pass theological muster. In other words, the transhuman/posthuman beings must be able to be assessed as being consistent with the theological tradition expressed in the Bible and in major historic creeds. I address one of many issues that will require assessment. I show that it is biblically and theologically reasonable to understand transhuman/posthuman beings as created by God.

God Is Doing the Creating—Still

Central to the monotheistic tradition and firmly embedded in the biblical materials is the idea that God is creator. Human beings are created by God in the *imago Dei*, the image of God. Admittedly, the

Bible is a collection of books primarily about human beings, from the creation stories through the story of the ancient Israelites and culminating in Jesus and the early church. Human beings, however, are not the sole focus of God's creative or salvific activity. After the first two chapters of the Bible, the creative activity of God continues in many and varied ways, even to the end-time, with "a new heaven and a new earth" (Rev. 21:1; 2 Pet. 3:13). The nature of animals and the status of the nonhuman creation have long been discussed.[19] Regardless of how those issues are resolved, the question now before us concerns new categories of creations (e.g., cyborgs, superintelligence, mind-uploads) in which the possibilities of consciousness and soul are more obvious than they are with animals.

Valuable here is the idea and terminology of "created co-creators," introduced by Philip Hefner and playing an important role in the religion and science field for over two decades.[20] The human creatures are given responsibility for being stewards of the rest of creation. They are to tend the Garden of Eden, allowing it to flourish with new life. Also, the human creation co-creates with God, developing tools and cities and people to use the tools and to live in the cities. "Be fruitful and multiply" (Gen. 1:28) is the deity's command. The creation in Genesis 1 is thoroughly good and full of promise and potential. There is no hint of trouble or evil in that first chapter. For sure, we move to Genesis 3 to find that sin appears, along with all its disastrous consequences. The human beings make irresponsible decisions, and we soon read stories of Cain killing Abel and a flood devastating the earth. Very powerful technologies in hands not tempered by humility and commitment to the mission to tend the garden can result in serious mischief and suffering.[21] While it is prudent to always remember that our technology can bring harm, this does not nullify the good that properly handled technology can generate.[22]

Hefner's notion of created co-creators provides the biblical and theological framework for the contention that God works through the human creatures to develop technologies, perhaps very powerful ones, for good. Put in a different way, technology can be a means of grace. The moral status of technology is vigorously debated.[23] My appropriation of Hefner's created co-creator concept is situated in an instrumental view of technology, that is, technology as value-neutral, with a positive effect if guided in a healthy direction.

These biblical and theological considerations, along with the assessment of technology as potentially positive in its impact, provide a basis for understanding God's using human created co-creators to continue to create, in this case, other, perhaps more-advanced, species. We could describe them as *techno sapiens* or *techno sentiens;* they include cyborgs, superintelligence, and mind-uploads. Admittedly, further theological work is required to address questions such as the potential fallen nature of transhuman/posthuman beings, and the nature of God's incarnation that would address that fallenness.

While I plan to address it at length in another paper, the question of other worlds that include extraterrestrial life is an example, at least theoretically, of God's creation of sentient beings other than *Homo sapiens*. Ted Peters calls for "exotheology," speculation on the theological significance of extraterrestrial life.[24] Pope Francis, in a widely circulated 2014 quote, said that he would baptize Martians, should they make that request.[25] This hypothetical example of baptizing Martians provides an interesting lens through which to view a text such as that beautiful hymn in Colossians 1:15–23, which affirms that God reconciles "all things, whether on earth or in heaven" (verse 20).[26]

Reflections by academic theologians on the implications for Christian theology of extraterrestrial life may not be directly transferable to transhuman/posthuman beings, but such theologizing provides a fertile starting point for the contention that transhuman/posthuman beings are creations of God. For example, Paul Tillich writes:

> Incarnation is unique for the special group in which it happens, but it is not unique in the sense that other singular incarnations for other unique worlds are excluded. Man cannot claim to occupy the only possible place for incarnation.[27]

Embracing Transhuman/Posthuman Beings

Some Christians expect that the antichrist will utilize the transhuman/posthuman technologies for evil.[28] On the opposite extreme, some Christian transhumanist/posthumanist enthusiasts may accept anything science can accomplish.[29] Both extremes are unwise. Prudence requires at least a general understanding of relevant technologies, followed by careful reflection from the core teachings of the religions, in our case, Christianity.

I have detailed a biblical example of Christianity's theological flexibility and inclusion, allowing Gentiles to convert without becoming Jewish. Christianity is sufficiently theologically nimble to include, in the spirit of Paul, beings resulting from enhancement and AI technologies. These beings can be understood as created by God who is working with God's created co-creators. The embrace of new categories of beings ought not to be indiscriminate, however. The hard theological work is to evaluate these new forms of intelligence and determine if these beings meet other theological criteria, such as, would they have free will? be fallen? With that qualification, and with due attention to ethical concerns not addressed in this article, let us sing with the psalmist, "Be glad and rejoice forever in what I am creating" (Ps. 65:18). +

Acknowledgment

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Notes

[1]Derek C. Schuurman, "Artificial Intelligence: Discerning a Christian Response," *Perspectives on Science and Christian Faith* 71, no. 2 (2019): 75–82, also urges Christians to engage in the evaluation of AI. He writes, "The rapid pace of change adds a degree of urgency to this call to engage" (p. 81).

[2]*Radical Evolution* is the title of the book by Joel Garreau, a competent journalist of cultural revolutions and, in this case, biotechnology. *Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies – and What It Means to Be Human* (New York: Doubleday, 2005).

[3]For example, Gareth Jones, "Moral Enhancement as a Technological Imperative," *Perspectives on Science and Christian Faith* 65, no. 3 (2013): 187–95; and Tracy Trothen, "Moral Bioenhancement from the Margins: An Intersectional Christian Theological Reconsideration," in *Religion and Human Enhancement: Death, Values, and Morality,* ed. Tracy J. Trothen and Calvin Mercer (New York: Palgrave Macmillan, 2017), 245–65.

[4]For example, Ron Cole-Turner, "Spiritual Enhancement," in *Religion and Transhumanism: The Unknown Future of Human Enhancement,* ed. Calvin Mercer and Tracy Trothen (Westport, CT: Praeger, 2015), 369–84.

[5]One can see the centrality of these questions showing up in the titles of books on biotechnology. Consider the subtitles of these books: Ray Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (New York: Viking, 1999); Garreau, *Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies – and What It Means to Be Human*; and Bill McKibben, *Enough: Staying Human in an Engineered Age* (New York: Henry Holt, 2003). McKibben has updated, but not essentially altered, his reflections on radical human enhancement in *Falter: Has the Human Game Begun to Play Itself Out?* (New York: Henry Holt, 2019). For a helpful review of four books on these topics, see Patrick S. Franklin, "The Human Person in Contemporary Science and Theology," *Perspectives on Science and Christian Faith* 64, no. 2 (2012): 120–29.

[6]For example, Leon R. Kass, "L'Chaim and Its Limits: Why Not Immortality?," *First Things: A Journal of Religion and Public Life* 113 (May 2001): 17–24; Gregory Stock, *Redesigning Humans: Our Inevitable Genetic Future* (Boston, MA: Houghton Mifflin, 2002), 78–96; Ronald Bailey, *Liberation Biology: The Scientific and Moral Case for the Biotech Revolution* (Amherst, NY: Prometheus Books, 2005), 25–61; Francis Fukuyama and Franco Furger, *Beyond Bioethics: A Proposal for Modernizing the Regulation of Human Biotechnologies* (Washington, DC: Paul H. Nitze School of Advanced International Studies, Johns Hopkins University, 2006); William Hanson, MD, *The Edge of Medicine: The Technology That Will Change Our Lives* (New York: St. Martin's Griffin, 2008); and McKibben, *Falter: Has the Human Game Begun to Play Itself Out?*

[7]Ron Cole-Turner has long addressed the impact of new and emerging technologies on human understanding and the human future. A recent edited collection is Steve Donaldson and Ron Cole-Turner, eds., *Christian Perspectives on Transhumanism and the Church: Chips in the Brain, Immortality, and the World of Tomorrow* (New York: Palgrave Macmillan, 2018). For other examples, see Ronald Cole-Turner, ed., *Design and Destiny: Jewish and Christian Perspectives on Human Germline Modification* (Cambridge, MA: MIT Press, 2008); Brent Waters, *This Mortal Flesh: Incarnation and Bioethics* (Grand Rapids, MI: Brazos Press, 2009); Ted Peters, *Science, Theology, and Ethics,* in Ashgate Science and Religion Series (Aldershot, UK: Ashgate Publishing, 2003); Schuurman, "Artificial Intelligence: Discerning a Christian Response," 75–82; Russell Bjork, "Artificial Intelligence and the Soul," *Perspectives on Science and Christian Faith* 60, no. 2 (2008): 95–102; and Celia Deane-Drummond, Sigurd Bergmann, and Bronislaw Szerszynski, eds., *Technofutures, Nature and the Sacred: Transdisciplinary Perspectives* (Abingdon, UK: Ashgate Publishing, 2015). The American Academy of Religion "Human Enhancement and Transhumanism" academic unit is also an indication of this interest from scholars of religion. A brief history of this academic group, which has given attention to some of the concerns expressed in this article, is found in Calvin Mercer, "Introduction: Making the Unknown Known," in *Religion and Transhumanism,* ed. Mercer and Trothen, ix–xiv. See especially page xi.

[8]Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford, UK: Oxford University Press, 2014).

[9]To minimize the dangers, Bostrom and others advocate value-loading each new generation of AI, so that superintelligence does not harm humans and the planet. Although they are addressing AI in general, and not specifically superintelligence, Albert M. Erisman and Tripp Parker discuss "Virtuous AI" in "Artificial Intelligence: A Theological Perspective," *Perspectives on Science and Christian Faith* 71, no. 2 (2019): 95–106. See especially pages 97–99.

[10]David Levy, *Robots Unlimited: Life in a Virtual Age* (Boca Raton, FL: CRC Press, 2005), 293.

[11]This video provides clips of robots as well brief remarks by a Japanese roboticist, https://video.search.yahoo.com/yhs/search?fr=yhs-ore-001&hsimp=yhs-001&hspart=ore&p=japanese+professor+with+human-like+robots#action=view&id=37&vid=aed4712a9452753a8e6a1a8c5c9b9efd. See also https://video.search.yahoo.com/yhs

/search?fr=yhs-ore-001&hsimp=yhs-001&hspart=ore&p=japanese+professor+with+human-like+robots#action=view&id=40&vid=15e34dcdf8380793edda4eabc0d9a4f1.

[12]For theological reflections on whole brain emulation, see articles by Calvin Mercer: "Mind Uploading, Embodied Existence, and Personal Identity—Is There a Theological Way through This Transhumanist Program?," forthcoming in *Religious Transhumanism and Its Critics,* ed. Brian Green and Ted Peters (Lanham, MD: Rowman & Littlefield Lexington Books, 2019); ___, "Whole Brain Emulation Requires Enhanced Theology, and a 'Handmaiden,'" *Theology and Science* 13, no. 2 (2015): 175–86; and ___, "A Theological Assessment of Whole Brain Emulation: On the Path to Superintelligence," in *Religion and Human Enhancement,* ed. Trothen and Mercer, 89–104.

[13]This theological fight between Paul and his opponents is also called the "Judaizing controversy," although that terminology is rarely used now. Also, Paul was not alone; he had allies in his struggle with the circumcision agitators.

[14]Who exactly were Paul's opponents is the subject of scholarly discussion, but my thesis does not depend on the outcome of this debate.

[15]Several excellent scholarly assessments of Paul give considerable attention to the theological questions. Although a bit dated, the following work by F. F. Bruce, a major evangelical scholar, is still valuable: *Apostle of the Heart Set Free* (Grand Rapids, MI: Eerdmans, 1977). See also James D. G. Dunn, *The Theology of Paul the Apostle* (Grand Rapids, MI: Eerdmans, 1998), and the more recent work by N. T. Wright, *Paul in Fresh Perspective* (Minneapolis, MN: Fortress, 2005).

[16]This issue is addressed in Adam S. Miller, "Sorting Out *Soma* in the Debate about Transhumanism—One Protestant's Perspective," in *Transhumanism and the Body: The World Religions Speak,* ed. Calvin Mercer and Derek F. Maher (New York: Palgrave Macmillan, 2014).

[17]Lee Johnson, "Dining and Dunking the Dead: Postmortem Rituals in First-Century Hellenistic Society and What They Reveal about the Role of the Body in Christianity," in *Religion and Human Enhancement,* ed. Trothen and Mercer, 301–16. See also Lee Johnson, "Return of the Corporeal Battle: How Second-Century Christology Struggles Inform the Transhumanism Debate," in *Religion and Transhumanism,* ed. Mercer and Trothen, 274–89; and Calvin Mercer, "Bodies and Persons: Theological Reflections on Transhumanism," *Dialog: A Journal of Theology* 54, no. 1 (Spring 2015): 27–33.

[18]While he argues for a revision, the traditional scholarly view of Paul is summarized in John G. Gager, *Reinventing Paul* (Oxford, UK: Oxford University, 2002). See p. 22 for the point about universalism.

[19]Joshua M. Moritz, "Evolution, the End of Human Uniqueness, and the Election of the *Imago Dei*," *Theology and Science* 9, no. 3 (2011): 307–39, provides a helpful review of this issue and questions ideas of the *imago Dei* that equate the divine likeness with some "characteristic, behavior, or trait which presumably makes humans unique—in a nontrivial way—from other animals and from the nonhuman hominids." Celia Deane-Drummond investigates these issues in *Creaturely Theology: On God, Humans and Other Animals*, ed. with David Clough (London, UK: SCM, 2009), and also in *The Wisdom of the Liminal: Evolution and Other Animals in Human Becoming* (Grand Rapids, MI: Eerdmans, 2014).

[20]Philip Hefner, *The Human Factor: Evolution, Culture, and Religion* (Minneapolis, MN: Augsburg Fortress, 1993). For a critique of the created co-creator concept, see Waters, *This Mortal Flesh*, 176–79.

[21]For a similar perspective on the technology and the early stories of Genesis, see Erisman and Parker, "Artificial Intelligence."

[22]One of the planks of the American Scientific Affiliation platform is "We recognize our responsibility, as stewards of God's creation, to use science and technology for the good of humanity and the whole world" (https://network.asa3.org/). Although they do not go so far as calling human beings created co-creators, Erisman and Parker, in "Artificial Intelligence," affirm that the development of AI systems "is a vital part of the creation mandate, and this work can be done to the glory of God" (p. 95).

[23]For a review of the options, see Maarten Franssen, Gert-Jan Lokhorst, and Ibo van de Poel, "Philosophy of Technology," *Stanford Encyclopedia of Philosophy,* last updated September 6, 2018, https://plato.stanford.edu/entries/technology/, and Thomas A. C. Reydon, "Philosophy of Technology," *Internet Encyclopedia of Philosophy,* accessed November 2019, https://www.iep.utm.edu/technolo/. Andrew Feenberg, in "What is Philosophy of Technology?" (lecture for the Komaba undergraduates), June 2003, http://www.sfu.ca/~andrewf/komaba.htm, argues that we should work to control technology when there are indications that it can raise problematic issues. With the very powerful enhancement technologies on the horizon, a critical and cautious approach to technology is in order.

[24]Peters, "Exotheology: Speculations on Extraterrestrial Life," a chapter devoted to the topic in *Science, Theology, and Ethics*, 121–36. Peters provides a review of the long discussion of this issue in Christian theology.

[25]Abby Ohlheiser, "Pope Francis Says He Would Definitely Baptize Aliens If They Asked Him To," *The Atlantic* (May 12, 2014), https://www.theatlantic.com/international/archive/2014/05/pope-francis-says-he-would-definitely-baptize-aliens-if-they-wanted-it/362106/.

[26]See, e.g., Edmund Michael Lazzari, "Would St. Thomas Aquinas Baptize an Extraterrestrial?," *New Blackfriars* (September 4, 2017): 440–57, https://doi.org/10.1111/nbfr.12319. BioLogos pondered this question in a panel discussion featuring Deborah Haarsma, Stephen Freeland, and Jennifer Wiseman, "Life Beyond Earth: What Would It Mean for Christians?," April 18, 2019, https://biologos.org/resources/life-beyond-earth-what-would-it-mean-for-christians. Stopping far short of answering the question in the subtitle, the panel encouraged exploration of various ways to understand, biblically and theologically, what intelligent life beyond Earth would mean.

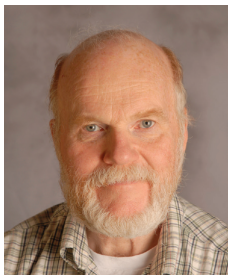
[27]Paul Tillich, *Systematic Theology*, Vol. 2 (Chicago, IL: University of Chicago Press, 1953), 95 f.

[28]Sean O'Callaghan gives a thorough and fascinating review of this genre in "Technological Apocalypse: Transhuman as an End-Time Religious Movement," in *Religion and Human Enhancement,* ed. Trothen and Mercer, 67–88.

[29]The Christian Transhumanist Association and the Mormon Transhumanist Association advocate a positive stance toward transhumanist/posthumanist possibilities.

Will Transhumanism Solve Death?

Russell Bjork



Russell Bjork

Many transhumanists hold that the problem of death can be solved using technological means such as medical breakthroughs, cryonic preservation, computer simulation, or uploading the contents of the brain into a computer. Most of these proposals fall short of accomplishing their goal even within a transhumanist framework. Moreover, the view that physical death is a problem to be solved technologically runs counter to biblical teaching regarding the cause of our physical mortality, the reality of final judgment, and the hope of physical resurrection. The claim of some that the biblical hope of resurrection will actually be fulfilled technologically is evaluated and found wanting. The basic problem of humanity is not that we are biological, but that we are dead in relationship to our Creator, and the ultimate solution to physical death is to be found in the gospel.

The lead article by David C. Winyard in this issue of *PSCF* asks how Christians ought to respond to transhumanism: "the social and philosophical movement that seeks fundamental 'enhancements' of life by futuristic science and technology."[1] This article will consider how Christians might evaluate and respond to an "enhancement" that many, but not all,[2] of those who identify as transhumanists aspire to: "solving" human mortality technologically.[3] They envision this being accomplished in one or more of the following ways:

1. Dramatic life extension by medical means.
2. Cryonic preservation of the body (or just the head) of a person who has died.
3. Computer simulation of a person who has died based on information preserved during life.
4. Uploading a person's brain into a computer.

Medical developments, such as methods for preventing, detecting, and treating disease, have already resulted in increases in average human lifetimes by over 60% in about one hundred years[4] and are likely to continue to produce further increases. But some transhumanists predict dramatic breakthroughs in this regard resulting from genetic technologies, such as CRISPR, and/or the use of nanobots (minuscule robots similar in size to cells inserted into the bloodstream) that would extend lifetimes to a few hundred years, or more.[5] Some are interested in tackling the process of aging itself as a curable disease rather than simply a consequence of growing older, ultimately leading to lifetimes of thousands of years or even longer.

Since 1967, about 250 people have had their bodies or just their heads preserved cryogenically when they died, and about 1,500 more have signed up for this when they die. Those who have done so, or plan to do so, have anticipated being revived at a later date when more-advanced technologies would allow for curing the original cause of death or uploading their preserved brain state (thus, preserving their consciousness in a digital state).[6]

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Others envision computer simulations based on personal information saved during a person's lifetime. The original person would die, but other people would be able to continue interacting with a simulation that appears to be the same person. Martine Rothblatt argues that such a digital mind

> will be able to faithfully mimic the workings of this predecessor's mind … [and will appear] to have a consciousness that is equivalent to that of its predecessor brain-based person.[7]

Other proponents argue,

> If … people are recoverable in the future, then they were never really dead in the first place. Real death occurs when information about a person becomes so disorganized that no technology could restore the original state.[8]

Uploading the brain differs from the simulation described above in that what would be preserved is the detailed state of the neurons and synapses of an individual's brain. This information would be used to emulate the computation occurring in the brain and thus, it is argued, would replicate the person's consciousness. Probably the best-known proponent of this is Raymond Kurzweil, currently the Director of Engineering at Google. He contends that we are heading toward a technological "singularity" by 2045,[9] which will make both the detailed mapping of a brain and emulation of its computations technologically possible.[10] While not all transhumanists subscribe to the singularity expectation,[11] many support the use of digital uploading and emulation of the brain to eliminate inherent limits to a human lifespan. Kurzweil believes this will allow us "to live as long as we want (a subtly different statement from saying we will live forever)."[12]

What Might a Technological Solution Really Solve?

This article will present a theological critique of the idea of solving death technologically, but first it is worth noting that, even within a transhumanist perspective, most of these approaches do not offer any possibility of being a reliable total solution to death and none offers such a possibility for all people.

Broadly speaking, an individual dies for one of the following reasons: natural causes (aging, disease, heart attack, stroke, etc.), accident, or intentional acts—either by others (murder, acts of war) or by self (suicide).

Medical means address only the first reason for death and offer no solution to most accidental or intentional causes—and in any case, it appears that there may be an inherent upper limit to longevity,[13] and finite life extension does not ultimately "solve" death but merely postpones it.

Cryonic preservation is very costly, must occur almost immediately after death,[14] and offers no solution to accidental or intentional causes if the body is destroyed or damaged beyond repair in the process. It also presumes that some future technology will be able to solve both the original and future causes of death for the individual (i.e., alternatives (1), (3), or (4) above are still necessary, so cryonic preservation is not a solution in its own right). This writer is unaware of any evidence of successful resuscitation of a preserved corpse, and critics of this procedure point out that the process of freezing the brain does irrecoverable damage to the brain tissue.[15]

While it is hypothesized that a computer simulation could allow others to continue interacting with the individual despite the latter's death, this relies on having sufficient preserved information to allow a realistic simulation. Moreover, it raises the question of personal identity which Rothblatt addresses this way:

> While the software-based mind will realize it is not the original brain-based mind, just as each human adult realizes they are not their teenage mind, or even the precise mind of the previous day, this fact of personal consciousness flux does not undermine the continuity of unique identity.[16]

This claim seems untenable in light of the fact that, even if such a simulation were possible, it would assuage only the sense of loss experienced by the loved ones of those who have died, without preserving many of the memories and deep thoughts—the core of being—of the one being simulated.

Some form of uploading might, hypothetically, address all three causes of death if a recent backup of the digitized state of the person's consciousness is on hand. But achieving something like this in the near future, if at all, is questionable both philosophically and technologically, given the storage required for the 100 billion or so neurons in a single brain, the even larger number of connections between neurons, the diversity of types of neurons and synapses in the brain, and the difficulty of mapping the connectome

of an actual brain. Moreover, even if something like the singularity were to make this possible in a single case, billions of times more storage would need to be built and maintained if this were to be possible for all people alive at any time, to say nothing of the need for computer systems to actually run the emulation forever.[17]

Biblical Teaching on Physical Death, Resurrection, and Final Judgment

In the Bible, physical death is portrayed as an enemy that will someday be destroyed[18] and as a precursor to final judgment.[19] Moreover, it is not portrayed as something to be accepted passively. The Bible records miracles of reversing physical death, performed by Elijah, Elisha, Jesus, Peter, and Paul, as well as miracles of healing by Jesus that likely prevented the beneficiary from dying.[20] For a Christian medical professional, combating life-threatening diseases can be a form of obedience to biblical mandates. But presumably those who were raised from the dead later died again, and medical interventions only serve to postpone ultimate death. In a sense, human or miraculous efforts do not ultimately prevent death; rather, they simply postpone it.

What is the relationship between physical death and human sin? In the account of the first sin recorded in Genesis 2, God gives the warning concerning the tree of knowledge: "in the day that you eat of it you shall surely die."[21] Since the individuals lived on for many years, many writers have held that "die" is not referring to physical death, but rather to spiritual death, that is, alienation from God.[22] While much Christian theology has held that Genesis 2–3 and Romans 5:12 teach that human beings were created physically immortal but lost immortality as a result of partaking of the fruit of the tree of knowledge of good and evil,[23] seeing mortality per se as a result of sin does not comport with the scientific evidence that humankind evolved from a long line of mortal creatures. For this reason, some writers have pointed out that the Genesis account fits well with the view that humankind was initially mortal, with perpetuation of life being offered through the "tree of life."[24] Following the initial act of disobedience, Adam and Eve were expelled from the Garden of Eden lest he "reach out his hand and take also from the tree of life and eat, and live forever" (Gen. 3:22).[25] Thus, regardless of the origin of human mortality, it does seem clear in scripture that our current subjection to mortality is at least an indirect consequence of sin.

Though most humans (except those alive at the return of Christ) will ultimately experience physical death, the Bible consistently teaches the ultimate resurrection and judgment of all humans. Daniel put it this way: "Multitudes who sleep in the dust of the earth will awake: some to everlasting life, others to shame and everlasting contempt" (Dan. 12:2). The Bible abounds in promises of *individual* resurrection and restored access to the tree of life, such as "*the one* who believes in me will live, even though they die" (John 11:25) and "to *the one* who is victorious, I will give the right to eat from the tree of life, which is in the paradise of God" (Rev. 2:7, emphases mine). According to Jesus, the promised resurrection flows from his cross: "unless a kernel of wheat falls to the ground and dies, it remains only a single seed. But if it dies, it produces many seeds" (John 12:24, spoken in the context of a prediction of his coming death). Eternal life is inseparable from a restored relationship to our Creator through Christ, which is, in fact, the essence of what eternal life is all about: "Now this is eternal life: that they know you, the only true God, and Jesus Christ, whom you have sent" (John 17:3).

Might Technology Be the Resurrection?

Most transhumanists do not profess to be Christians, and many are atheists. Many would agree with Kurzweil's assertion that "a primary role of traditional religion is deathist rationalization—that is, rationalizing the tragedy of death as a good thing."[26] However, as Winyard noted in his article, some do claim Christian faith, including those comprising an organization known as the Christian Transhumanist Association (CTA).[27]

Micah Redding is the executive director of this group. He is a prolific author, and many of his essays are linked (directly or indirectly) from the CTA web site. In the article "The Resurrection Is Technological," he argues that the biblical promise of "the ultimate resurrection of all people, and the eradication of death itself,"[28] is to be fulfilled through technological achievement. However, this article and others by this author raise a number of questions, including

1. How does physical immortality achieved through technological means provide "ultimate resurrection" for individuals who die

before the technology is developed? If it does not, how are the biblical promises cited above to be fulfilled for these people—or are they?

2. Redding's article states that "humans made a bad choice, and were subsequently barred from the tree of life."[29] What was this "bad choice"? And how does technological achievement reverse this?
3. The article quotes 1 Corinthians 15:20 which refers to Christ as the "firstfruits" of the resurrection. If the resurrection is physical immortality achieved through technology, then in what sense is Christ the "firstfruits"?
4. What is the significance of the cross of Christ? Do the biblical doctrines of atonement and final judgment have any relevance?

Is Being Biological the Problem?

In any domain, any form of problem solving begins with identifying the problem that is to be solved. Solving a symptom rather than the real problem will allow the underlying problem to persist, perhaps resulting in other symptoms instead. For many transhumanists, mortality is a consequence of our being biological, because our bodies die either due to natural causes or due to some form of physical damage. The basic problem, they contend, is that we are biological beings, and the proposed cure is to escape biology, as suggested by the subtitle of Kurzweil's 2005 book, *The Singularity Is Near: When Humans Transcend Biology*.[30] Escaping biology smacks of the ancient heresy of Gnosticism[31] and seems counter to the view that God is the Creator of the biological and chose to incarnate himself in human flesh.

A question for transhumanists to ponder is whether being biological is really the issue. Would solving physical death by becoming a digital consciousness in a computer change the human propensity to exhibit greed, power-lust, and cruelty? Would physical immortality—in itself—be the source of true meaning and purpose in life? Or would there still seem to be something missing? Recall Kurzweil's comment about living "as long as we want (a subtly different statement from saying we will live forever)."[32] In the Terasem survey cited earlier, "8.1% said they didn't want immortality because of the 'boredom' they feel they'd endure as a consequence."[33]

A Christian Evaluation of Transhumanist Approaches to Solving Death

While medical efforts to tackle issues that shorten life do seem consistent with the teaching of the Bible and Christian practice, looking to some sort of technology for immortality does not. We would rightly condemn a physician who only prescribed aspirin to treat pain caused by a life-threatening but curable condition, while neglecting treatment for the underlying condition. When someone seeks to solve physical death apart from a restored relationship with our Creator, are they not doing the same thing?

In Athens, Paul expressed God's purpose for humanity in this way:

> The God who made the world and everything in it is the Lord of heaven and earth … God did this so that they would seek him and perhaps reach out for him and find him, though he is not far from each one of us. (Acts 17:24, 27)

Our real problem is not that we die physically, but that we are already dead in our relationship to our Creator; what we need is not conquest of physical death but a restored relationship with the One who created us. As Paul put it, "… you were dead in your transgressions and sins … But because of his great love for us, God, who is rich in mercy, made us alive with Christ …" (Eph. 2:1, 4–5).

We have noted that the Genesis account speaks of two trees in the Garden of Eden: the "tree of the knowledge of good and evil" and the "tree of life" (Gen. 2:9). Whether either tree is to be understood as being a literal tree or one or both are symbolic of larger issues is not the point here. The former is never referred to again in the Bible, while the latter is not mentioned again[34] until the final book of the Bible—all but one of the times being in the final chapter.[35] From the Genesis account, we learn that the choice to partake illicitly of the former led to humanity being banished from the latter. While this is a form of divine judgment, there is also a sense in which this banishment represents divine mercy, since immortality in our present condition of estrangement from God would literally be Hell.[36] The efforts of some transhumanists to achieve immortality apart from our Creator appear to represent a repeat of the same rebellion that brought about our present condition in the first place. In fact, some proponents

of transhumanism seem to equate science and technology with God.[37] For example, at the very end of a documentary portraying his life, Ray Kurzweil says, "Does God exist? I would say not yet."[38]

There are many places where Christians can and should collaborate with others in addressing issues of mutual concern. But overcoming physical death by transcending biology is not one of these, since transcending biology entails rejecting a fundamental aspect of how God made us and how he has manifested himself by becoming fully human (and thus sharing our biological makeup) in Jesus Christ.

How Might Christians Respond to Transhumanist "Solutions" to Physical Death?

Throughout human history, the reality of physical death has been a source of angst for many. One need think only of mummification and the pyramids in Egypt and similar practices in other cultures, or legends concerning a fountain of youth, or even the belief that vampires achieve immortality by feeding on human blood, for example. For some, in fact, the reality of death makes life meaningless.

Thus, simply critiquing transhumanist approaches to solving death misses a crucial point. At first glance, such things as freezing dead bodies or uploading oneself into a computer sound far-fetched, but intelligent, even brilliant, people are investing their financial resources and time in arguing for and carrying out these technologies. For example, Kurzweil was born in 1948, so he will be well over 90 years old by the time he believes the singularity will make uploading the brain (and hence personal consciousness) possible. To live that long, he spends over $1,000,000 per year on a special diet and pills.[39]

What do Christians have to say to those who embrace transhumanist solutions to death? In the end, the message is the same Gospel we are commissioned to share with everyone. The subject of the Gospel is a man who was fully human—and therefore biological just as we are—who suffered the cruelest form of physical death. It is about *the one* who conquered physical death by being raised bodily from the dead on the third day. It is about *the one* whose resurrection life we are promised a share in. To those who believe this message, it is the life-transforming power of God.[40] The lengths to which some will go to escape our present mortality should serve as a reminder of the relevance of this Gospel—not simply "going to heaven when we die," but the possibility of a restored relationship with our Creator that can begin in this life and continue into a resurrected life to come. It is too easy for Christians to forget the existential relevance of the fact that Christ has delivered "those who all their lives were held in slavery by their fear of death" (Heb. 2:15), but that is the true power of our message. +

Notes

[1]David C. Winyard Sr., "Transhumanism: Christian Destiny or Distraction?," in *Perspectives on Science and Christian Faith* 72, no. 2 (2020): 68.

[2]According to a survey of transhumanists funded by Terasem, a leading transhumanist organization, 76.2% replied that they "did want immortality," while those who replied that they did not, cited reasons such as "boredom" or "the earth would be overpopulated." Hank Pellissier, "Do All Transhumanists Want Immortality? No? Why Not? (Terasem Survey, Part 1)," Institute for Ethics and Emerging Technologies, August 1, 2012, accessed July 31, 2019, https://ieet.org/index.php/IEET2/print/6262.

[3]The phrase "solve death" comes from a protest sign outside Google's headquarters: "Google, please solve death," as reported in Mark O'Connell, *To Be a Machine: Adventures among Cyborgs, Utopians, Hackers, and the Futurists Solving the Modest Problem of Death* (New York: Anchor Books, 2017), 171. The phrase "solve death" also appeared on the cover of *Time* 182, no. 14 (September 30, 2013).

[4]Raymond Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Penguin, 2005), table entries on p. 324 for 1900 and 2002 United States.

[5]Ibid., 253–58, 323.

[6]"Cryonics," *Wikipedia,* accessed September 9, 2019, https://en.wikipedia.org/wiki/Cryonics.

[7]Martine Rothblatt, "The Terasem Mind-Uploading Experiment," *International Journal of Machine Consciousness* 4, no. 1 (2012): 141, accessed August 22, 2019, https://www.cyberev.org/martine.pdf.

[8]"Cast Your Data into Space" (blog), July 30, 2019, accessed August 22, 2019, https://www.terasemcentral.org.

[9]Lev Grossman, "2045: The Year Man Becomes Immortal" (cover story), *Time* 177, no. 7 (February 21, 2011): 42–49.

[10]Kurzweil, *The Singularity Is Near,* 198–200.

[11]Gareth John, "The Singularity: Fact or Fiction or Somewhere in Between?," Transhumanist Party, January 3, 2019, accessed August 7, 2019, https://transhumanist-party.org/2019/01/03/singularity-fact-or-fiction/.

[12]Kurzweil, *The Singularity Is Near,* 9.

[13]David Adam, "What If Aging Were a Disease?," *MIT Technology Review* 122, no. 5 (Sept/Oct 2019): 15–18.

[14]O'Connell, *To Be a Machine,* 30.

[15]CBC Radio, "Preserving Your Brain Might Kill You, But It Could Help You Live Forever," Quirks & Quarks, last updated May 7, 2018, accessed September 3, 2019, https://www.cbc.ca/radio/quirks/may-5-2018-preserving-brains-for-uploading-coral-reefs-sound-sick-

south-american-child-sacrifice-and-more-1.4647066/preserving-your-brain-might-kill-you-but-it-could-help-you-live-forever-1.4647089.

[16]Rothblatt, "The Terasem Mind-Uploading Experiment," 141.

[17]Michael Graziano, "Why You Should Believe in the Digital Afterlife," July 14, 2016, accessed September 3, 2019, https://www.theatlantic.com/science/archive/2016/07/what-a-digital-afterlife-would-be-like/491105.

[18]1 Corinthians 15:26; Revelation 20:14.

[19]Hebrews 9:27.

[20]For example, Luke 7:1–10.

[21]Genesis 2:17 ESV. The NIV translates "in the day" by "when," but the Hebrew is literally *bə·yō·wm*, "in the day," as in most translations.

[22]William Horst, "Morality, Not Mortality: The Inception of Death in the Book of Romans," *Perspectives on Science and Christian Faith* 71, no. 1 (2019): 24.

[23]Compare most traditional systematic theologies such as Thomas Aquinas, *Summa Theologiae* (Roman Catholic) First Part of the Second Part, Question 85, Article 5; Louis Berkhof, *Systematic Theology* (Grand Rapids, MI: Eerdmans, 1941) (Reformed), 656–57; Francis Pieper, *Christian Dogmatics* (Saint Louis, MO: Concordia, 1950) (Lutheran), 536; or H. Orton Wiley, *Christian Theology* (Kansas City, MO: Beacon Hill, 1952) (Wesleyan), 91–93.

[24]John H. Walton, *Genesis (NIV Application Commentary)* (Grand Rapids, MI: Zondervan, 2001), 183–84.

[25]All scripture throughout unless otherwise noted is from the New International Version.

[26]Kurzweil, *The Singularity Is Near,* 372.

[27]Winyard, "Transhumanism: Christian Destiny or Distraction?," 77–78.

[28]Micah Redding, "The Resurrection Is Technological," September 28, 2017 (blog), accessed August 12, 2019, http://micahredding.com/blog/the-resurrection-is-technological.

[29]Ibid.

[30]Kurzweil, *The Singularity Is Near.*

[31]O'Connell, *To Be a Machine,* 158.

[32]Kurzweil, *The Singularity Is Near,* 9.

[33]See Pellissier, "Do All Transhumanists Want Immortality?"

[34]The phrase "tree of life" is used poetically four times in Proverbs (3:18, 11:30, 13:12, 15:4), but these passages do not appear to be referring to the tree mentioned in Genesis.

[35]Revelation 2:9, 22:2, 22:14, 22:19.

[36]In *The Great Divorce*, C.S. Lewis paints a powerful portrayal of what this would be like.

[37]O'Connell, *To Be a Machine,* 208.

[38]Barry Ptolemy, *Transcendent Man,* documentary film (Ptolemaic Productions, 2009). The words quoted occur at the very end of the film.

[39]Erin Brodwin, "The 700-Calorie Breakfast You Should Eat If You Want to Live Forever, According to a Futurist Who Spends $1 Million a Year on Pills and Eating Right," April 13, 2015, accessed August 7, 2019, https://www.businessinsider.com/ray-kurzweils-immortality-diet-2015-4.

[40]1 Corinthians 1:18.

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Call for Papers

THE NUCLEAR OPTIONS: CHRISTIAN PERSPECTIVES ON FISSION, FUSION, AND OUR ENERGY FUTURE

Do we have any energy source that is available 24 hours every day, releases no CO_2 into the atmosphere, and does not kill birds? Yes, nuclear fission. Then why do Sweden and France rely on it, but Germany is trying to phase it out to zero? Can we justify burying nuclear waste for thousands of years? Are there security risks? Will fusion ever be less than a few decades away? What insights might Christian perspectives bring to the table?

On the ASA and CSCA websites, Robert Kaita has written an essay that informs us about what is currently available in fission and fusion, and raises a gamut of questions. He is well prepared to lead us on this topic after nearly forty years in nuclear fusion research at the Plasma Physics Laboratory at Princeton University. Kaita's research interests include plasma heating techniques and plasma instabilities, and he developed diagnostic instrumentation and structural materials for fusion research devices. He also supervised the doctoral research of numerous students in the Plasma Physics Program in Princeton's Department of Astrophysical Sciences, and has served as the president of the American Scientific Affiliation, and is a member of our *PSCF* editorial board.

Readers are encouraged to take up one of the insights or questions, or maybe a related one that was not mentioned, and draft an article (typically about 5,000–8,000 words) that contributes to the conversation. These can be sent to Robert Kaita at kaita9094@gmail.com. He will send the best essays on to peer review and then we will select from those for publication in a theme issue of *Perspectives on Science and Christian Faith.*

The lead editorial in the December 2013 issue of *PSCF* outlines what the journal looks for in article contributions. For best consideration for inclusion in the theme issue, manuscripts should be received electronically before **September 30, 2020**.

Looking forward to your contributions,

James C. Peterson, *Editor-in-Chief*

The Transhumanist Vision: Technological Bliss or Tragic Misadventure?

D. Gareth Jones

D. Gareth Jones

Transhumanism has burst upon the scene as a technologically based approach to the world and human aspirations. For some, it is compatible with Christian thinking and attitudes, although this depends upon the manner in which transhumanism is practiced and on the core beliefs of one's Christian faith. For many, however, the two are seen as incompatible worldviews, depending upon the degree to which human-driven technologies or God's grace are core elements. Nevertheless, there are overlaps between the two since technology has made profound inroads into Christian attitudes and expectations, particularly in the biomedical and health area.

The thrust of this article is to explore these inroads and the possibility that they expose Christians, far more than they might realize, to aspects of transhumanist thinking. This is done by tracing the trajectory of modern medicine with its increasing dependence upon technological interventions, and, hence, increasing reliance upon nonbiological intrusions in the human body. From here it is a short distance from improving human well-being to creating improved versions of humans as we know them. The debate hinges on the role and meaning of enhancement, and a continuum is traced from routine therapy, through more extensive enhancements, to radical transformation with its goals of eradicating disease, death, and mortality. The latter is the utopian world of transhumanism, even though there are elements of these within traditional Christianity. The challenge is to determine the role and extent of technology in bringing them about. For instance, there is increasing evidence of healthy individuals employing drugs designed for therapeutic purposes to improve their cognitive performance and to modify their behavior. These trends are critically analyzed by exploring the characteristics of Christian enhancement, including an examination of certain theological dualities, such as mortality and immortality, perfection and imperfection, humility and hubris. It is concluded that Christians are constantly to question how the technology at their disposal is being used, both at the individual level and in the Christian community. In this way, the value or otherwise of transhumanist tendencies will become clear.

David Winyard in his seminal article for this issue very cogently charts the background to contemporary transhumanism, revealing what its main proponents claim, their vision, and even their "religious" moorings.[1] In this way, he helpfully outlines the contributions of thinkers such as Max More,[2] William Sims Bainbridge,[3] Ray Kurzweil,[4] Nick Bostrom,[5] and Martine Rothblatt.[6] This clearly indicates the fundamental basis of the movement, namely, its secular vision of unlimited techno-scientific progress. Far-reaching enhancements to the human condition will, it is claimed,

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be achieved—and perhaps can only be achieved—through science and technology. These will be so profound that they will be able to overcome life's basic limitations, although the science and technology will themselves have to be radically overhauled in order to bring about the revolutionary changes envisaged. The faith of transhumanists, therefore, is two-fold—it is heavily dependent upon radical forms of science, and also on the development of these new radical new procedures. Nevertheless, the rapid progress in regenerative medicine, genetic engineering, neuroscience, neural implants, bionics, artificial intelligence (AI), robotics, nanotechnology, and computer technology points in the direction of ever-increasing control over the human body, and, hence, over many aspects of human life as we know it today.

In view of these challenges, Winyard poses a number of questions, commencing with the limitations of the science and technology required, and the relevance of even very sophisticated science and technology in making human beings more human. He also queries the value of technological enhancements for improving the quality and depth of human life, and whether transhumanism is a scientific enterprise and/or a religious one.

In an effort to elaborate on these concerns, the present article proposes that transhumanism is not a recent isolated phenomenon that has arisen out of nowhere. Rather, the enhancements characteristic of contemporary medical science contain within them the seeds of the transhumanist agenda. To an extent, all have, unawares, bought into elements of transhumanism, albeit in nascent form. It would not have blossomed in the absence of the many revolutionary scientific advances characteristic of modern medicine. Recognition of this link between transhumanist vistas and the everyday health enhancements enjoyed by most people in an increasing number of technologically advanced societies, in no way justifies transhumanist thinking. But it does provide a context for assessing the claims of transhumanism and for understanding why it has arisen as a phenomenon in societies dominated by spectacular scientific achievements in medicine, and how, for instance, increasing longevity can be a harbinger of transhumanist claims that people should live to well in excess of 100 years and ultimately achieve physical immortality.[7]

But what is transhumanism and from where has it come? And to what extent is it a homogeneous movement? In addition, does it have a place for Christian input, and, if so, what is the nature of that input?

The Emergence and Flourishing of Transhumanism

The origins of transhumanism emerged with a number of thinkers from the 1920s onward, but it was not until the 1950s that a more specific reference to the term "transhumanism" appears in the writings of Sir Julian Huxley, the British evolutionary biologist. In a 1957 essay, he wrote about the human species being able to transcend itself in its entirety as humanity. He wrote,

> We need a name for this new belief. Perhaps *transhumanism* will serve: man remaining man, but transcending himself, by realizing new possibilities of and for human nature … the human species will be on the threshold of a new existence … It will at last be consciously fulfilling its real destiny.[8]

Over succeeding years, a range of thinkers took up and developed the transhumanist theme, emphasizing artificial intelligence and the concept of the technological singularity.[9] In 1998, Nick Bostrom and David Pearce founded the World Transhumanist Association, that later adopted The Transhumanist Declaration, and was transformed into Humanity Plus (H+).[10]

Definitions of transhumanism vary, but tend to revolve around a new way of thinking that starts from the premise that the human condition is open to being altered in dramatic ways.[11] These changes include the development of super-intelligent machines, personality pills, space colonization, molecular nanotechnology, vastly extended life spans, uploading of our consciousness into a virtual reality, and reanimation of cryonics patients. By its very nature, transhumanism is interdisciplinary, aiming to promote opportunities for enhancing the human condition and the human organism opened up by advances in technology. While the potential technological developments are many, the ones that repeatedly come to the fore are genetic engineering and information technology, with future ones such as molecular nanotechnology and artificial intelligence. For transhumanists, human nature is a work in progress since current humanity need not be the

endpoint of evolution. The key to unlocking humanity's potential lies with technology, the adoption of which may lead to the emergence of posthumans, beings with vastly greater capacities than found in any present human beings.

For a transhumanist such as Bostrom,[12] transhumanism has roots in secular humanist thinking, and yet it is more radical in that it does not confine itself to traditional means of improving human nature, such as education and cultural refinement. Instead, it looks to the direct application of medicine and technology to overcome our basic biological limits. In this way, it opens up the posthuman realm, with posthumans overcoming what for us are inherent biological limits. This leads to the concept of the emergence of distinctly different posthumans, with their increased life expectancy, intelligence, health, memory, and emotional sensitivity. The ideal would be for these future posthumans to lead lives that are more worthy than those of ordinary humans. For Bostrom, the tragedy is that 150,000 human beings die every day without having had access to the anticipated enhancement technologies that will make it possible to become posthuman.[13] The corollary, from his perspective, is that the sooner this technology develops, the fewer people will have died without having had a chance to experience this transition to the posthuman realm. It has even been postulated by a critic of transhumanism that transhumanists have no interest in natality since the birth of a child only serves as a reminder of death and decay.[14]

Implicit within these developments is what is viewed as the moral urgency of saving lives, on the ground that aging is currently the number one killer.[15] Indeed, aging is seen as the most important limitation of human existence, since it leads to death. The goal of rejuvenation technology is to combat this and unlock the secrets of indefinite youth.[16] Hence, a key transhumanist priority is anti-aging medicine, with the goal of radically extending people's active health-spans. This, in turn, leads to what is viewed as an intermediary measure, the cryonic suspension of the dead, in anticipation that future technologies will become available to reanimate people who have been cryonically suspended.[17]

From this brief overview, a number of dominant features emerge: the necessity of biomedical enhancement, the context provided by evolutionary thinking, the postulated emergence of posthumans, and the superiority of this new humanity. While most transhumanists do not refer ostensibly to religious aspirations, one gets the impression that for most of them religion is irrelevant.

Nevertheless, for some transhumanists there are religious overtones, and these have hints of perfection, of playing God, and of transforming *Homo sapiens* into *Homo deus*.[18] Ted Peters has commented, "Enhancement technology has become for many among the nonreligious the ticket to divinity, to deification, to *theopoiesis*, to becoming a god."[19] More specifically, there are Mormons with transhumanist inclinations, leading to the establishment of a Mormon Transhumanist Association in 2006, followed in 2014 by a Christian Transhumanist Association.

Christian Transhumanism

A Christian transhumanist has been described as someone who advocates using science and technology to transform the human condition, consistent with and exemplified by the discipleship of Christ.[20] In setting out to love God, Christian transhumanists aim to focus on that which is transcendent; pursue greater coherence of mentality, physicality, and spirituality; and seek the betterment of the world. They seek to use science and technology to accomplish these ends. Their assumption is that God works through technology and also through evolution. The Christian Transhumanist Association affirms, among other points, that God's mission involves the transformation and renewal of creation, that science and technology are tangible expressions of our God-given impulse to explore and discover, and that the intentional use of technology, coupled with following Christ, will empower us to become more human.[21] It is this last point that sets them apart from other Christians, since science and technology have become central to their mission. Their goal is to improve the human condition, via the ethical use of technology to extend human ability by enhancing human intellectual, physical, and psychological capacities.[22]

Christian transhumanism walks a tightrope as it seeks to balance its commitment to technology as the agent of human transcendence and the Christian's recognition of one's dependence upon God's grace as the mark of his undeserved goodness. In addition, there is a tendency to ignore the way in which

technologies so often are perverted and bent toward destructive ends.[23] It also has, as its working assumption, the prospect that technology can accomplish the sort of transformation that Christians have traditionally argued can be brought about only by an act of a gracious and loving God.

The early insights of Julian Huxley were secular, and yet he also had religious leanings albeit "without revelation."[24] However, Pierre Teilhard de Chardin, the Jesuit priest and palaeontologist, sought to reconcile his Christianity with a grand evolutionary vision of the future trajectory of humankind culminating in the Omega Point.[25] He used the term "God-Omega" since his main emphasis was on Omega as a personal being, as Christ.[26] For him, humankind is made to be surpassed since he looked forward to a super-humankind. The goal of the future lies beyond humans, and even beyond the biological. For Teilhard, the divergence of evolution up to humans is replaced, once humans are reached, by a convergence. The details are not relevant for a discussion of transhumanism since Teilhard was not a transhumanist in the modern sense, and yet his speculative Christological vistas have inspired some Christian transhumanists. For him, *Omega* was the end product of natural evolution and, augmented by his Christian faith, was also Christ or God. For Teilhard, cosmogenesis was Christogenesis.[27]

In traditional Christian terms, we grow in grace and in godliness by following Christ in our daily living. This is a gradual process as we grow in obedience and are led by the Holy Spirit. However, some have argued that we can amplify this growth process by applying DNA technology.[28] This is the aim of the Genetic Virtue Project (GVP), an interdisciplinary effort to enhance human ethics using genetic correlates of virtuous behavior. The empirical plausibility that virtues have biological correlates is based on the assumption that (a) virtues are a subset of personality traits conceived of as "enduring behaviors," and (b) that these traits have a genetic basis. The drive for moving in this direction is to eliminate evil. In other words, it would be possible to bring about virtuous living by genetic engineering rather than by discipline and faithfulness.

In light of the above account of transhumanism, one can conclude that it contains within it a number of diverse currents, in large part arguing from a secular basis, although not exclusively so. It has religious overtones, while some coming from a Christian base have bought into the potential of technology to enhance Christian aspirations. Has this inadvertently altered the character of the gospel itself? Quite clearly, a Teilhardian approach has vast ramifications for the meaning of the gospel, and, while this approach is not typical of all transhumanists, it is an indication of one outcome of shifting the balance between a biblically based Christian faith and an evolutionary-based one.[29] Equally, undue dependence upon the prospects opened up by what technology might be able to accomplish in modifying human abilities or life span will have implications for human meaning, and not merely for human health and well-being. These are cautions that underlie the manner in which we approach the offerings of modern medicine.

The Trajectory of Modern Medicine: A Prelude to Transhumanism

When writing on transhumanism, an overbearing temptation is to delve immediately into what appear to be the outlandish speculations of an out-of-control secularist scientific mindset, far removed from any Christian attitudes or aspirations. Eradicating aging as a cause of death, using implants to augment our senses, boosting our cognitive processes by being connected to memory chips are all viewed as steps on the way to merging humans and machine.[30] To conclude that these are the fantasies of egomaniacal geeks is hardly surprising. And yet, care is required at this point since the distinction between some elements of a transhumanist vision and a plethora of Christian expectations of what constitutes a healthy, fulfilled life may be smaller than frequently assumed. It is for this reason that there are Christian transhumanists, who regard themselves as being faithful exponents of the gospel.

The reason for this assertion is that the character of medicine has been transformed, over many decades, from its role as a healing profession with the aim of, as far as possible, restoring individuals to good health, and caring for them and comforting them when cure has been out of the question.[31] Traditionally, there was a pastoral dimension within medicine, hence, its recognition as a caring profession. Its practitioners invariably did good, even if their abilities were frequently constrained due to their limited understanding of biological processes, but, on some

occasions, they actually did harm. Any advances that helped rectify this ignorance were welcomed, and this continued until it became evident that medicine itself was being transformed from within by massive shifts in its biological substructure: in genetics, neuroscience, reproduction, developmental biology, and public health. Consequently, the ability of medicine to control human beings in previously unimaginable ways began to surface, with the unanticipated consequence that it may, on occasion, be used in significantly harmful ways. Its power to do good now had to be seen alongside this far less desirable power, and choices had to be made. Medicine had become a far more ambiguous venture than previously, in which biomedical scientists had become the power brokers and medicine, as a caring profession, had been transformed into a scientifically based, technologically refined enterprise aimed at restoring and even improving the human body.[32] These concerns should immediately lead to caution at grandiose vistas, whether expressed by transhumanists or others, of completely transforming the human body.

Threats posed by medical advances stem from the capabilities of the science alongside dramatic changes in the worldviews of many in society. Consequently, "the Christian drivers that led to the establishment of hospitals and overcame social deprivation have been replaced by a secular humanistic worldview intent on lauding biological quality and longevity."[33] Other Christian writers point to the threat posed by reductionism, technology, and consumerism.[34] The shift is from viewing human beings in their wholeness as persons with social relationships and cultural norms, to abstracted physical machines capable of being understood as little more than biochemical, physiological, and molecular entities. Very readily, the process of manipulating brains, livers, and limbs is equated with manipulating and transforming the individuals themselves. Rather than being content with healing and caring for patients, the manipulations undertaken come to be regarded as ends in themselves.[35] In this way, medicine, as traditionally conceived, begins to metamorphose into a means of improving people and going beyond the therapeutic; thus transhumanism in embryonic form has been born.

Whenever technology is regarded as more than a mere tool, it can readily be approached as a source of meaning; whatever can be accomplished using technology can be justified as a means of modifying the human condition. This in itself may have little to do with transhumanism, but once Christians, along with most other people, welcome such incursions as beneficial, the stage is set for the emergence of transhumanism. It is this gradation—from accepting technologies that largely improve human well-being and are compatible with a Christian rationale, to forbidding post-Christian ones capable of threatening the core of one's humanity—that is both unanticipated and deceptive.

It is not enhancements as such that are the problem, but it is the manner in which they will be deployed. It is the burgeoning power of technology that is at the core of all these enterprises, from regenerative medicine with its many therapeutic possibilities at one end, to the production of cyborgs with their increasing reliance upon nonbiological interventions in the brain and body.[36] Prospects of this nature are proving deeply disconcerting for many people, including—but not confined to—those with religious perspectives. The question is whether these prospects should be viewed in optimistic or dysfunctional terms. The gravity of the situation is highlighted by the message promulgated by some transhumanists that, in future, there will exist two populations of human beings, the unenhanced (the natural) and the physically, cognitively, and genetically enhanced (post-persons/posthumans).[37] These populations will, in turn, represent the privileged and the unprivileged, the rich and the poor, thereby creating a new form of inequality. Humans will have become creators in their own right, by constructing a substantially "improved" version of themselves, a version that goes well beyond routine treatment and involves far more than the routine regenerative capacities of the human body.[38] No matter how speculative much of this is, and even how unlikely it is to eventuate in anything resembling this form, it points to a dominant thread within medico-social thinking, one based in a scientific rationalist materialism, substantially at odds with Christian conceptions. Nothing in this trajectory is inevitable, even if the technological feats behind it were to eventuate as envisaged. All these possibilities may not be core transhumanist ones, especially for those with a religious outlook, and yet they appear repeatedly in the literature.

Exploring the Enhancement—Transhumanist Continuum

The continuum from therapy through various enhancements, and on to overt transhumanism provides a crucial framework within which to approach transhumanism.[39] One day it may prove possible to enhance a healthy person (H) so that they become super-healthy (SH), such as being able to protect against early onset Alzheimer's disease (AD) by some form of genetic manipulation of embryos. Would this be therapy or enhancement? They will not be SH because the protection is solely against early onset AD. Similarly, public health measures, such as the use of vaccines as prophylactics and the provision of clean water supplies, have been transformative for whole populations. Life expectancy has been increased, largely through dramatic decreases in neonatal and childhood mortality.[40]

More extensive enhancement could, theoretically, lead to an extension of abilities, so-called super-abilities (SA). In this instance, normal functions are extended, leading to individuals who are more intelligent than they would otherwise have been, or are capable of running faster than through training alone. These individuals perform beyond their natural capacities, although even these enhanced individuals may perform less well than other highly talented, non-enhanced individuals. The bar has been raised by good nutrition and hygiene, and by superior educational opportunities.[41] The border between therapy and enhancement has become indistinct, but this is not transhumanism.

The goal for some is to produce post-persons/post-humans.[42] Such beings would have been radically transformed (RT), and could be designated a new quasi-species, who will, apparently, enjoy absolute morphological freedom and live for hundreds of years.[43] Radical transformation would appear to have no boundaries, since it has become a means of deconstructing and reconstructing the human body.[44]

In this utopian world, aging is viewed as a disease that is to be treated and even vanquished.[45] Mortality will have been replaced by immortality, and human bodies will be capable of endless renewal in an age- and disease-free world. Transhumanism is highly speculative about what science will achieve and the ways in which it will enable humans to perform tasks barely imaginable at present.[46] Its philosophical dependence upon these futuristic scenarios allows it to envision a massively transformed future, in which science has become the tool for a range of philosophical pretensions. By contrast, therapeutic enhancements of the human condition are driven by a medical/health model, in which the good of the patient is paramount, an end in harmony with Christian perspectives. A person might contend that these futuristic scenarios have similarities to Christian claims about the after-life, and yet this is misleading since the one will be brought about by human effort and science, whereas the other is completely dependent upon the actions and purposes of God.

In his analysis of human enhancement, Denis Alexander recognizes four types.[47] Type A, transhuman enhancement, refers to physical or mental enhancements that go well beyond anything found in present humanity. A current example is those who have had microchips implanted in their hands containing personal details, credit card numbers, and medical records (it can be argued that these examples are relatively close to Type B and not typical of the full-blown transhumanism advocated by many transhumanist writers). Type B, individual enhancement, refers to enhancement of the individual over and above their own previous abilities, but still within the range of abilities presently found within human populations. An example is a disabled athlete using artificial legs to make them competitive with healthy unenhanced athletes. Type C, prophylactic enhancement, is the use of technological processes to prevent disease, such as vaccination and daily statins to reduce blood cholesterol to prevent heart disease and strokes. He also recognizes a fourth type, D, namely Christ-centered enhancement (see section Transhumanism through a Christian Prism below).

Winyard divides potential human enhancements into six steps, spanning a timeframe from the present to 2045 and beyond.[48] For him, steps 4–6 look beyond present capabilities and fit into Alexander's transhuman enhancement category. In contrast, steps 2–3 correspond to Alexander's individual enhancement, and step 1 to his prophylactic enhancement. In other words, there is a noticeable divide between currently feasible and currently utilized enhancements (the SH and SA referred to previously), and those characteristic of the far more speculative transhumanist pretensions (the RT category). This is the fundamental divide between improvements in human health

and well-being, as opposed to attempts to create a new form of human being: parallel to the divide between Christian and secularist worldviews.

Enhancement per se is a virtue; it is preferable to live in a stimulating environment, rather than in a depressing and debilitating one. It is preferable that most children live beyond the age of five years, and that people, in general, live for many years in a relatively disease-free body, rather than in a body wracked with disease. Hence, it is preferable to eliminate infectious diseases, provide a nutritious diet, control cancers, and eradicate congenital disorders. All are enhancements with the potential to improve the quality of human life, and are determined by a desire to maintain the sense of a common humanity and by the need to improve the well-being of as many as possible.[49] They are to operate within constraints imposed by the broad parameters of the religious notion of the "givenness" of human existence.[50] This notion reflects dependence upon God and his good purposes, and while it is to be approached cautiously, it is not suggesting that nothing can ever be altered; rather, it provides constraints and boundaries for human manipulation.

Central to any consideration of enhancement are its goals. Why is it being undertaken? Who will potentially benefit? Who, if anyone, will be disadvantaged?[51] The central focus is the good of individual humans and of human communities, a basic concept within Christian thinking and practice.

Can People's Morality Be Improved Biologically?

In his perceptively prophetic novel, *Brave New World*, Aldous Huxley in 1932 foresaw attempts at enhancing people's morality using pharmacological means.[52] And yet this brave new world of his was certainly not a paradise. Unfortunately, this reminder of the inevitability of a downside to our technological ventures is all-too-often overlooked by the purveyors of a future technological nirvana—our brave new world of unimaginable enhancements will probably not be exempt from the tragedy of unforeseen failure.[53]

The performance of ordinary people is currently enhanced by biomedical technology. Drugs designed to treat a medical condition are employed by healthy individuals to improve their performance even though there is no indication of the medical condition in question. For example, the use by students of psychostimulants is commonplace,[54] while some student populations appear to be amenable to the use of neuroenhancers if they can be assured there are no adverse effects.[55] In addition, drugs originally designed for therapeutic purposes are employed by healthy individuals to stave off tiredness, improve concentration and short-term memory, and combat the formation of traumatic memories.[56]

Cognitive-enhancing drugs, such as modafinil, are routinely employed, even though they may be addictive, due to the similarity in brain mechanisms for learning and memory and for addictive behavior.[57] It is also salutary to realize that cognitive enhancement brought about by modifying the brain may have long-term negative repercussions.[58]

When discussing the drugs generally associated with the enhancement of moral behavior, two emerge as of preeminent interest, namely, serotonin and oxytocin. The latter is even referred to, perhaps misleadingly, as "the trust hormone" or "moral molecule."[59] Chemicals like these probably influence brain circuits active during moral judgment and linked to emotions such as empathy, guilt, and pity.[60] However, this and other results are far removed from the notion that oxytocin is a moral enhancement agent.[61]

Serotonin, for its part, appears to be the neural substrate of ethical decision-making.[62] Overall, however, there is a complex interrelationship between biological, psychological, and social systems.[63] It is important, therefore, to ensure that any social dysfunction is principally the result of neural characteristics, and does not originate in the environment and in the network of the individual's relationships.

The complexity of these interrelationships should serve as a warning against placing excessive reliance upon moral bioenhancement as superior to the usual methods of moral education, even if the latter are considered inadequate to cope with the destructive resources at humankind's disposal.[64] Even proponents of genetic and other biological means of improving moral status recognize that these are a long way from having been perfected.[65] Unfortunately, this way of thinking is committed to the notion that moral issues have to be reduced to a neurobiological substratum and therefore have to be amenable to a technological solution.[66] Their

assumption is that were societies to move in this direction, serious crime would be eliminated. While there is a close two-way relationship between our brains and behavior, and while drug treatment can improve behavior, it would be unwise to place excessive reliance upon this means of increasing altruism and justice.

Care is required in placing too much reliance upon attempting to modify people's moral responses by technological means. This would require a high level of moral awareness by the "haves" to make decisions about the moral bioenhancement of the "have nots." But how will they acquire the moral wisdom to determine the scope of the moral enhancement needed to curb the criminality, say, of others?[67] Even more tendentious is the suggestion that technological enhancement procedures should be made compulsory for certain forms of criminality,[68] and the further suggestion that parents will have a moral duty to enhance the cognitive abilities of their children.[69] These directions are seriously put forward by some, but, in reading the literature, it is often not possible to know whether these writers consider themselves to be transhumanists. Their dependence upon scientific manipulation is, however, undoubted.

When the initial debate on the prospects opened up by technological means of "improving" morality was concluding, a newer method of cognitive enhancement appeared, namely, transcranial direct current stimulation (TDCS). The claim here is that TDCS can improve language and mathematical abilities, memory, problem solving, attention, and even movement.[70] In TDCS, weak electrical currents are applied for about 20 minutes to the head via electrodes placed on the scalp. The currents pass through the skull and alter spontaneous neural activity, the goal being to increase neuroplasticity and enable learning. Effects can persist for up to 12 months.[71] These changes probably result from changes in the local concentration of the neurotransmitters GABA and glutamate, both of which are important in synaptic mechanisms implementing learning and memory.[72]

These characteristics of TDCS make it an attractive tool for manipulating neurobehavioral plasticity and potentially for enhancing psychological functions.[73] There are also claims that certain biochemical interactions stimulate the moral imagination, increase empathy toward others, and improve powers of moral judgment and reasoning,[74] although little attention has been paid to possible negative side-effects. These data are interesting in themselves, and yet there are dangers of concentrating solely on one moral response at the expense of the importance of human relationships. Nevertheless, TDCS may improve some aspects of learning, and it is regarded by many transhumanists as a practical expression of transhumanism.

Transhumanism through a Christian Prism

The challenge for Christians living in a highly technological world and confronted by technologically based claims, is to find a balance between therapeutic technologies for which they are very grateful, and extreme visions, whether utopian or dystopian, that extend far beyond any therapeutic imperative. Doomsday scenarios frighten and scare with their visions of radically modified humans: post-persons with enhanced cognitive and moral capacities,[75] cyborgs in which every body system will have been redesigned,[76] and even reanimated cryopreserved bodies.[77] Each of these has its origins in the present, although there are immense differences between those with artificial limbs or joints and the cyborgs of transhumanism, or between cryonic procedures and the infinitesimal chance of these ever being reanimated. Christians are to be realists, utilizing what is helpful and uplifting, and rejecting the hype and extremism.[78]

Rival Virtues

Alexander, in his analysis of transhumanism, starts from the characteristics of Christian enhancement, namely, growth in virtues such as kindness, humility, love, and generosity, all of which are central to the flourishing of relationships.[79] These are central to healthy human communities with their diversity of human personalities, abilities, convictions, limitations, and strengths, all expressed so eloquently by the writers of the New Testament letters when reflecting on the church as the body of Christ.[80] In contrast, the transhumanist vision appears to look to the artificial, the robots, the cyborgs, and programs to ensure that all operate according to preordained specifications, even as some of them claim to exhibit a great deal of concern about and motivation from human relations.

The virtues for Christians are not static but develop as people respond to the call of God and as they

increase in faithfulness. This is what Paul refers to as the fruit of the Spirit—love, joy, peace, patience, kindness, goodness, faithfulness, gentleness, and self-control.[81] These are not automatically implanted in someone's life, but have to be nurtured through obedience and response to the work of the Holy Spirit in their life. In other words, they are the antithesis of mechanically implanted ways of operating morally. This is not an argument against a brain implant to overcome a deficit, such as a motor deficit in Parkinson's disease, but it would be an argument against an implant aimed at providing a person with moral directions provided by an outside agent. Hypothetical as the latter may be, it serves to illustrate the difference between the two situations and represents a mode of control generally regarded as antithetical to Christian aspirations.

One goal of some transhumanists appears to be to rid humans of their bodily restrictions, and ultimately to replace the body altogether by a digital mind.[82] This is not a universal transhumanist aspiration, but it characterizes one strand within the movement. For this group, a future life in the body, including a resurrected body,[83] has disappeared, and with it, redemption and newness of life. Others, by contrast, claim to want a more robust body, with meaningful relationships. However, the thrust toward the artificial tends to undermine this.

The transhumanist worldview with its excessive dependence upon technology has problems coping with suffering,[84] as well as with loss and disappointment, even though some Christian transhumanists claim to respond to suffering and loss. Similarly, experiencing joy at overcoming obstacles, assisting others, looking after those in need, and healing the sick and downtrodden is less apparent in a technologically dependent world.[85] The human agenda within a Christian context is rich with challenges and hope, even when the surroundings may be negative and full of despair. For the transhumanist, however, all that seems to matter is a technologically engendered seamless perfection based on hubris, and an assumption that technological approaches will solve every problem.[86]

The Christian imperative to love one's neighbor, and especially the weak and poor, points to the need to assess enhancements in relation to the manner in which they will benefit as many people as possible and not just those with power and money—an element strikingly absent from much of the current ethical debate.[87] If moral enhancements are to benefit as many as possible, it is strange to hear calls for them to be made obligatory, since these calls reflect the powerful dominating the powerless. This domination, with its downgrading of personal liberty, is the antithesis of moral enhancement. In view of these considerations, Alexander concludes,

> Christians find themselves at the difficult juncture between the present evil age and the age to come, where the waters are rough and often treacherous as two strong currents flow in opposite directions. But being made in the image of God involves "subduing the earth" (Genesis 1:28) and that might surely, in principle at least, include the prevention of lethal genetic diseases by the restoration of mutated DNA to its normal sequence.[88]

This encapsulates a Christian response with its openness to scientific intrusions into the human body, but against a backdrop of God's purposes for human beings with our present mortal bodies and our future resurrected bodies.

Theological Challenges

These challenges can be framed by reference to three dualities.[89]

1. Mortality and Immortality

Transhumanism epitomises a secular eschatology, in which humans will be able to achieve a form of bodily (or digital) immortality. The future becomes an extension of the present, and hope emerges from this continuation. However, if this extension is going to prove successful, the problems and shortcomings, let alone the evil, of the present age will have to be removed by technology. In other words, if continuation of the present is to be an attractive option, all pathologies that lead to illness and aging would have to be removed by technology, thereby ushering in perfection and immortality. Transhumanists assume that the future existence as envisaged by them will be a vastly improved version of the present life, an assumption that has been stridently criticized by many Christian writers.[90] This, of course, does not include Christian transhumanists, as outlined in the earlier section, Christian Transhumanism.

Secular transhumanists ignore the relationship between death and sin, and hence the place of grace and forgiveness in confronting sin. To live forever with some form of physical immortality would not

constitute redemption, but would give corruption an everlasting licence.[91] Divine grace would have been replaced by autonomous human achievement. Christian theology recognizes that God experiences suffering and death, suffering from which posthumans seek to escape. Replacing grace by human/posthuman scientific effort may be a path to which some seek to aspire, but it is not a path akin to a Christian one.

Facing up to the reality of death brings us to the heart of Christian thinking. Christians should not extol the virtues of death since death is real and is an evil. Allen Verhey writes, "Death sunders human beings from their own flesh, from the community of praise, and from God. Death is a power that threatens […]"[92] It threatens an unraveling of meaning and is always a cause of sorrow and grief, but the context for the Christian is one of hope based in the power of God that raised Jesus from the dead.[93] Consequently, Christians are not to seek hope in technological mastery over nature, "but rather in the creative work of God that can call a cosmos out of chaos and give light to the darkness and life to the dust."[94] Since Christians do not ultimately rely on technology, they are freed to care for others even when death is imminent. By recognizing and accepting the "not yet" character of their present existence, Christian expectations will be constrained.[95]

A Christian diagnosis notes the inequalities of opportunity throughout the world, where speculation about endless biological life amounts to little more than academic theorizing. Celia Deane-Drummond has written,

> Such drives avoid facing the tragic reality of a life cut off well before its prime, and the added injustices associated with uneven distribution of medical resources that make consideration of life extension and other enhancements the privilege of a relatively small minority, even if desired more widely.[96]

Enhancement from a Christian angle centers on caring for people in need, treating diseases that can be treated, providing nutritious meals, and seeking to ensure that as many people as possible have housing that is warm and dry. These are realistic goals that accept human mortality within the context of the Christ-centered hope that God will bring into being a world redeemed and redirected. It is the hope of the resurrection and of resurrected bodies in which all are made new.[97] This new creation differs radically from the technologically driven present world envisaged by transhumanists. Christians neither reject the blessings that frequently accompany technology, nor do they look to technology to usher in the new heavens and the new earth.

2. Perfection and Imperfection

The continuum from therapy, through enhancement and on to transhumanism, creates problems for Christians since it encapsulates elements of striving for perfection. In societies that offer improved health and longer lives, it becomes increasingly difficult to accept imperfection and limitations.[98] Nevertheless, awareness of these temptations serves as a reminder that for Christians ultimate perfection is to be found in God alone and in his redeemed kingdom. Not only this, the perfection to be sought is that of character and attitudes rather than of the physical body. The work of Christ transcends the physical and biological, but neither does it totally ignore them.

Over against perfection stands the dark specter of our imperfection as human beings. Everything we touch is tainted; we see in a glass darkly.[99] Human understanding is partial, and human wisdom is less impressive than often imagined. All our scientific endeavors and all our clinical competence are incomplete; the developments of which we are most proud leave much to be desired, and Christians should be the first to applaud what can be accomplished, but also acknowledge that which is beyond our powers of comprehension and control. Perfection is unattainable biologically and untenable theologically.[100]

Lisa Fullam, in her analysis of the claims of transhumanists, notes that the act of attempting to engineer virtue may actually exacerbate social sins, since it is flawed humans who are setting the ground rules for determining the virtues being manipulated.[101] Against this, some writings from a Christian stance advocate for enhancing genetic virtue on the ground that it may be able to enhance the human tendency to, and capacity for, virtuous action.[102] Apart from the questionable Christian rationale for this, there are few grounds for anticipating that this will prove feasible scientifically.

3. Humility and Hubris

Any Christian conception of humility will have as core dual features the importance of serving others

and of serving God, rather than oneself. This will lead to lowly acts of service; we will not think of ourselves more highly than can be justified.[103] Christians are to be realistic about themselves and others, being fully aware that there are many occasions when they and others will be wrong. These features, in turn, point to the ways in which Christians are to behave, and they also constitute the basis for good practice in the scientific realm.

This Christian approach to the world differs radically from transhumanism, especially by secular forms of transhumanism, characterized as the latter is by hubris at the possibilities opened up by scientific capabilities to transform the human condition. This goes well beyond any healthy approach to science and its admittedly exciting prospects of improving aspects of human life, but equally aware of its limitations and the sometimes-aberrant directions provided by human beings. Ted Peters contends that each new technological transformation is blighted by human fallenness, and therefore has the potential for self-destruction along with the potential for healing.[104] For him, "only God's final act of redeeming grace will relieve us of such self-destruction."[105]

Overconfidence in the reliability of scientific procedures and in excessively bold interpretative frameworks leads on occasion to paradigms that extend far beyond what can be justified by the data. This is the result of hubris and unscientific speculations that take on the aura of invincibility, that emerges repeatedly in hyper-speculative digressions on cyborgs, posthumans, and transhumanism in general. It also emerges in the assurance with which moral bioenhancement is put forward as a solution to human problems. Justin Tomkins comments, "Becoming better people rather than enhanced humans involves living with a sense of how our own callings relate to the wider activity of God himself."[106] This involves trusting in God and not seeking to take ultimate control ourselves.

Peters nicely sums up the need for realism in all discussion of the future. He writes,

> Realism maintains a stubborn awareness that every dramatic technological transformation carries with it human fallenness, the potential for self-destruction right along with the potential for healing. Only God's final act of redeeming grace will relieve us of such self-destruction.[107]

The realism inherent within Christian thinking leads to a questioning of the motives, the grand theorizing and the incipient pride and arrogance of those who pontificate about radically transforming human beings with technologies yet to be developed. All such ventures are driven by the prospect of remaking humanity in one's own image, an image of oneself according to one's own ego. It is reminiscent of the scenarios suggested by reproductive cloning, of making more people like "me," with my esteemed virtues (whatever these may be); unfortunately, we make errors of judgment, we are self-centered, and our vistas may turn out to be incomplete and unhelpful. Honesty and objectivity are basic requirements in any exciting area.

Can We Learn Anything from the Transhumanist Vision?

The temptation when confronted by extreme vistas with which one has little sympathy is to dismiss them completely. And yet that would be unhelpful, since transhumanism, for all its failings, is a forcible reminder that Christians are as liable as anyone else to rely excessively on technology. Rather than looking to God, whom Christians claim to worship and rely on, they immediately utilize the nearest technological fix. The balance between fixes and patience can readily disappear, and little regard is given to the suffering and discomfort that may be called for on occasion. Our temptation is to accept all that technology has on offer or, alternatively, to reject it in its entirety. Discernment and understanding, based on biblical teaching and directives, are constantly to be the Christian's guides in order to meet the challenges of an environment strongly influenced by a secular mindset.

Tomkins, in his assessment of transhumanism, utilizes Bonhoeffer's distinction between the ultimate and the penultimate, and the importance of retaining sight of both.[108] The Christian perspective regards the physical world as having value as part of creation, plus the incarnation of Jesus pointing to the new creation. A danger inherent within transhumanism is to reduce all things to the artificial and brain function, valuing intelligence more highly than love or compassion, downplaying the importance of human embeddedness in our bodies, and rejecting biblical insights into the centrality of a resurrected spiritual body.[109] It is true that there are Christian transhumanists who are attempting to utilize technological

developments in the service of Christ's redeeming purposes in the world, but they have yet to demonstrate that this approach will enhance, rather than detract from, Christian understanding.

These comments do not lend themselves to a simple conclusion: technological bliss or tragic misadventure? All such contrasts are unhelpful simplifications; our dependence upon technology will always be a mixed blessing. If it ends up in secular transhumanism, it will have seriously misled us; if it ends up in Christian transhumanism, it will prove a distraction, depending upon the extent to which our technological dependence has or has not replaced the biblical witness to God's redeeming purposes in Jesus Christ. However, even for those not tempted by any form of transhumanism, the reliance upon technological answers can be both a blessing and a distraction. Indeed, it will always be a mixture of both, leaving us with the responsibility of discerning on what or on whom to place our reliance. There is a continuum between therapy, sophisticated enhancement, and what one might describe as "transhumanism light." For the Christian, the constant call is to examine that on which one is relying, and on whom or on what, one is trusting. It is to question how the technology at our disposal is being used, both at the individual level and in Christian community. +

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For now we see only a ***reflection*** *as in a mirror; then we shall see* ***face to face.***
Now I know ***in part****; then I shall know* ***fully,***
even as ***I am fully known.***
1 Corinthians 13:12, NIV

Apologetics & Origins

NATURE'S CASE FOR GOD: A Brief Biblical Argument by John M. Frame. Bellingham, WA: Lexham Press, 2018. 124 pages. Paperback; $11.99. ISBN: 9781683591320.

John Frame is Emeritus Professor of Systematic Theology and Philosophy at Reformed Theological Seminary in Orlando, Florida. He has written the Theology of Lordship series, which includes *The Doctrine of the Knowledge of God* (1987), *The Doctrine of God* (2002), *The Doctrine of the Christian Life* (2008), *The Doctrine of the Word of God* (2010); *Systematic Theology: An Introduction to Christian Belief* (2013); *A History of Western Philosophy and Theology* (2015); and many other books. Frame was a professor at Westminster Theological Seminary and Westminster Seminary California until 2002 when he moved to Reformed Theological Seminary. Frame is in the conservative Reformed tradition and the presuppositional apologetics school of Cornelius Van Til. He is considered to be one of the leading interpreters of Van Til.

This little book caught my eye because, surprisingly, Frame seems to be making a case for a form of natural theology. Natural theology is the investigation of God and his attributes and actions apart from the Bible, that is, what is seen in the natural world and in human nature, experience, and reason. Those in the presuppositionalist apologetics camp have resisted natural theology because of *sola scriptura*. They argue that what we believe about God and his works comes from the Bible and that leaving out the Bible in this discussion dooms it to failure. In addition, the Bible clearly speaks about God and his actions. Why do we need a reflection about God divorced from his revelation to us in scripture and in Jesus Christ? Frame discusses this problem and his response in the Preface (pp. 1–13).

There is a long tradition of philosophical (rather than biblical) arguments for the existence of God. Arguments from ancient Greece, such as the cosmological argument or the teleological argument for the existence of God, are arguments from nature. C. S. Lewis in *Mere Christianity* uses the nearly universal sense of right and wrong in human beings to argue for the existence of God. Not only the existence of God but some attributes of God—his wisdom, his goodness, and his purposefulness—are defended by these arguments from nature. Presuppositionalists generally regard these arguments as wrong-headed and useless, even if they are not necessarily wrong. Human beings, as creatures, are not in a position to judge whether or not the Creator exists. Our hesitation to acknowledge God's existence based on what is seen in nature is due to a willful suppression of the truth. Furthermore, one of the chief places in scripture where a natural theology argument is used (Romans 1 and 2) concludes that even though the evidence is "clearly seen" in things created and in the human conscience, these evidences leave humankind without excuse. They are unsuccessful because of the spiritual deadness of the human heart. "There is no one righteous … there is no one who seeks God" (Rom. 3:10–11) is the conclusion of it all.

Frame opens *Nature's Case for God* with the reminder, however, that "Scripture itself tells us that God is revealed everywhere and that human beings are therefore under obligation, not only to hear God's word in Scripture, but to obey his revelation in all creation" (p. 4). He appeals to texts such as Psalm 19:1, "the heavens declare the glory of God," and Romans 1:20, "God's invisible qualities—his eternal power and divine nature—have been clearly seen, being understood from what has been made." Frame calls his project in this book a "biblical natural theology," arguments about God from nature based on a biblical worldview. He says, "We should not look at nature autonomously, on the basis of our own reasoning power, but on the basis of God's revelation in Scripture" (p. 17). We look to nature when the Bible invites us to.

This biblical natural theology does not lead to salvation. It is insufficient because it does not include the message of salvation in Christ. But it does prepare the way for the hearing and believing of the Gospel as it is preached. Frame calls it a "prolegomenon" (p. 7). Believers, because their eyes have been opened to the truth of God as Creator, now see evidence for God everywhere. Frame writes, "The natural world, the creation, is a wonderful testimony to believers that God is real and that everything displays his glory" (p. 11).

Nature's Case for God is divided into two parts: The Witness of the Created World and The Witness of Human Nature. Frame does note that human nature is part of the created world (p. 11). Part One has five chapters: "The Greatness," "The Oneness," "The Wisdom," "The Goodness," and "The Presence." These are short chapters, just a few pages each, that highlight the particular attribute of God along with scripture passages that invite us to look to nature to see that attribute. Each chapter is followed by a list of questions for thought or discussion. I found this section to be a delightful and profound meditation on God.

While each chapter is excellent in showing us in nature the particular attribute of God, I will illustrate Frame's method with the chapter on "The Presence," which is also a transition to the second part. Frame cites Psalm 139:7, "Where can I go from your spirit?"; Acts 17:28, "in him we live and move and have our being"; and ultimately,

the idea of the image of God in humans (Gen. 1:26–27) to point out that God is near. God's presence is known even by unbelievers, because of creation and especially their humanity. Dominion over the rest of creation as expressed in Genesis 1 and Psalm 8 is the main way humans express the image of God. Interestingly, while some lament humankind's impact on nature (especially the negative effects of pollution and the human-caused extinction of other species), Frame points to this human trait as a revelation of the presence of God:

> Humanity has become the dominant species on the earth, ruling in every earthly environment … we also know [God] by knowing ourselves. He is closer to us than anyone or anything else. Every part of our mind and body reveals him …What amazing creatures we are! How much more amazing must be the one who put us together! That one is as close to us as the mirror in which we look each day … And from his presence we know he exists. (pp. 62–63)

After reminding us about the distortion of this image in myriad ways, Frame points us to Jesus Christ, the perfect, uncorrupted image (p. 67).

Part Two speaks of the human conscience: "The Seared Conscience," "The Accusing Conscience," "The Awakened Conscience," and "The Good Conscience." Frame examines the conscience at various stages of the human spiritual condition.

> The seared conscience is the mind of the bully, the criminal, and the tyrant. People with seared consciences do not seem to be even minimally affected by moral considerations. They wish to inflict their power on others, without any limitations of morality. (p. 79)

Yet, even the seared conscience functions. It may be ignored, but it cannot be completely forgotten (Rom. 1:32). Frame writes,

> When I am tempted to betray a friend, I know it is wrong. This is something I must not do … Betrayal is not merely bad for my friend, or for me, or for the species; it is objectively bad … only God has the authority to tell me what is objectively wrong. We may do what we can to silence the voice of conscience, even to sear it. But it will not stop speaking to us, accusing us. Within us, it makes its case for God. (p. 82)

The accusing conscience not only accuses ourselves (Rom. 2:14–15), but it accuses and excuses others. The morality of accusers is not always on target (although it often is), but the notion that everyone thinks there is a right and wrong is an evidence for God.

The awakened and the good conscience are the result of the new heart that God gives us. Our awareness of sin leads us to repentance and faith in Christ. Neither is perfect. Frame writes,

> Of course, the newly awakened conscience is not perfect … It needs to be taught and trained. (p. 94)
>
> To say I have a good conscience is not to claim sinless perfection … however … the Christian, whose conscience is awakened and directed by the Spirit, is able to behave faithfully … (p. 101)

As scientists, readers of this journal are interested in the study of creation (nature). As people of faith, they believe that God created and sustains that creation. *Nature's Case for God* articulates a biblical way of thinking about the relationship between the two.

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FRIEND OF SCIENCE, FRIEND OF FAITH: Listening to God in His Works and Word by Gregg Davidson. Grand Rapids, MI: Kregel Academic, 2019. 297 pages with bibliography and index. Paperback; $25.00. ISBN: 9780825445415.

Offering a direct and powerful rebuttal to perspectives that lead to conflict between faith and science, especially those views of young-earth creationism and intelligent design (ID), Gregg Davidson argues, in considerable detail, that scripture and the scientific views on topics such as the age of the earth and evolution are in harmony. This book is an outgrowth of years of intensive study and dialogue with advocates of many diverse views of the relationship between science and scripture. He clearly articulates the underlying principles of these views and provides ample information to support his position that science and Christian faith are in harmony.

Davidson is chair of the Department of Geology and Geological Engineering at the University of Mississippi, specializing in hydrology and geochemistry. He earned a BS in geology at Wheaton College and a PhD in geology at the University of Arizona. In addition to a few books of fiction, Davidson has authored two other books on science and faith. These are *The Grand Canyon, Monument to an Ancient Earth* (coauthored with Carol Hill, Wayne Ranney, and Tim Helble) and *When Faith and Science Collide: A Biblical Approach to Evaluating Evolution, Creationism, Intelligent Design, and the Age of the Earth*, published in 2009, which is a precursor to this work. Davidson is a Fellow of the American Scientific Affiliation.

Friend of Science: Friend of Faith comprises fourteen chapters organized in five parts. In the first part, Davidson sets forth the manner in which he recommends issues of apparent tension between science and the Bible be addressed. He suggests that three questions be considered:

1. Does the infallibility of scripture rest on a literal interpretation of the verses in question?

2. Does the science conflict with the intended message of scripture?
3. Is the science credible? (p. 23)

Davidson illustrates this approach with the historical example of Galileo's advocacy of heliocentrism. Here the book, in an apparent attempt to keep the text simple and readable to a broad audience, oversimplifies the history. Galileo's conflict with the church leaders is presented as a pure science-faith tension, ignoring the more complex history of political and personality issues that also played a key role. Nevertheless, he clearly shows how to analyze issues of science and the Bible.

In the next three parts, he shows examples of how to apply these three questions. In Part 2 (chaps. 3–5), he focuses on the first question. In the case of the age of the earth, he argues that the literal interpretation of Genesis, generally used to contend for a young earth, fails on the basis of self-inconsistency. Rather than countering with scientific facts or alternative hermeneutics, he seeks to show young-earth creationist advocates that their position is not internally consistent. One of his many examples is the sequence of the creation of humans and animals. Genesis 1:25–26 states that the animals were created first, whereas Genesis 2:18–19 asserts that they were created after humans to seek a suitable helper. Another example discussed in chapter 4 is conflict between genealogies, showing that the message of the ancestry is more important than the literal interpretation. Chapter 3 argues for a form of accommodation in which the biblical text is considered to be written from the perspective of the scientific views of that era. The Holy Spirit accommodated the incomplete and often erroneous views of nature rather than correcting them with views that would be in accord with modern science. Chapter 5 defends a framework interpretation of the days of creation. In this view, there is a conceptual structure of the days of creation rather than a chronological sequence. Each chapter addresses the most common objections raised to these views.

The question of conflict is met head on in Part 3. The primary thrust is to claim that there is no conflict because there is concordance between the Bible and science as understood in the ancient Near East societies. In this approach, conflicts between the Bible and science are resolved by understanding the view of nature in that culture and finding concordance there, rather than with modern science. For example, Davidson shows how references to the path of the sun and to the firmament separating the waters correspond to the three-tier cosmology accepted in the ancient Near East. In doing so, he touches on all the usual arguments of the time and sequence of creation and the Flood in the time of Noah. In this way, conflict with modern science is excused rather than resolved. Harmony is not to be found with modern science but with ancient science.

At other times, Davidson does claim that the Bible is in concordance with *modern* science. Perhaps the most telling is his effort to avoid conflict between modern genetic analysis and a historical Adam and Eve. He cites the recent work by Swamidass[1] and others as indicating that genetic studies do not definitively rule out the possibility of a universal ancestral couple of some kind (pp. 99–100). However, Davidson fails to note that these potential scenarios depend on a variety of assumptions: that Adam and Eve possessed an extremely unlikely and contrived DNA sequence, and/or had thousands of contemporary peers, and/or lived hundreds of thousands of years ago, long before the origin of *Homo sapiens sapiens*. For this reviewer, these assumptions strain concordant views beyond plausibility.

The longest section of the book by far is Part 4 in which Davidson presents a powerful defense of modern science. Aiming directly at the core issues of the age of the universe and the earth, the origin of life, evolution, and the origin of humans, he contends that current scientific understanding is credible and continues to grow. Davidson unabashedly maps out possible reasons why abiogenesis cannot be ruled out.

Finally, Part 5 takes direct aim at young-earth creationism, young-earth evolutionism, and intelligent design. He articulates the primary arguments for and against these views and soundly rejects them all.

Two groups of people would benefit the most from this book. On the one hand, there are those who adhere to a young-earth or ID position, but they have growing concerns and questions and are seeking alternative perspectives. This book provides extraordinary detail on virtually every argument on those issues. On the other hand, those who are already convinced of Davidson's position would benefit by gathering clarity on data and arguments that are most useful in discussions with young-earth and ID advocates. Though somewhat pedantic in spots where every possible contention is covered, the book is easy to understand by anyone with a basic interest in science. While the book contains few if any substantive new ideas, it presents a detailed and comprehensive account of ways of harmonizing science and scripture.

In the experience of this reviewer, in previous decades it was hard to find scientific experts who would take the time to systematically address the full spectrum of ideas raised in young-earth and ID literature. It is noteworthy that Davidson and others are now coming forward with clear and comprehensive coverage of the issues. This work is a valuable addition to that collection.

Note

[1]S. Joshua Swamidass, *The Genealogical Adam and Eve: The Surprising Science of Universal Ancestry* (Downers Grove, IL: IVP Academic, 2019).

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Environment

BEYOND STEWARDSHIP: New Approaches to Creation Care by David Paul Warners and Matthew Kuperus Heun, eds. Grand Rapids, MI: Calvin College Press, 2019. 252 pages. Paperback; $17.99. ISBN: 9781937555382.

Reforming the way we think about non-human creation
It's not natural resources, it's kin

We are more than the top of the creation status chain in charge of carefully using natural resources. We are brothers and sisters of animals and plants, made of the same atoms as the walls of the Grand Canyon and the pollen in a pine cone. Recognizing our role in creation leads us to reconcile with God and with the nonhuman parts of creation, a newly released book declares. *Beyond Stewardship: New Approaches to Creation Care*, edited by David Paul Warners and Matthew Kuperus Heun, takes the Christian stewardship ethic to another dimension. Written by authors connected to Calvin University and supported by the Calvin Center for Christian Scholarship, the book is designed to help concerned Christians reframe care of the nonhuman creation in new ways.

People familiar with the Christian environmental stewardship (CES) model may recognize the concept of humans wisely using and protecting nature as a representative of God, and the use of the Hebrew words *abad* (work, till, cultivate) and *shamar* (watch over, keep) in creation care (Gen. 2:15).[1] A 1980 book supported by the Calvin Center for Christian Scholarship, *Earthkeeping: Christian Stewardship of Natural Resources*,[2] was an important catalyst in the acceptance of stewardship responsibilities by US Christians.

Beyond Stewardship contends that "stewardship" suggests a person who is separated from what they oversee, making decisions in the absence of an owner, and paying attention only to economically valuable resources. Instead, the authors of *Beyond Stewardship* argue that humans are a part of the creation, in relationship with God and with the rest of creation, and, by our fundamental "creatureliness," need to expand our sense of moral responsibility to include all of nonhuman creation. Consequently, they define other vocabulary for what is often called "creation care," terms such as "earthkeeping," "place-keeping," "kinship," and "reconciliation."

The book's fourteen chapters are separated into three parts, beginning with a chapter by Heun and ending with a chapter by Warners. Each chapter begins with a compelling illustration and then pivots in a new direction, asking the reader to change to a new way of looking at a problem. A foreword by Bill McKibben, along with a preface and an introduction jointly written by both editors, sets the stage for the ideas of the book. An afterword by three authors of the original *Earthkeeping* book, an illustrated story by Calvin students, and appendices containing resources and discussion questions complete the book.

The two chapters in Part 1, Rethinking: Expanding Awareness, echo the introduction and spell out more clearly the problems of the CES model. These thoughts resonated with concerns I have had: the CES model does not protect parts of creation with low economic value, humanity is still too central to the paradigm, and we could "steward resources" without solving root problems that cause ecosystem degradation. Even so, we are told that it is important to use the vocabulary that is understood by our audience, and the best term for some is "stewardship."

In the five chapters of Part 2, Reimagining: How Things Could Be, the book becomes a wild ride. From concepts of kinship, creatureliness, and earthiness to the idea of each of us actually being a whole symbiotic community of microbes and human body combined, the authors of this section push the reader to recognize our physicality and mortality. Humans were tasked with naming the other creatures; this understanding gives us a special relationship to them. Finitude, sin, and mutual dependence mark our relations to nonhuman parts of creation. In our individualism and desire to be like gods, we have forgotten our interdependence with the rest of the creation. The sin of pride caused the fall of humanity and warped our relationship with our fellow creatures and with the nonliving material world around us. Our grief, lament, and repentance of sin lead the way to a reconciled relationship with the rest of creation as a part of Christ's sacrificial redemption of the whole world. That work of radical love brings the kingdom of God to Earth. Indeed, human care of the nonhuman creation is a part of an enriched understanding of the Gospel itself.

Part 3, Reorienting: Hopeful Ways Forward, consists of seven chapters. There are no quick fixes offered, but the emphases on hope and justice were welcome. Not all people are equally able to protect our world, as a story about poor tea-farm workers illustrated. In America, environmental racism causes people of color to be more exposed to toxins and to be given less opportunity to

experience many good aspects of the nonhuman world. Lead exposure in Flint and Grand Rapids, Michigan, highlighted these problems. In spite of these things, Part 3 describes actions people can take, the value of urban areas, and the ability of humans to alter unjust systems and to envision a world of shalom based on freely given gifts—an economy of reciprocity.

Beyond Stewardship is a thought-provoking and well-written book. Coordination of chapter format, references by each author to other chapters, and strong editing made this book an easy read. Only about five of the authors are scientists, but the science is connected to philosophy, economics, geography, theology, and other fields so well that it is appropriate reading for Christians both inside and outside the various scientific fields.

If there are weaknesses in the book, they stem from the flip side of the writing harmony of a group of close friends and colleagues. There are (possibly mistaken) assumptions about the audience's prior knowledge of American evangelicalism and general theology. Although the preface addresses this briefly, the difference between reformed theology and other theologies was not very clear. There were also some missing voices in a book that is written about connectivity. While chapters on environmental racism, human rights, and Native American approaches to the world dealt with these topics respectfully, almost all of the chapters were written by white North Americans. Including African American voices in the reformed tradition and the theology of Native American Christians, such as Terry LeBlanc or the late Richard Twiss, was not possible with the writing of the book by this particular group of colleagues. The omission was unavoidable given the origin of the project, but still unfortunate.

Beyond Stewardship skirts some difficult theological problems. For example, whether Christians believe that only spiritual death, only physical death for humans, or all physical death on Earth resulted from the Fall, believers struggle with questions about the goodness of current creation. Did sin change the world so much from God's original design without death that the lion, eagle, leviathan, and shark would not have existed except for the Fall? Alternatively, were lions and hyenas fighting over food, diseases, parasites, poisonous plants, tornadoes, and snake bites actually always part of God's good creation? How you view these ideas affects what you think God expects of humans caring for the rest of creation.

There are a number of places where authors use the Bible to support a particular statement, but then do not respond to other passages that are commonly used to conclude almost the opposite. For example, *Beyond Stewardship* stresses continuity between our mortal world, the kingdom of God, and heaven. However, the apostle Paul appears to distinguish between flesh and spirit, worldly and heavenly (for example, John 6:63, 2 Corinthians 5). Likewise, the discussion of human kinship with animals would have been strengthened by some response to the Old Testament commandments to kill animals.

Critics of creation care, such as the Cornwall Alliance,[3] express the belief that environmentalists are worshipping the environment, approaching pantheism, and believing New Age teaching. The Cornwall Alliance holds that care for the poor is not compatible with climate change response. These are common perceptions, but they were not addressed. Nonetheless, no book can touch on all of the questions raised by a new approach to caring for the world we inhabit. *Beyond Stewardship* has prepared us for a great deal of scholarship to come. As we approach global environmental crises, this hopeful, loving, and complex look at God and the created world is a breath of fresh air.

Notes

[1]All biblical references or quotes are taken from the New International Version.

[2]Loren Wilkinson, ed, *Earthkeeping: Christian Stewardship of Natural Resources* (Grand Rapids, MI: Eerdmans, 1980).

[3]The Cornwall Alliance for the Stewardship of Creation was initially The Interfaith Council on Environmental Stewardship, which published *The Cornwall Declaration on Environmental Stewardship* in 2000 and took its current name in 2007. They claim that some Christians are falling into climate idolatry and that godly stewardship means dominion, continued human population increase, and continued fossil fuel use.

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History of Science

ON TRIAL FOR REASON: Science, Religion, and Culture in the Galileo Affair by Maurice A. Finocchiaro. Oxford, UK: Oxford University Press, 2019. ix + 289 pages. Hardcover; $32.95. ISBN: 9780198797920.

In 1633 Galileo was condemned by the Inquisition for holding that the earth moves, something they considered "false and contrary to Scripture." After reciting an abjuration, Galileo spent the rest of his life under house arrest. His major work, the *Dialogue on the Two Greatest World Systems*, was banned and remained on the *Index of Forbidden Books* until 1835.

Maurice A. Finocchiaro is a distinguished historian of science who has written extensively on science, religion, and culture in Galileo's day. In this book, he summarizes his earlier work and renders it accessible to a wider audience. He insists that the Galileo affair should

be separated from the *original* affair that climaxed in 1633, and the *subsequent* affair, which began after his condemnation and continues to the present day. Looking first at the structure of the original affair, he sees an undeniable conflict that takes the form of religion versus science, namely, religion attacking science. "The scientist Galileo," he writes, "was persecuted, tried, and condemned by institutions and officials of the Catholic religion" (p. 250). The subsequent affair also consists of a conflict between science and religion, but this time it takes the form of science versus religion. For the past four centuries, the Roman Catholic Church has been under fire from scientists and alleged representatives of the scientific method for its treatment of Galileo. This can be seen in the writings of Milton, Voltaire, and Einstein, which Finocchiaro considers merely the tip of an iceberg of anticlerical feeling. On the other side, the proclerical side, we find various apologists, such as Pierre Duhem and Paul Feyerabend, who attempted to defend the church and blame Galileo.

Finocchiaro claims to have followed Galileo's ideal of open-mindedness and to have dug below the surface of anticlerical criticism and proclerical apologetics. He believes he has found what he characterizes as a phenomenon of myth-making and mythologizing, that is, the rise, evolution, and fall of cultural myths. In the seventeenth century, various questions were raised about the physical truth of the motion of the earth, but science gradually established incontrovertibly that Galileo had been right on this issue. Galileo was also criticized for his hermeneutical principle that scripture is not a scientific authority; cultural developments also vindicated him in this regard, as is evidenced by the fact that this is now the official position of the modern Roman Catholic Church.

As it became increasingly clear that Galileo could not be validly accused of being a bad scientist, a bad theologian, or a bad logician, he started being blamed for other reasons. Some authors began to stress the legal aspect of the trial, charging that he had been guilty of disobeying the church's admonition regarding Copernicanism. Others blamed him for his epistemological realism and argued that the condemnation would have been avoided if epistemological instrumentalism had prevailed. In chapter five, Finocchiaro offers an interesting reappraisal of the first steps that the Inquisition took in 1615–1616 and that led to the condemnation of Copernicus. A high-ranking official, Michelangelo Seghizzi, is said to have enjoined Galileo to abandon completely the Copernican theory and, henceforth, not to hold, teach, or defend it in any way whatsoever. But it is also recorded that Galileo had just seen Cardinal Bellarmine who had issued a friendlier warning. Finocchiaro finds a number of inconsistencies in the available accounts, and he argues that Pope Paul V did not intend an injunction as stringent as the one that was formulated by Seghizzi. This lack of clarity is important as it was to affect Galileo's trial seventeen years later.

Finocchiaro is also concerned with what he calls "the current spectacle of the Galileo affair." On the one hand, we witness the phenomenon of a rehabilitation movement within the Roman Catholic Church, which is exemplified in Annibale Fantoli, *The Case of Galileo* (2003). On the other hand, we see the rise of "socially oriented critiques of Galileo by leftist sympathizers and self-styled progressives," and we marvel at "the conflict between these two points of view, as well as the irony of the switching of sides" (p. 256).

In the context of the current controversies over the relationship between science and religion and between institutional authority and individual freedom, Finocchiaro pleads for a more fair-minded appraisal of the facts. We must take seriously the arguments for rejecting the ancient geostatic worldview voiced by Galileo's opponents but also defend him from uncritical praise or biased condemnation.

Few, if any, readers of this journal will want to dissent from the author's advice. It is commonsensical. We can perhaps regret that Finocchiaro did not quote recent works on Galileo in which we find a serious and scholarly attempt to explain what happened and to suggest what we can learn from the unfortunate and misguided battle between science and religion. One could mention, among other works, J. L. Heilbron's *Galileo* (2010) that offers an objective assessment of the clash between science and religion.

Reviewed by William R. Shea, Professor Emeritus, University of Padua, Italy.

THE GESTATION OF GERMAN BIOLOGY: Philosophy and Physiology from Stahl to Schelling by John H. Zammito. Chicago, IL: University of Chicago Press, 2018. 354 pages + 147 pages of notes, indices of names and of subjects. Hardcover; $45.00. ISBN: 9780226520797.

John Zammito has published a substantial corpus of works on Immanuel Kant and contemporaries. He served as Weir Professor of History at Rice University from 2007 to 2019; this year he migrated to Rice University's Baker Residential College, where he is Baker College Chair for History of Science, Technology, and Innovation. Beyond his primary body of work on the history of ideas in the Enlightenment period, he has also authored a useful commentary on the modern ("post-positivist") history of the philosophy of science. He notes in his acknowledgment section that the present work is the result of ten years of labor. The thoroughness of his account is impressive; the book is not a quick read, and especially not if one takes the time to

glean the source documentation and commentary in the lengthy section of notes.

During the early eighteenth century, the mechanical-mathematical description of natural phenomena promoted by Descartes, Gassendi, Boyle, and Newton, was in its glory. Its clarity and cleanness of approach, especially manifest in Newton's *Principia*, provided strong support for the Cartesian reduction of living systems to machines. And beyond, it established the fruitfulness of experiments. But whereas a machine approach to living systems could prove successful in some dimensions, such as depicting a circulatory system as a device of plumbing and pump, other aspects of living systems proved more problematic. For example, the ability of life forms to organize themselves as they developed from an embryo, to take in nutrients and grow, and to repair and reproduce themselves argued that organisms were more than Cartesian-Newtonian clockworks. Enlightenment savants sought a more holistic model for organismal design, one which would include phenomena such as self-organization and goal-directed behaviors, while at the same time not falling back on Aristotelian, Hermetic, or other hidden spiritual forces. A clear identification of processes common to major groups of life, or perhaps all of life, would prove necessary.

The materials at hand were primarily those from two sources or practices: the long tradition of natural history, with its reservoir of comparative data for systematic organization; and medical physiology, which itself had a complicated and often contentious relationship with contemporaneous chemical researches. Both traditions were replete with teleological referents. Zammito chronicles the attempt by Enlightenment scientists and savants to articulate an overarching theoretical framework, or at least a research program, by which to unify these practices. By the mid-to-late eighteenth century, a major geographic center for this effort was concentrated in emerging German universities and medical schools, although prominent natural historians elsewhere, such as Boerhaave, Camper, Linnaeus, Maupertuis, and Buffon were marshalling data and ideas which pushed the discussion. Zammito judiciously dissects the ligaments of experiment, theory, and personality, which became intertwined as the new discipline of biology was birthed. I attempt to sketch some of the highlights of Zammito's narrative below.

The poet/physiologist Albrecht von Haller (1708–1777) is the focal personage of Zammito's early narrative, and a foil for further developments in the middle 1700s. Haller, a devout Bernese Calvinist, studied at Boerhaave's medical school in Leiden during the middle 1720s and then undertook advanced mathematical training with Johann Bernoulli in Basel. Along the way, he became a respected anatomist as well as a convinced proponent for the experimental approach to physiology. Haller would land a position in anatomy at the University of Göttingen, where he published a critical edition of Boerhaave's works, as well as providing an introduction to the German translation of the first volumes of Buffon's *Histoire Naturelle*. In 1753, a substantive lecture delivered to the Göttingen Academy was published. In this lecture, Haller addressed two topics of physiological import: the "sensibility" of nerves, and the "irritability" of muscular tissue. While Haller himself was inclined to interpret these as resulting from mechanism, this publication, as well as his several years of experiments (often on live animals), triggered a wide discussion on the nature of organisms and their behaviors. In 1753, Haller returned to Bern, where he would write works on embryology and compile massive bibliographies of physiological publications. Sensibility and irritability remained at the forefront of a growing list of phenomena demanding a different level of interpretation than that of wheels and pulleys.

Johann Friedrich Blumenbach (1752–1840) is central to the middle third of Zammito's narrative: he "came to be the patriarch of German life sciences well into the nineteenth century" (p. 186), taking on the role of biological authority following Haller's death in 1777. Blumenbach studied at Göttingen, where he received his appointment as extraordinary professor in 1776 and promotion to ordinary professor in 1778. He also served as an industrious curator of the university's natural history collections. His many publications included a two-volume *Handbook of Natural History* (1779–1780), which underwent many subsequent revisions, and a *Handbook of Comparative Anatomy* (1805). His students included Alexander von Humboldt, C. F. Kielmeyer, and G. R. Treviranus among others. He traveled and corresponded widely. While revering Haller, Blumenbach differed significantly on embryology: he sided with the rising epigenetic school of organismal development, rather than Haller's preformationist thought. Following Caspar Friedrich Wolff, Blumenbach believed that epigenesis, in turn, required an innate or immanent organizational principle within the organism, which Blumenbach famously named "Bildungstrieb" or formational drive. Propagation, nutrition, and regeneration were to be included as aspects of the Bildungstrieb.

Like Buffon, Blumenbach realized that Earth and its life were far older than the then-common belief of a few thousands of years. He took up the subject of fossils in the first and subsequent editions of the *Handbook of Natural History*, affirming a lengthy history to Earth and life. Engaging with the geology of his compatriot Abraham Werner as well as the Swiss Calvinist André de Luc, he opposed a cyclical view of geohistory then being elaborated by James Hutton. The distribution of

fossils in successive stratal horizons argued that Earth catastrophes ("revolutions") resulted in major extinction events followed by repopulations of Earth's surface by new life forms. These biotic replacements, in fact, could well be a potential effect of the Bildungstrieb. However, Blumenbach did not feel free to postulate continuities in the history of life. Rather, following a major catastrophe, the Bildungstrieb would be forced into new directions, and new life forms (in many cases, not totally unlike prior forms) would naturally emerge.

The latter portion of Zammito's volume includes a chapter on Carl Friedrich Kielmeyer (1765–1844) and his influence on the course of nineteenth-century-biological science. Zammito contends that Kielmeyer, although a student of Blumenbach's, did not derive his biophilosophy from the Göttingen professor. Kielmeyer published little, but he influenced a broad cadre of his students at Stuttgart, as well as others, through unpublished and published class notes; he himself furnished annotated versions of his class notes to his friend Cuvier and to Goethe. His published 1793 address, "On the interrelations of the organic forces in the series of different organizations, the laws and consequences of these" set forth a rationale for organizational and research principles for what Treviranus would later term "biology" (1802). Kielmeyer described organic systems as supervening on organic chemistry but as entirely natural, thus requiring a new layer of laws and an organizational schema which, in turn, required a historical-hierarchical structure to the realm of living creatures. Zammito documents the energizing effect of this proposal for the biology of the first half of the nineteenth century.

A running dialogue between these early biologists and contemporary philosophers, including Diderot, Herder, Kant, Goethe, and Schelling, helped variously to clarify or complicate epistemological issues or the warrant for research. Schelling's proposal, which he termed "*Naturphilosophie*," affirmed that life's organization could be investigated via natural principles and appeared to resolve some of the epistemological issues posed by Kant. It would prove inspirational to Ignaz Döllinger, and through Döllinger, to the anatomists von Baer, von Pander, and Oken. However, Schelling's conjunction of *Naturphilosophie* with Spinozism led to disenchantment with *Naturphilosophie* among German scientists of the next generation.

Zammito's book is thorough and thoughtful. He is fluent in the primary literature and effortlessly dialogues with both past and contemporary interpreters. In places, he graciously but unapologetically disagrees with some of his colleagues. It may well be the case, as Stephen Gaukroger claims in his jacket recommendation, that "*The Gestation of German Biology* is his crowning achievement." It is of great use as a reference and highly recommended.

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Medicine and Health

FEARFULLY AND WONDERFULLY: The Marvel of Bearing God's Image by Paul Brand and Philip Yancey. Downers Grove, IL: InterVarsity Press, 2019. 272 pages. Hardcover; $14.59. ISBN: 9780830845705.

I first read Paul Brand and Philip Yancey's books, *Fearfully and Wonderfully Made* and *In His Image*, in the 1980s. I loved them so much that, when I began teaching anatomy courses as a faculty member in the mid-1990s, I made *Fearfully and Wonderfully Made* required reading for students in my human anatomy courses. Now, after more than two decades of reading student journal responses to this thoughtful and deeply meaningful book, I can say with confidence that it has been an excellent tool in helping students integrate anatomy and their Christian faith. Therefore, when *Fearfully and Wonderfully: The Marvel of Bearing God's Image* was released, I couldn't wait to read it. *Fearfully and Wonderfully* combines the original two books into one volume. Brand died in 2003, so to write this revised and updated combined edition, Yancey went back to his original interview notes and Brand's writings, and also incorporated updated information.

The familiar verses of Romans 12:4–5 introduce us to the image of the Body of Christ as an analogy for the church. In Romans, Paul teaches us that every part of that Body plays its own important role. In *Fearfully and Wonderfully*, Brand, through the pen of Yancey, expands the scriptural image of the church as the Body of Christ with unforgettable stories of Brand's work with lepers in India and in the United States. For example, he asks the reader to consider the body's skeleton. Our skeleton provides more freedom than restriction compared to organisms that have an exoskeleton, such as a crayfish. In an analogous way, God's laws are intended to free us rather than restrict us. I was particularly convicted when he pointed out that, like an exoskeleton, rigid, rule-focused faith does not accommodate the kind of growth and adaptation that a grace-focused internal skeleton does. He reminds us of the importance of touch and the miracle of the compliancy of skin, urging us to consider the value of compliancy when we (Christians) work and live among others who may not share our beliefs and values. And he asks us to think more deeply about what the Lord's Supper means if we more fully understand the structure and function of blood.

I found Brand's exploration of the role of pain to be the most poignant. As a physician who has treated thousands of leprosy patients, Brand knows, *really* knows, the function of pain and how wrong things go when we lose the ability to feel pain. Pain warns us that a body part needs special attention. We avoid constant re-injury because of pain, so that a body part can heal. Similarly, Brand reminds us that it is important to pay attention to the parts of the Body of Christ that are suffering. "I can read the health of a physical body by how well it listens to pain … Analogously, the spiritual Body's health depends on whether the strong parts attend to the weak" (p. 187). How the church needs this lesson today!

In the early chapters of this book, Brand describes his unexpected call to medicine. He was raised in India by his missionary parents and planned a career in construction with intentions of using it back in India. He had seen firsthand how expertise in construction could improve the lives of the people of India. He tells the story of how he was drawn reluctantly to medicine when he witnessed a blood transfusion bring a patient back from near death. He altered his path and trained as an orthopedic surgeon, specializing in the hand. When Brand describes how he came to work with patients who suffer from leprosy, he shares his surprise with the reader when he realized that both his construction and his medical training were critical in caring for those who could no longer feel their limbs. Brand treated the disease (medicine) but also designed shoes (construction/engineering) that avoided the development of pressure sores that form when a leprosy patient fails to shift their gait the way those of us with feeling in our feet do, without even thinking about it.

I hope that my students, worried about choosing a major and a career while trying to discern God's will for their lives, will find comfort and wisdom in Brand's winding path to uncovering God's will when they read this book. I'm using the book's discussion questions as prompts for student journals. The responses so far have been uniformly positive. Students who began reading with dread—another book a professor wants them to read—found themselves deeply engaged. All readers, not only anatomy students, will find a message for them in this book.

The discussion questions make this book easily accessible for small groups or adult Sunday school classes and for any member of the Body of Christ who needs a reminder of what that membership really entails. All will benefit from *Fearfully and Wonderfully*.

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Φ Philosophy

SINCE THE BEGINNING: Interpreting Genesis 1 and 2 through the Ages by Kyle R. Greenwood, ed. Grand Rapids, MI: Baker Academic, 2018. 308 pages. Paperback; $27.00. ISBN: 9780801030697.

Anyone familiar with the exegetical history of the first two chapters of the Bible knows that dealing with this topic in a single book is an impossible task. There have been more attempts to understand Genesis 1 and 2 than any other biblical chapters, and there has never been a wider range of differing and conflicting interpretations. Yet despite this situation, Old Testament scholar Kyle Greenwood has assembled a fine team of academic specialists from various disciplines, and they offer in this book a remarkably informative and insightful set of chapters/papers introducing readers to this challenging topic.

Most of the chapters follow a four-part rubric: (1) the interpretation of the days of creation in Genesis 1, (2) the cosmology or structure of the world, (3) the creation of humans and their status, and (4) the Garden of Eden (p. xxi). In the preface, Greenwood makes an important qualification regarding the use of the term "literal" in biblical hermeneutics. For some, it means "a plain-sense reading of the text." But for others, literal "refers to the text's intended usage given the word's context and the genre of the literature in which it appears" (p. xxiii). In this way, Genesis 1 and 2 can be read Christologically, eschatologically, allegorically, typologically, metaphysically, philosophically, midrashically, or scientifically.

In the opening chapter, Greenwood points out that there are very few direct references to Genesis 1 and 2 in the rest of the Old Testament. Notably, Adam rarely appears after Genesis 5 and Eve is never mentioned after Genesis 4. At best, Greenwood suggests that there are what he terms numerous "echoes" or "reverberations," alluding to these opening chapters (p. 21). For example, typological allusions to the Garden of Eden appear with the expressions "the garden of God" (Ezek. 28:13; 31:8–9) and "the garden of the Lord" (Gen. 13:10; Isa. 51:3). Greenwood concludes that these echoes and reverberations are subtle evidence that the biblical authors were not concerned with the order of creative events or the time frames in Genesis 1, in contrast to the desires and assumptions of many Christians today.

Michael D. Matlock examines Jewish interpretations of Genesis 1 and 2 during the Second Temple period (roughly 587 BC to 70 AD). Exegetical practices were influenced by Hellenistic philosophical categories. Even the translation of the Old Testament into Greek (Septuagint; LXX) features, in places, Platonic concepts.

For example, Genesis 1:2 refers to the earth being "empty" (NIV), but in the LXX this adjective is rendered "invisible" or "unseen" (Greek: *aoratos*) and points back to Plato's invisible pre-existing world of ideas (p. 30). In an important development in the history of exegesis, Philo of Alexandria champions allegorical interpretations and even spurns literal readings of the six days of creation in Genesis 1 (p. 42). This approach later makes its way into Christian biblical interpretation.

In a chapter entitled, "New Testament Appropriations of Genesis 1–2," Ira B. Driggers deals with the well-known fact that New Testament (NT) writers tore Old Testament (OT) passages completely out of their original context. But he notes that this hermeneutical approach was "commonplace in Second Temple Judaism" (p. 48) and that "NT writers do not engage Genesis (or any other OT document) as a way to preserve its 'original' meaning, much less to verify the historicity of past people and events, but rather they draw out the implications of the central Christian claim that Jesus Christ is risen Lord" (pp. 73–74). In other words, the Old Testament was not used to affirm concordist readings but rather for rhetorical and theological reasons affirming the Christian faith.

Eisegetical eccentricities are further revealed in Joel S. Allen's essay, "Early Rabbinic Interpretations of Genesis 1–2." The rabbis assumed that scripture was "omnisignificant," in that every biblical detail leads to "a never-ending world of interpretive possibilities" (p. 80). As Allen notes, there was not one meaning for a passage, but "a hundred million possible meanings" (p. 94)! This hermeneutical approach is often referred to as "midrash." To offer a striking example from the Genesis Rabbah (first to fourth century rabbinic interpretations on Genesis), the Bible begins with the Hebrew letter *bêt* (equivalent to English "b"). This letter is shaped basically like a square with the left side open: ב. Since Hebrew is read from right-to-left, Genesis Rabbah 1:10 argues that

> it isn't permitted to investigate what is above [the upper line, i.e., the heaven], what is below [the lower line; i.e., the underworld] and what is before and what is behind [to the right of the vertical line; i.e., the past]. But from the day the world was created and thereafter (it is permitted) [the open side of *bêt*]. (p. 82)

In a chapter on the Ante-Nicene fathers, Stephen O. Presley notes that they were engaged in countering Greco-Roman philosophical concepts, such as the eternity of the world. As a response, a well-developed doctrine of *creatio ex nihilo* emerged through the work of Justin Martyr, Tatian, Theophilus, and Irenaeus (p. 108). These fathers approached Genesis 1 and 2 with a hermeneutical balance between literal and spiritual meanings. The latter included a range of literary categories such as allegory, typology, tropology, and eschatology (p. 102). In dealing with the Nicene and Post-Nicene fathers, C. Rebecca Rine observes that they maintained the Ante-Nicene trend of responding to Platonic, Aristotelian, and Manichean philosophies by appealing to Genesis 1 and 2. St. Augustine was a leading critic of the Manicheans. These fathers also continued to read scripture both literally and allegorically, and Rine notes that they held a trivium of exegetical concerns: recognition of human authorial intention, consonance with fundamental church teachings, and sanctification of the reader and listeners (p. 128). Yet cosmological questions related to Genesis 1 and 2 were not far from the minds of these fathers. For example, they asked why the four elements (fire, wind, water, earth) are not *all* mentioned in the first chapter of scripture, or why are there no details about the shape of the earth and its circumference (p. 142). Concordist proclivities seem to be an inevitability in the human mind.

Jason Kalman, in "Medieval Jewish Interpretation of Genesis 1–2," notes that a "revolutionary change" in rabbinic hermeneutics arose during the eleventh and twelfth centuries (p. 149). A trend began with contextual readings of scripture, known as "peshat exegesis." Biblical scholar Rashi was a leading proponent. However, exegetical polysemy continued. Famed philosopher Maimonides, in attempting to resolve philosophical and scientific conflicts with scripture, came to believe that the Bible "communicates on multiple levels according to the reader's intellectual ability. Simple people could read narratives in a straightforward manner [being unaware of a conflict], while the intellectuals [being aware of a conflict] could read them as parables intended to reveal philosophical truths" (pp. 150–51). A sense that cosmological issues were incidental to religious truths also emerged. Rashi's grandson Rasham argued that the purpose of Genesis 1 was not to reveal how God created the world, but instead this first biblical chapter was symbolic and intended to promote observance of the Sabbath (p. 158).

In contrast to their Jewish colleagues, medieval Christian scholars, according to Timothy Bellamah,

> took for granted that the creation narratives provided a historical record of some sort, and they took it as part of their task to ascertain the chronology of events on which they commented, doing this for the sake of establishing a *comprehensive history of the world*. (p. 187; my italics)

In this way, concordism became deeply embedded because these Christians assumed that the Genesis narratives could be aligned with the philosophy and science of the day. Debates arose on whether all things in the world were created simultaneously, or whether

they were made over a period of time, such as six days (pp. 175–76). But Thomas Aquinas put discussions about God's creative method in perspective. He writes in his *Commentary on the Sentences*, "[T]here is something belonging to the *substance* of faith, namely that the world began at creation … By what mode and order it was made, however, belongs to the faith only *accidentally*" (pp. 1254–55, my italics). In other words, the message of faith in Genesis is *that* God created, but *how* he created is incidental.

Concordism and the literal interpretation of Genesis 1 and 2 find their zenith in the Protestant reformers Martin Luther and John Calvin, both of whom were young-earth creationists (pp. 195, 197). Jennifer Powell McNutt underlines that "overreliance of allegorical readings" in earlier generations and belief in the "primacy of literal interpretation" led to the "hermeneutical lens of historicity" being applied throughout early Protestantism (p. 190). Luther fully depicts this method in his 1536 *Lectures on Genesis*. "[W]e assert that Moses spoke in a literal sense, not allegorically or figuratively, i.e., that the world, with all its creatures, was created within six days, as the words read" (p. 195). Luther and Calvin also accepted the cosmic fall. The latter contended that "corruptions" and "deformity of the world" were more the result of the "sin of man than the hand of God" (p. 197). Yet both reformers had an "appreciation for the doctrine of accommodation," which "allows the [biblical] text to speak truth to the common person without disproving the natural philosophy [i.e., science] of the period" (p. 204).

In his chapter entitled "Post-Darwinian Interpretations of Genesis 1–2," Aaron T. Smith discusses the wide range of exegetical approaches and reactions to the theory of biological evolution. He notes that Christians in Darwin's generation, such as the Baptist theologian Augustus Strong and the Anglican priest Charles Kingsley, were comfortable with absorbing evolution into their theology. Yet others, like Presbyterian theologian Charles Hodge, viewed Darwin's reductionist theory as "atheistic" (p. 262). The twentieth century saw a similar range of views. Seventh-day Adventist George McCready Price inspired fundamentalists Henry Morris and John Whitcomb to write *The Genesis Flood* in 1961, which ushered in the modern young-earth creationist movement. Baptist theologian Bernard Ramm attempted a concordist harmonization between scripture and geology with his "trinitarian progressive creation" (p. 252). Movements away from concordism also arose from both liberals, such as Rudolph Bultmann, and conservative Christians, such as Karl Barth.

David T. Tsumura in his chapter reveals that archeological discoveries in the ancient Near East (ANE) have significant implications for the interpretation of Genesis 1 and 2. Beginning in the late nineteenth century, this evidence sets the historical and intellectual milieu during which the inspired biblical authors wrote their creation accounts. For example, the terms "image" and "likeness of god" were applied to ANE kings (p. 230). But in a radical polemical move, Genesis 1:26 NASB states, "Then God said, 'Let us make man in our image, in our likeness, and let them rule.'" In other words, *all* humans are like earthly kings representing the Creator. This "royal designation" assigned to men and women to rule the world was in sharp contrast to the ANE belief that they are merely slaves of the gods. Notably, Tsumura takes to task the theologically fashionable idea that Genesis 1 reflects a cosmic temple. He argues that "one cannot say that the cosmos, let alone the Garden of Eden, was made for Yahweh to dwell in" (p. 229). Tsumura appeals to 1 Kings 8:27 NIV, "But will God really dwell on earth? The heavens, even the highest heavens, cannot contain you. How much less this temple I [Solomon] have built!" He then adds that Isaiah 66:1 views the heaven as God's throne and the earth as his footstool.

To conclude, this book is a "biopsy" of the wide range of interpretive approaches to Genesis 1 and 2 throughout the ages. The days of Genesis 1 have been understood as literal 24-hour days, symbolic and allegorical days, and geological periods hundreds of millions of years long. Cosmological interpretations have included concordist attempts to align scripture with geocentricity, heliocentricity, geology, and evolution. The Garden of Eden has been viewed as a literal historical place, or viewed figuratively and allegorically. And the *de novo* creation of a historical Adam has proven to be quite resistant to reinterpretations over time. I suspect that further exploration of ANE creation accounts and an appreciation of their ancient understanding of living organisms (biology) will free the church from this last concordist stronghold.

This is a very good book. It is very well documented, quite readable for a general audience, and offers a wide range of valuable insights by leading scholars into the various hermeneutical approaches to Genesis 1 and 2 throughout history. This is an important contribution, and I very much recommend that it be added to your library.

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ON THE ROAD WITH SAINT AUGUSTINE: A Real-World Spirituality for Restless Hearts by James K. A. Smith. Grand Rapids, MI: Brazos Press, 2019. 256 pages. Hardcover; $24.99. ISBN: 9781587433894.

Science and philosophy originate from the human quest for knowledge. "Science" derives from the Latin

noun *scientia* based on the verbal root *scire* "know." *Scientia* in turn borrows from the Greek concept *epistemonikos* "making knowledge," based on the verbal root *epistomai* "know/ understand," which founds the philosophical discipline of epistemology. Existential pondering of knowledge has always been seminal for Christians, who believe Jesus Christ to be the incarnation of the wisdom of God (1 Cor. 1:24) and the life of God—"the *'logos'* who was with God, was God, was the creator of all that exists, and is the life which is the light of humanity" (John 1:1–5).

On the Road with Saint Augustine is philosopher James K.A. Smith's intellectual autobiography. Smith's confessional desire "to know" true meaning, identity, peace, and authentic life is the book's "on-ramp" into a journey stimulated by conversations with Heidegger, Camus, Sartre, Derrida, Marcel, and Nietzsche, along with brief exchanges with the popular voices of Ingmar Bergman, Ferdinand Hodler, Bruce Springsteen, Joel Osteen, Walker Percy, and Thomas Wolfe, among a host of other interesting interlocutors. Smith's constant companion, however, is St. Augustine, whose reflections emerge truest to the author's own life and experience.

Augustine's arrival at wisdom began with the brazen journey currently traveled by many postmoderns—the quest for self-discovery, glory, and satisfying pleasure. We hit the road, Smith suggests, because parents are thought clueless and everything we want is out there, on the road. "'Here are the keys' is a quasi-sacramental pronouncement that unleashes you to finally be yourself" (p. 60).

On this account, the Prodigal Son is our archetype. We are all prodigals suffering the delusion of self-sufficiency away from the true home of our heart's desire and need. Like the Prodigal, human journeys always prove restless until the traveler comes to know the Father's embrace.

Existentialists help us to understand the rationale of the road. For the nonphilosopher, this revelation is Smith's most surprising insight. The one who introduced Smith to Augustine was none other than Martin Heidegger, whose categories of thought, if not semantics, were formed by courses Heidegger once taught on Paul's letters and Augustine's *Confessions*. The connections are readily apparent. As Paul admonished Christians to "not be conformed to this world" (Rom. 12:1), so Heidegger warned against falling prey to the "mass society of 'the they' (das Man)—an idea conceived in Heidegger from Augustine's disdain for 'absorption' in the world" (p. 30). As Augustine came to know liberation through confession, so Heidegger "took up Dasein, which means 'being there'" (p. 28). Smith explains:

> And so Dasein functioned like a philosophical saint of sorts, an exemplar to imitate. Could we measure up to "authentic" Dasein, seizing possibilities and resisting temptation? Could we learn to be resolute, to resolve to answer the call of being, to seize our inmost possibilities—to become the "I" that I'm destined to be? As Bakewell rightly notes, while later existentialists would frame this as a call to "be yourself," for Heidegger it was a "call to take up a self that you didn't know you had." (p. 28, quoting Sarah Bakewell, *At the Existentialist Café*, 79)

Invisible to the untrained eye, Smith argues that these thoughts undergird our postmodern world:

> Existentialism seeped into the postwar water and was disseminated not only in philosophy books but in film and art, perhaps especially in the movies. (p. 28)
>
> The DNA of our quest for authenticity points to the legacy of Heidegger and existentialism. (p. 29)

Hence, in philosophy as in life, the existential quest for authentic truth is the place where the rubber hits the road. The heart's desire is for a road to a true home. It is a quest.

The book's skeletal outline follows intuitively: "Heart on the Run," "Augustine our Contemporary," "A Refugee Spirituality," "Freedom," "Ambition," "Sex," "Mothers," "Friendship," "Enlightenment," "Story," "Justice," "Fathers," "Death," "Homecoming." As Smith unveils his story, it becomes apparent that the philosopher's life has indeed tracked with Augustine's—through stretches that he no doubt would have preferred not to tell, but toward a destination that he, like Augustine, has found worthy.

Smith finds the quest for self-realization a mirage. "The highway is my way" (p. 60), an itinerary the postmodern quest diverts from authentic authenticity to a false way of life characterized by anxiety-laden punishing emptiness. Similar to Augustine's preconversion state, Smith recalls how "freedom to be myself starts to feel like losing myself, dissolving, my own identity slipping between my fingers … its own form of enslavement" (pp. 62, 63).

With the apostle Paul and St. Augustine, Smith arrives home, not by finding the right road but by *being found* by the grace of God: "It turns out that being free isn't about leaving; it's about being found" (p. 76). As Augustine put it, "The human will does not attain grace through its freedom, but rather attains its freedom through grace" (p. 71). The existential emptiness debilitating the postmodern world is thus a signpost signaling the need for another way—namely, the regenerative grace of God.

> Grace isn't just forgiveness, a covering, an acquittal; it is an infusion, a transplant, a resurrection, a revolution of the will and wants. It's the hand of a

> Higher Power that made you and loves you reaching into your soul with the gift of a new will. Grace is freedom … [Grace is] the gift that gives you your self again. (p. 70)

Smith's treatment of existentialism and popular culture refreshingly refrains from demonizing the giants of secularism, while gently exposing their deficiencies as proponents of comprehensive truth. His subtitle, *A Real-World Spirituality for Restless Hearts*, finds expression in a scholarly honesty appreciative of the truth found in the precursors of postmodernism but sober to their blind spots. Following Augustine's navigation, Smith's *On the Road with Augustine* is a timely message for restless hearts whose self-charted courses have sputtered into despair.

What does such a book have to do with science? A great deal, if the ultimate goal of science is to understand the reality in which we live. And what, we may ask, is the end of science, if not to enrich life and human understanding of the world in which we live? Hence, science has as much at stake in epistemology as the humanities. For to do science without the big philosophical questions in mind is to be irresponsibly inhuman. Why perform science to prolong and improve life, if we don't know what it means to live? With Augustine, we may expect life on the home front to be neither a philosophy nor a science but a reunion with the Father of both.

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Science and Religion

CAN A SCIENTIST BELIEVE IN MIRACLES? An MIT Professor Answers Questions on God and Science by Ian Hutchinson. Downers Grove, IL: IVP Books, 2018. 288 pages. Paperback; $22.00. ISBN: 9780830845477.

Imagine, in your student years, getting an opportunity to sit down with a new-found mentor for an extended period of time, to ask all of the questions that you have about faith and science. You may be coming from a wide range of backgrounds: new to your faith and unsure of how your interest in science can be reconciled with it, inexperienced and facing the reality of making it in the world on your own, or perhaps over eager to set the secular or academic world straight. Now imagine that this mentor engages you as a person and conversationally brings you along on a personal yet intellectual journey through all the answers to your questions. That is what Ian Hutchinson's *Can a Scientist Believe in Miracles?* is like.

The core of the book is derived from questions that Hutchinson has received through many years of participating as a faith and science panelist for the Veritas Forum (veritas.org). From their website, the Veritas Forum seeks to "place the historic Christian faith in dialogue with other beliefs and invite participants from all backgrounds to pursue Truth together." As such, one can imagine the breadth and depth of questions Hutchinson has received (more than 220 according to the preface) to put him in a position to write a book like this. Fitting for the source material, the target audience is the university student looking for an introduction to these issues, and hoping for some answers.

In chapter one, Hutchinson gives a very personal account of his own spiritual journey and sets the tone for the book. This infuses the text with parts of Hutchinson that you might not otherwise see in his writings, and deepens the text, unlike sometimes dry or opaque academic readings. Each subsequent chapter focuses on an overarching topic such as "Are there realities that science cannot explain?" and "What is faith?" Under these headings, actual questions posed by participants in the forums are arranged, with Hutchinson's responses provided after each. The questions are used verbatim; this format was a good choice because they are very relatable. The scope of the questions is broad. Most of them are directly addressing faith and science issues and will probably be easily anticipated by a reader—for example, challenging the "scientific evidence" for Christianity or covering well-established "conflicts" between science and the Bible, such as cosmology and evolution. However, some questions are much more general and might be approached differently from a student more scientifically inclined, questions such as "Isn't Christianity's claim to uniqueness intolerant?" and "What explanation do you have for evil?" Others are surprisingly personal, such as "In my youthful experience of prayer, nothing ever happened. So …?"

The format allows Hutchinson to provide direct answers to each question while also building context for the subsequent questions. His answers flow easily between personal and intellectual, providing earnest opinions along with concise but well-supported philosophical and scientific arguments for his position. While the book has a scholarly feel with many references to external philosophical and scientific works and scriptures, there are many clear definitions of terms and plainly worded explanations of these texts and arguments. Occasionally, in answering the questions, these explantions come at the expense of depth, but I think that they are appropriate. The notes section at the end has enough sources for the curious reader to follow up on a given topic. Many of the answers and refutations come back to themes familiar to Hutchinson's previous book, *Monopolizing Knowledge*: the definition of what science is and what validates knowledge. However, as

part of some of the more general discussions on tolerance, I do feel that there was a missed opportunity to address more-current social issues, such as racial reconciliation and gender equality, that younger generations are likely to be concerned about.

However, overall, I recommend this as a great resource for those starting to seek answers to these questions. Having them all in one place and addressed thoughtfully will be valuable to students in need of a digestible introduction to the issues. I also admire this work as one of service that clearly was done with heart. It is a demonstration of commitment to teaching, mentoring, and equipping the next generations to be thoughtful and well informed about the intersection between their faith and science.

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THE WORK OF HIS HANDS: A Scientist's Journey from Atheism to Faith by Sy Garte. Grand Rapids, MI: Kregel Publications, 2019. 255 pages. Paperback; $16.99. ISBN: 9780825446078.

The Work of His Hands is a curious book in that it is part memoir and part research, part expository and part apologetic. The book follows Garte's conversion from confirmed atheist to devout follower of Jesus Christ. Garte was raised in a nonreligious Jewish family with deep commitments to the Communist Party. He was reared to believe that religion was not only wrong but evil. His parent's atheism was passionate and deeply felt; like all faiths, "the faith I was born into raised questions" (p. 22). With the help of science, Garte says he began to lose faith in atheism.

The book is laid out in two parts. The first part deals with the issues, mainly scientific but some social and philosophical, that persuaded Garte's eventual conversion to Christianity. The second part deals with the questions he had to face once he committed to the faith. These questions are more philosophical in nature and deal with the problem of evil, love, freedom, and, most applicable to this work, the relationship of science and the Christian faith.

Garte explains that discoveries of chance, complexity, and chaos began to chip away at his faith in scientific materialism. The "simple, elegant solutions that scientists have traditionally sought are consistent with a materialistic view of nature … chaos, fractals, complexity, and other modern findings of science" led him to doubt pure materialism (pp. 49–50). A positive reason to believe in God came in the form of cosmic fine-tuning. The sheer improbability that nuclear (strong and weak), gravity, and electromagnetic forces would have just the right values at the moment of the big bang to produce a life-affirming universe is nothing shy of a mystery. There are possible explanations for this improbability. For example, the multiverse theory is a possibility, but this is no less a supernatural explanation, according to Garte, than is theism.

The questions hardly stop with the complexity of physics and quantum mechanics but extend into biology and chemistry. Life itself is terribly complex (and "magical," to use Garte's word), from chemistry to genetics to evolution. But the most special of all life is human life. Some people accept plant and animal evolution but draw the line at human evolution. "I can understand that, and in a way I even agree." Not that Garte rejects descent with modification, but that "I strongly believe that people are special" (p. 82). Garte seems to affirm some form of substance dualism when he argues that human exceptionalism which has produced masterpieces of art, technology, and self-sacrifice, to name a few, is due to two things: evolution which has produced our bodies (including the brain), and the mind.

In the chapter, "Origins," Garte argues that there is a tripartite mystery that science has struggled to explain—the origin of the universe, life, and human consciousness. He notes that it would be a "God-of-the-gaps" fallacy to appeal to the divine as the explanation for these unanswered questions. But it is in these epistemic gaps that Garte first considered the possibility of God's existence. Some may accuse Garte of blurring the lines between science and faith (and that may be his point) when he writes, "I believe that if and when we do finally gain some scientific understanding on the origin of the universe, the origin of life, and the origin of human consciousness, we will find further pointers to the creative action of God" (p. 98). He uses the remainder of this chapter to show how it is reasonable to conclude that God is the rational explanation for these three origins. However, these origin mysteries were not what finally led to Garte's faith; no, it was not until Garte could see the limits of science that his eyes were opened to faith.

"Science and knowledge are not synonymous … there are other kinds of knowledge that are not scientific—they fall outside the methods or interests of science." These other kinds of knowledge include not only social science but also "art, love, and compassion" (p. 120). Garte here is going after scientism, the view that science is our only means of truth. If science cannot answer all questions, even all scientific questions, then there is reason to consider other claims. Garte says that the scientific method took him as far as it could, but the epistemic road continued even though it could not be traversed any further by science. It was time for a new means of travel.

The main body of the book ends with Garte explaining how he accepted the call to faith. This chapter is personal and reflective, as he recalls a dream, his first experiences attending church, his conversion, and his discovery that there were other scientists who were committed Christians. The chapter ends with Garte recalling an imaginary, but quite lovely, sermon he preached in his mind while driving the Pennsylvania Turnpike.

Part 2 of the book, "Issues and Questions," is more philosophical than the first half. Here Garte takes a somewhat defensive apologetic stance, defending Christianity against claims such as Christianity is oppressive, dogmatic, baseless, or contradicting. The most theological chapter, "Love and Freedom, Chance and Will," delves into the problem of evil, theodicy, divine love, and purpose. Garte admits, "My own approach to theodicy is not theologically sophisticated" (p. 164). While I did have some musings about the assumptions and implications of Garte's approach, I was nonetheless appreciative of many of his affirmations, especially his commitment to the idea that love and freedom are necessary features of this world. "We must be free in order to love and to be loved. Free will allows us to have faith and a relationship with God" (p. 174).

The final chapters of the book delve into a defense of evolutionary creationism, critique of atheistic evolution, and appraisal of the intelligent design movement. Garte believes that the universe is designed, but he prefers to speak about "divine design" instead of "intelligent design" because "the mechanisms by which life was designed and created are not currently within our ability to understand" (p. 186). Although we may never know such mechanisms, Garte takes the radical stance that faith and science, the books of scripture and nature, "will in the end meet at one single point of perfect harmony" (p. 212). He ends declaring that "modern science leads to faith in God and that a scientific understanding of nature can never be complete without the acknowledgment that the Creator of the universe is the Author of all" (p. 221).

The book was both enjoyable and informative. I would not normally have read a memoir had I not been asked, but I am happy that I did. There is a bit of a question as to just who this book is written for. The scientific discussions do not require a science degree, but a fair amount of acquaintance is presumed. For those who are less versed in science (like this author), do not fear, there is a brief but helpful appendix which provides some details regarding molecular biology and evolution. My sense is that the book is less for Christians who need to come to terms with the real findings of science and more for the science-minded agnostic who questions whether Christianity can reasonably be considered.

Reviewed by Wm. Curtis Holtzen, Professor of Philosophy and Theology, Hope International University, Fullerton, CA 92823.

TECHNOLOGY

AUTOMATION AND UTOPIA: Human Flourishing in a World without Work by John Danaher. Cambridge, MA: Harvard University Press, 2019. 336 pages. Hardcover; $39.95. ISBN: 9780674984240.

John Danaher opens his book *Automation and Utopia: Human Flourishing in a World without Work* with the claim, "Human obsolescence is imminent." What we do, he argues, is increasingly less relevant "to our well-being and the fate of our planet" (p. 1). The Anthropocene is yielding to the Roboscene, and soon "there will be little left for us to do except sit back and enjoy the ride" (p. 2). If we don't want to end up sated and stupefied in *WALL-E* world, Danaher urges, we need to imagine how humans will find meaning and value in a post-work society.

Danaher begins by making a case for the possibility of automating all forms of work "performed in exchange for an economic reward" (p. 28). Automation, which already has a long history, will continue to advance further into agricultural, industrial, financial, legal, medical, governmental, scientific, and every other form of physical labor and into the affective domain. Next, Danaher argues that we should accept this as a good thing and hate our jobs (even if we love them). The current reality of work for many is bad—precarious, inequitable, oppressive, and unsatisfying—and it is getting worse. Since the "structural badness" of work is very difficult to reform, Danaher concludes that we should embrace the economic liberation that autonomous and intelligent technologies may provide. After these discussions of automation and work in the first part of the book, Danaher turns his attention to what he sees as the next significant human project: creating a world in which humans can thrive when they no longer need to work for economic benefit. Danaher presents two possible worlds: a cyborg utopia, in which we merge with technology to upgrade ourselves and maintain our cognitive evolutionary niche; and a virtual utopia, in which we retreat from our cognitive dominance and cultivate crafts through games.

Danaher makes many careful moves in this book, and it is worth following his argument and thought experiment all the way through—even as one's disagreements may mount. One can be skeptical about the absolute automation of work, pointing to work that requires

such things as creativity, care, curiosity, and contemplation. But the advancing automation of tasks will likely create more unemployment and greater inequities. In his 1952 novel *Player Piano*, Kurt Vonnegut imagined a dystopia in which society is divided between an elite wealthy group, mostly engineers and managers, and everyone else, the "Reeks and Wrecks" who are part of a work creation program called the Reconstruction and Reclamation Corps. As dehumanizing as Vonnegut's dystopia is for everyone in it, we see something worse emerging now in the widening gap between highly compensated technology workers and gig or "ghost" workers, who perform low-skilled tasks to make technology work better. When these tasks are automated, what will this "surplus population" do? Will they end up on the streets of our high-tech cities with others who have already been displaced?

One may want to reform rather than reject contemporary capitalism, perhaps exploring a corrective Protestant work ethic as Kathryn Tanner does in *Christianity and the New Spirit of Capitalism* (Yale, 2019). But what would happen if economic precariousness were to become less of a driving motivation for work? Would we, as Dorothy Sayers imagined in her 1942 lecture "Why Work?," come to view and engage in work as a creative activity pursued for the love of the work itself? Whatever we believe about the possible extent of automation and the future of capitalism, Danaher raises important issues for anyone interested in the future of work.

As for creating a better world, I hope that no one objects to this pursuit. If the digital transformation of our present world is a descriptive reality and not merely a prospective possibility, as Luciano Floridi argues in *The Fourth Revolution: How the Infosphere Is Reshaping Reality* (Oxford, 2014), then how will we continue to shape the world we've been digitally enhancing for over half a century? Danaher's rehabilitation of the concept of utopianism is helpful: rather than a rigid plan (a "blueprint," which can lead to violence and inertia), he defines utopia as a range of possibilities that are practical but also radical improvements (a "horizon"). Before presenting two utopian scenarios, Danaher develops a useful "utopian scorecard," which evaluates utopias against the problems of automation (such as attention, autonomy, and agency) and the dangers of blueprint utopianism.

The cyborg utopia, in which we have been living for some time—conceptually (extending our minds through artifacts) and technically (with medical implants)—is the conservative option. This is its strength and weakness, since it conserves both what we value (our superior intellectual agency) and what we do not (for example, social inequities). This utopia could therefore become a dystopia, and Danaher concludes it is not the utopia we are looking for.

The best possible world Danaher imagines is a virtual utopia. "Virtual" is not reducible to life inside a computer-generated environment; humans have been living in complex virtual or artificial environments, such as societies and cities, for many millennia. To these we have added digital simulations, which are still real in the impacts they have on us and others. More radical than the vision of a virtual utopia is Danaher's proposal of what we will do in these physical and digital virtual environments. The virtual utopia is a utopia of games—we will play games that we understand (so there is no coercion), we will play for "trivial or relatively inconsequential stakes" (because all the important work will be done by artificial agents), and we will cultivate abilities and virtues through the games we select and create (p. 229).

This is a retreat of sorts, as it involves severance from knowledge about, and surrender of control in, the Roboscene. But, for Danaher, the gains outweigh the losses: human attention, autonomy, agency, and other important values will be preserved as people think, plan, decide, create, interact, and realize "ever higher degrees of achievement" (p. 236). These highest achievements include the cultivation of craft, a dedication "to good work for its own sake" (p. 239). Games, Danaher concludes, "could be enough to sustain meaning and flourishing" and "would represent a significant societal improvement" (pp. 245, 251).

I explained Danaher's argument to my daughter during her recent visit home from college, where she is studying philosophy, politics, and economics. We discussed some of the questions left unanswered in *Automation and Utopia*. How would we create a moral community that could construct and sustain a virtual (or any other) utopia? Would we really, after centuries of unfilled promises, finally realize the end of penury through science and technology? And if we did, what would motivate us to pursue a good life for all? Our dissatisfaction with a future full of games may have been influenced by the family game night gone wrong the previous evening, due to various human failures, and we ended up discussing work from the perspective of practical theology—i.e., examining present and prospective social conditions of work in relation to Christian tradition.

Danaher emphasizes the value of processes (*energia*) over end states (*kinesis*), but we were skeptical about the satisfaction of "purely procedural goods" (p. 238). Not only would a virtual utopia cut us off from more direct engagement with the world and significant goods such as knowledge of it, but we would have little or

no instrumental value. For Christians, who believe that creation mediates knowledge of God and that we are cocreators with God in the transformation of the world, living life as a mere game would be a form of hell.

In an epilogue titled "The Unending Quest," Danaher describes Jorge Luis Borges's short story "The Library of Babel" as a "meditation on the meaning of life in a universe of infinite possibilities" (p. 271). Our current situation, he suggests, is analogous to that of the denizens who search Borges's fictional library for meaningful books among every possible book. Their quest is futile, for their world is an antilibrary—a repository of mostly meaningless and misleading books. Danaher concludes: "We shouldn't keep searching through the infinite darkness for something we ourselves can never obtain; we shouldn't sacrifice everything else that is good in life for an unending, and unrealizable, goal" (p. 273). But what if the world is more like a library, presenting us with information? And what if our encounter with that information transforms us? And, finally, what if the telos of our quest not only matters as a transformative process but is also an end state that is already being realized through our ongoing transformation? This would cause a Christian, formed by the past, future, and present coming of Christ, to be wary of desiring or designing a utopia so far removed from the created world.

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Transhumanism

HUMANS 2.0: Scientific, Philosophical, and Theological Perspectives on Transhumanism by Fazale R. Rana with Kenneth R. Samples. Covina, CA: Reasons to Believe Press, 2019. 306 pages. Paperback; $19.95. ISBN: 9781886653122.

Biochemist Fazale Rana and philosopher-theologian Kenneth Richard Samples work together to provide a scientific and theological account of advances related to transhumanism. Their book contains three unequal sections: one on the science of human enhancement (about 110 pages), one on the ethics of human enhancement (about 65 pages), and one on transhumanism and Christianity (about 35 pages). They conclude the book with special foci on AI and artificial wombs, and a primer on molecular biology for those with limited scientific background. Throughout the work, Rana and Samples recount storylines from the *Iron Man* comic book storyline to illustrate the involved issues.

The book achieves several worthy goals well. First, the breadth of engagement helps readers connect scientific advance with secular and transhuman philosophy and biblical Christianity. Second, the initial section provides competent detail on the science involved, while at the same time acknowledging how quickly science develops. The authors provide enough of a foundation that readers will be able to apply the relevant principles even as science continues to develop. (For instance, the CRISPR-Cas9 chapter includes nothing about recent developments, but the reader can connect the dots.) Third, the book makes a good argument for how particular scientific developments fit into and move toward a transhumanist agenda. There is no one location where this argument is made absolutely clear, but it is implied and stressed at various points that together make the case stronger.

However, the book's strengths are uneven and its overall impact weakened in a few key ways. First and foremost, the second two parts—handling ethics and transhumanism and Christianity—do not rise to the level of detail and sophisticated argument that the first part does. It left me with the vague sense that science is hard and complicated; ethics and the Bible are easy and straightforward. The authors, of course, say no such thing, but the level of engagement, research, and arguments gives that sense. (In particular, several of the ethical and biblical chapters are conspicuously short; this may leave the impression that there is not much to say on these topics.) Frankly, the answers provided in those sections will introduce readers to important key concepts, but they will fall a bit flat for anyone beyond a beginner's level, and they certainly won't convince skeptics that Christianity has much to contribute.

Second, the authors make unfortunate compromises and unhelpful proposals. For instance, they support somatic cell gene editing for human enhancement (p. 187), stating that it must, of course, be "limited," but they provide nothing substantive to handle such limiting. Who limits? By whose judgment? How? When? Further, their advice for Christians assumes that believers will retain a high degree of cultural influence and power, which they can use to "point out" various inconsistencies to transhumanists. The role of the Christian in this whole enterprise basically boils down to occasionally piping up and "pointing out" potential challenges. I cannot help but wonder whether Christian witness might be relegated to the margins, margins which could potentially involve suffering, but which would not "point out" things to rich, smart people in white coats.

In the end, I want to like the book, and I would recommend it. I guess by that I mean I am sympathetic with the project, and enough of it is done well to make this worth a read. The scientific explanations and descriptions themselves are worth the modest price of the

book. But I would encourage any reader to view the ethical and theological sections as starting points, just as inspiring by their incompleteness as for the content they do provide.

This book serves as a good introduction to scientific advance, the challenges that are already here and coming, and the way those challenges will be escalated and co-opted by various late modern and postmodern worldviews. We need more Christians knowledgeable about these issues, engaging the ethical and theological material as seriously as they do the scientific.

Reviewed by Jacob Shatzer, Associate Professor of Theological Studies and Associate Dean, School of Theology & Missions, Union University, Jackson, TN 38305. +

Letters

Does Complementarity Explain Anything?

Jim Stump presents a notable defense of the view that God guides evolution in his article, "Did God Guide Our Evolution?," in *PSCF* 72, no. 1 (2020): 15–24. While I am partial to the epistemological view that he espouses, there remain some difficulties. As he points out, the idea is an old one described with different terms over the years, from cognitive dualism to complementarity to levels of explanation, to cite a few. Cognitive dualism received a surge of interest and support with the discovery of scientific complementarity. Best known is the wave-particle duality articulated by Louis de Broglie in the 1920s. Scientific complementarity gave cognitive dualism support as a fundamental principle of the universe. Its logical application to Christianity was widely publicized by, among others, Richard Bube and especially Donald MacKay, in the 1970s. The late Jack Haas took a somewhat skeptical view in his series entitled "Complementarity and Christian Thought: An Assessment" in the September 1983, December 1983, and June 1984 issues of *PSCF*. As he explained to me personally, his major concern was that complementarity didn't really explain anything.

While Jack has a point, I still find complementarity to be the best available perspective, even though it does not provide us with an understanding of divine action. The analogy of the tea kettle can help one to understand the problem. Stump attributes this analogy to John Polkinghorne while acknowledging in a footnote that Polkinghorne was "probably not" the first to use it. The earliest reference I have found is in the book *Christianity in a Mechanistic Universe*, edited by Donald M. MacKay and published in 1965. In his essay contribution to that book, Frank H. T. Rhodes, ninth president of Cornell University from 1977 to 1995, refers to "Dr Douglas Spanner's example of the boiling kettle …" (p. 42) and describes the identical analogy and application.

In this analogy, the explanation for "why is the tea kettle boiling" can be either "I want some tea" or "the thermal energy of the flame transfers energy to the water beyond its boiling point." These are complementary and not mutually exclusive explanations. But all of us are intuitively aware that humans have the agency to translate the desire to have some tea into igniting the fire or activating the electrical switch that provides the heat to boil the water. Though we may not understand all the details involving our consciousness and free will in generating and carrying out our desires, we do understand the connection. In contrast, we do not understand divine action through which God translates his ultimate purposes into guidance of evolution. The intelligent design community feels that they do not need to provide such a mechanism but merely need to demonstrate that there was such guidance. Stump rejects Russell's idea of quantum interference by God as being inadequate. He also rejects, perhaps inappropriately, Barrigar's probabilistic view of God's purposes as too deistic. The epistemological view does not provide insight into any means by which divine action actually guides evolution. Complementarity seems to be an accurate description that two different discourses are necessary to fully represent phenomena. But it fails to explain the relationship between those discourses.

We have a biblical basis for claiming that God can work his purposes through random processes (see, for example, 1 Kings 22:34 and Acts 1:26). Yet we have no insight into how this is achieved. The mysterious way in which God guides evolution or anything else remains mysterious. The evidence in science is that evolution with key elements of randomness accurately describes the development of all life forms of which we are aware. The inference that God does, in fact, guide evolution, as well as all of nature, is our interpretation of how God carries out his purposes as revealed in God's Word.

Randy Isaac
ASA Fellow

The *Agape*/Probability Proposal Is Not Deist

Jim Stump has recently addressed the question, "Did God Guide Our Evolution?"[1] Along the way, he rejects three strategies for reconciling science and theology, including this writer's *Agape*/Probability (A/P) proposal.[2] Stump rejects the A/P proposal "because of its implications for God's distance from the created order"[3]—that the A/P proposal leaves God as a "spectator" to creation as the universe unfolds from its initial

conditions. That is, the A/P account "confine[s] God's action to very rare occasions,"[4] and therefore looks akin to deism.

This reading of the A/P account is only possible, however, by setting aside its most fundamental parts. So, I need to reiterate that the whole A/P account is about how the trinitarian God of *agape* love has created a universe in which God can actively engage in agape relationships. *Agape* relationships, including incarnation, crucifixion, resurrection, ascension, and the ongoing action of the Holy Spirit in the lives of ordinary people throughout history, means that God's action is frequent, not rare. As I state, "Divine *agapic* action can take diverse forms, including giving gifts and fruit of the Holy Spirit; providing inspiration, wisdom, guidance; providing healing (emotional, relational, and physical); and acting in physical surroundings (nature) to bring about *agapic* consequences for people and/or animals."[5] This is precisely the opposite of deism.

Enlightenment deists, like theists, believed in a Creator God, but what distinguished them as deists were two doubts they had about the God of theism: one doubt dealt with divine purpose (they doubted that God created the universe with human-related purpose); and the other, with divine action (they doubted that God engages in relationships with humanity). These two doubts led to an inference that after creation God has had no further engagement with the universe; this then led to a secondary derivative inference, that God simply "watches" the processes of the universe unfold. In other words, what constitutes deism is not the belief that God watches everything unfold, spectator-like; what constitutes deism is its doubts, denying both divine purpose in creation and divine involvement with humanity—which makes deism the exact opposite of the A/P account.

Moreover, Stump's critique implies that there is some inadequacy in the sort of God that would enjoy watching the system he created unfold. But why should God not enjoy watching the spectacular creation he has created? With exploding stars, crashing galaxies, expanding nebulae bubbles, black holes shredding nearby celestial objects, not to mention all the stunning biological processes going on—an infinity of incredible beauty and awesomeness!—it seems a peculiar restriction on the Creator of beauty to imply that there is something unacceptable about God enjoying "watching" this incredible creation unfold while "waiting" for *agape*-capable beings to emerge. In no way does this make God "distant from creation" after God's act of initial creation. Moreover, I put "waiting" and "watching" in quotes because God's relation to time is not ours—so our sense of waiting such a long time, billions of years, for *agape*-capable beings to emerge need hardly be God's sense of time.

That God takes pleasure in watching his magnificent creation unfold while it brings about *agape*-capable beings no more makes the A/P account deist than belief in a Creator God makes orthodoxy deist. The A/P account's front-loaded account is perfectly consistent with an orthodox trinitarian understanding of God's nature, character, and purpose, and is in no way akin to deism—it is precisely the opposite. Moreover, there is available today no account that more fully integrates today's mainstream scientific knowledge with God's purpose and action in creation than that provided by the A/P account, thereby offering a powerful alternative to both ID and materialism. I fear that Stump's misdescription of parts of the A/P account will lead readers to miss the value of what the A/P account has to offer.

Notes

[1]Stump, "Did God Guide Our Evolution?," *PSCF* 72, no. 1 (2020): 15–24.
[2]Barrigar, "God's *Agape*/Probability Design for the Universe," *PSCF* 70, no. 3 (2018): 161–74.
[3]Stump, "Did God Guide Our Evolution?," 18.
[4]Ibid., 20.
[5]Barrigar, "God's *Agape*/Probability Design for the Universe," 171.

Chris Barrigar

Response to Randy Isaac and Chris Barrigar

My thanks to Randy Isaac for taking the time to read and respond to my article. It was Randy who instigated the article (though he should have none of the blame for anything incorrect or foolish I've written!) by inviting me to present a paper at the 2018 ASA meeting, with himself and Denis Lamoureux responding to the book *Theistic Evolution*, edited by J. P. Moreland, Stephen C. Meyer, Christopher Shaw, Ann K. Gauger, and Wayne Grudem (Crossway, 2017). The paper became more than a book review, as it gave me the opportunity to try to work out some issues related to what I have called "cognitive dualism."

Randy's central concern seems to stem from sympathy he has with the comment he relayed from Jack Haas, "complementarity doesn't really explain anything." My response to that is, "Right, that's the point." My claim is that the sort of explanation being pushed for is what philosophers often describe not as wrong, but wrong-headed, or as a category mistake. I am not explaining how God guides evolution, but rather I am trying to explain why we can't get an explanation to that.

This metaphor isn't perfect, but you might think of it like a response to attempted proofs for how to trisect any given angle with a compass and a straightedge. I consider three such attempts and show where I think they go wrong, and then offer a proof for why there is no solution to that problem. If someone says, "OK, I accept your proof, but I'm still concerned that you've not shown us how to trisect an angle," then I have not successfully communicated what I am trying to do.

I think one of the problems here is that the position I have attempted to describe is not exactly the same as complementarity or different levels of explanation—at least as I have seen these articulated. There are big areas of similarity, to be sure, but cognitive dualism is set in the context of a particular tradition of philosophy that gets scant attention in the academic discipline of science and religion. (By the way, in his recent book, *Against Methodology* [Routledge, 2019], Josh Reeves shows that there has been an overreliance on analytic philosophy of religion, which has led to an impasse on key issues.) The main point of difference is the degree to which language is accepted as "constitutive," rather than merely "descriptive" as Charles Taylor calls the traditions in his *Language Animal* (Harvard University Press, 2016). There is fear that accepting a constitutive role for language leads one into the morass of postmodern relativism. And it certainly does cast significant doubt on any kind of direct realism, which takes scientific theories as literal descriptions of reality. But there is a position between realism and relativism called "scientific perspectivism," which lends itself well to cognitive dualism. It acknowledges that there is an independent reality, but our access to it comes through the concepts available to us through our language; then, because different languages "carve up" reality in different ways (they are "re-presentations," not literal descriptions of reality), there is a real possibility that different discourses constrain our thinking in different ways. Of course, we might call these discourses "complementary," but in my understanding of cognitive dualism, the real work is being done by a particular view of language which does not seem to be shared or even discussed by most in the science and religion discussion—undoubtedly, this is a liability for wide acceptance of my position.

Chris Barrigar's concerns are more pointed and personal. I am pleased to report that he and I have begun some productive personal correspondence in the attempt to understand each other better. It is never fun when someone disagrees with you in print, particularly when you feel that disagreement stems from misunderstanding or even misrepresentation. I think his claim that I "reject" three strategies (including his) is a tad strong. I said that I would "consider a range of defensible ways of responding to this question, arguing more specifically for the one I find most persuasive" (p. 16) and that the four I present "point toward the most plausible responses we can make to the perceived dilemma" (p. 16). So I have explicitly included Barrigar's general view among those I take to be defensible and most plausible. Further, in writing about his view in particular, I said, "Barrigar's account is sophisticated and subtle, and definitely worth further consideration" (p. 18). That doesn't sound to me like a "rejection."

I continue to maintain that each of the strategies I critiqued has merit and should be studied further for the insights it brings—this itself may be another argument in favor of my perspectivism. In our finite understanding, we are right to reach for models and explanatory structures where we can find them. But, of course, the front-loading view (or what I called the "nomological strategy") is not the one I find most persuasive.

Barrigar is most concerned that I have labelled him as a deist. I didn't quite do that, but admit that I came close. "Deism" is probably a term thrown around too casually against one's interlocutors (perhaps not unlike "concordism"). And hardly anyone uses it today as it was originally understood by the likes of Benjamin Whichcote, John Toland, and Matthew Tindal in the seventeenth and eighteenth centuries. Back then, to be a deist was not a declaration about God's approach to the world, but rather about our approach to believing in and understanding God. Namely, deists based their religion on reason rather than revelation. Now, it is usually used to mean that God started things off and then had no more involvement. Barrigar definitely does not have an uninvolved God, and so does not deserve the deist label. But the kind of involvement he admits is only with respect to things such as sustaining, inspiring, and providing wisdom. And we have no scientific explanation for those kinds of activities—nor do I see how we ever could without becoming complete reductionists. So, my main point of concern with his view is that it leaves the same dualism I described intact: there are still two different kinds of description we have to use—a scientific and a personal. So, it seems advantageous to me to limit science and say that there may be more of God's activity going on in, say, the evolution of *Homo sapiens* than is describable by science.

Others, no doubt, evaluate the pros and cons of these positions differently. We all benefit by continued conversation across perspectives. I am grateful to *PSCF* and the ASA for fostering this. +

J. B. Stump

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

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