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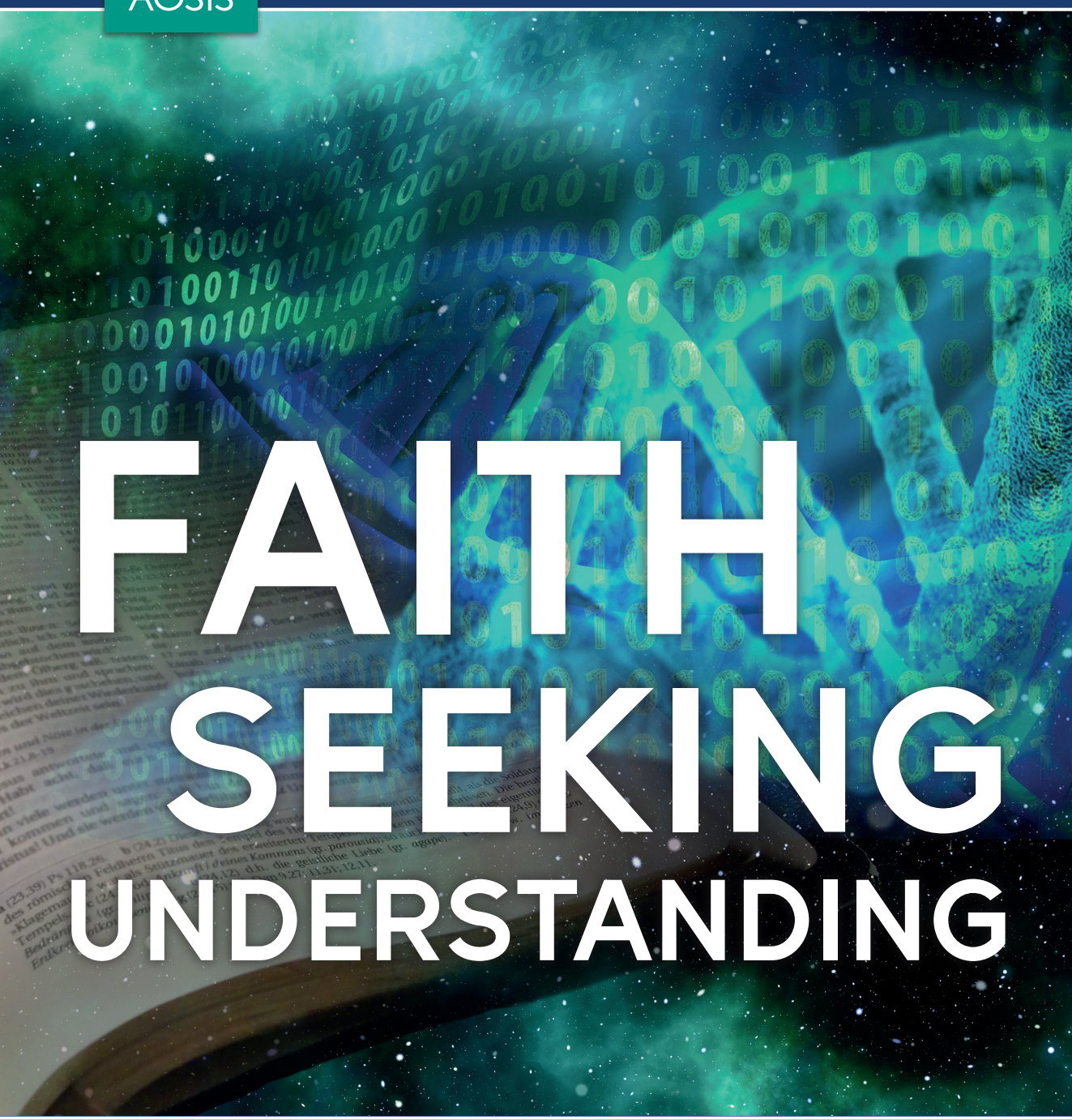

FAITH SEEKING UNDERSTANDING

Edited by

Nico Vorster &
Frederik van Niekerk

Reformed Theology in Africa Series
Volume 9

FAITH SEEKING UNDERSTANDING

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Peer review declaration

The publisher (AOSIS) endorses the South African 'National Scholarly Book Publishers Forum Best Practice for Peer Review of Scholarly Books'. The manuscript underwent an evaluation to compare the level of originality with other published works and was subjected to rigorous two-step peer review before publication, with the identities of the reviewers not revealed to the editor(s) or author(s). The reviewers were independent of the publisher, editor(s), and author(s). The publisher shared feedback on the similarity report and the reviewers' inputs with the manuscript's editor(s) or author(s) to improve the manuscript. Where the reviewers recommended revision and improvements, the editor(s) or author(s) responded adequately to such recommendations. The reviewers commented positively on the scholarly merits of the manuscript and recommended that the book be published.

Research justification

The debate between faith and science is an ongoing and dynamic conversation marked by the need to consistently factor in new data generated by the sciences, and new perspectives developed in theology. In this book, a group of theologians and ethicists provide insights into the debate from a faith perspective. The basic thesis permeating the discussions is that faith and science are capable of enriching and complementing each other, albeit in their own unique way. What unifies faith and science is the search for truth. What differentiates them is the unique lenses they employ to find the truth. In the end, both scientists and theologians must take into account all the pathways and lenses that lead us to a better understanding of reality. This study presents concrete examples of how theological knowledge and scientific data can be fruitfully used and integrated to develop new horizons of understanding.

The general aim of this contribution was to narrow in on some of the burning themes that are driving the faith or science scholarly debate. Each contributor highlights a different aspect of the debate. The topics addressed include theoretical perspectives on the science-faith relation, the ancient scientific worldview of the creation narratives in Genesis, evolution and human origins, science and African Pentecostalism, faith and the Fourth Industrial Revolution, science and transhumanism, science and traditional medicine, and the role that faith and science can play in the human quest for meaning. Most of the contributors approach the topic from a post-foundationalist and post-positivist epistemological point of view. A wide range of hermeneutical methods is employed, ranging from systematic biblical-theological perspectives to literary and source criticism. Analytical, normative and existential philosophical arguments are also utilised throughout the course of the book. The most important contribution of the book lies in the transdisciplinary perspectives that emanate from the discussion. The ways in which the authors go about integrating theological and scientific perspectives to address ultimate questions about meaning and to inform moral discourse show that religion still has an important role to play in a world increasingly shaped by technological rationality. At the same time, it indicates that religion and science do not have to stand in conflict with each other. If the two lenses on reality engage in mature dialogue, they can enrich, inform and, on some occasions, even correct each other.

The target audience of this book includes theological scholars, natural scientists and science philosophers.

This book contains no plagiarism, and none of the work has been published elsewhere.

Nico Vorster, The Unit for Reformational Theology and the Development of the South African Society, Faculty of Theology, North-West University, Potchefstroom, South Africa.

Frederik van Niekerk, Unit for Energy and Technology Systems, Faculty of Engineering, North-West University, Potchefstroom, South Africa.

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Abbreviations, acronyms, boxes and tables appearing in the text and notes

List of abbreviations and acronyms

1IR	First Industrial Revolution
4IR	Fourth Industrial Revolution
AH	Anatomical Human Being
AHIOG	Anatomical Human Being Who was Created Possessing the *imago Dei*
AI	Artificial Intelligence
AM	Alternative Medicine
ANE	Ancient Near Eastern
BCE	before the Common Era (used of dates before the Christian era, especially by non-Christians)
IBC	International Bioethics Committee
MRCA	Most Recent Common Ancestor
NIV	New International Version
NWU	North-West University
SA	South Africa
TM	Traditional Medicine
TMT	Terror Management Theory
UDCD	Universal Declaration on Cultural Diversity
UDBHR	Universal Declaration of Bioethics and Human Rights
USA	United States of America
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHO	World Health Organization
WMA	World Medical Association
YHWH	God's name written in paleo-Hebrew and transliterated as YHWH
YECs	Young Earth Creationists

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Notes on contributors

Jaco Beyers
Department of Religion Studies,
Faculty of Theology and Religion, University of Pretoria,
Pretoria, South Africa
Email: jaco.beyers@up.ac.za
ORCID: https://orcid.org/0000-0001-5432-2898

Jaco Beyers is an associate professor and head of the Religion Studies department in the Faculty of Theology and Religion at the University of Pretoria. He is also the chair of the Faculty Teaching and Learning Committee. His role has also included managing the Biblical and Religious Studies programme since 2012. His research interests include studies on secularisation and post-secularisation, inter-religious dialogue, theology of religions and religious studies, focusing on religion and art. He has published several articles on various topics in peer-reviewed journals and has attended several international conferences. He also contributed chapters to several books.

Manitza Kotzé
The Unit for Reformational Theology and the Development of the South African Society,
Faculty of Theology, North-West University,
Potchefstroom, South Africa
Email: manitza.kotze@nwu.ac.za
ORCID: https://orcid.org/0000-0002-3120-2807

Manitza Kotzé is an associate professor at the Faculty of Theology at the North-West University, South Africa, where she teaches Dogmatics and Christian Ethics. Within the Faculty, she is affiliated with the Unit for Reformed Theology and the Development of the South African Society. Her research focuses on the intersection of doctrine and bioethics, particularly in terms of assisted reproductive technologies and the use of biotechnology to enhance human health. Her most recent publication is *Life in transit: Theological and ethical contributions on migration* published in 2021 by AOSIS BOOKS in South Africa.

Andrew Loke
Department of Religion and Philosophy,
Faculty of Arts, Hong Kong Baptist University,
Hong Kong
Email: andyloke@hkbu.edu.hk
ORCID: https://orcid.org/0000-0001-8569-482X

Andrew Loke is an associate professor in the Department of Religion and Philosophy at Hong Kong Baptist University. His main publications include *The Origins of Divine Christology* (Cambridge University Press), *A Kryptic Model of the Incarnation* (Routledge), *Investigating the Resurrection of Jesus Christ (Routledge), and God and Ultimate Origins* (Springer Nature).

Marius Nel
The Unit for Reformational Theology and the Development of the South African Society,
Faculty of Theology, North-West University,
Potchefstroom, South Africa
Email: marius.nel@nwu.ac.za
ORCID: https://orcid.org/0000-0003-0304-5805

Marius Nel is a research professor and has occupied the Chair of Ecumenism: Pentecostalism and Neo-Pentecostalism since December 2016 at the North-West University in South Africa. He is a South African C2 NRF-rated researcher and specialises in apocalypticism in the Old and New Testament, the history of the Pentecostal movement and the study of its doctrine. His prominent publications include *An African pentecostal hermeneutics* (Wipf & Stock Publishers) and *Pacifism and Pentecostals in South Africa: A New Hermeneutic for Non-Violence* (Routledge). He has written more than 80 journal articles at the time of the publication of this book.

Riaan Rheeder
The Unit for Reformational Theology and the Development of the South African Society,
Faculty of Theology, North-West University,
Potchefstroom, South Africa
Email: riaan.rheeder@nwu.ac.za
ORCID: https://orcid.org/0000-0001-9355-7331

Riaan Rheeder is a professor in bioethics, affiliated with the Unit for Reformed Theology and the Development of the South African Society within the Faculty of Theology at North-West University in Potchefstroom. His research interests are exploring and promoting the Universal Declaration of Bioethics and Human Rights (UNESCO) bioethical principles from a Protestant perspective. He is also involved in a project with The International Network of the World Medical Association Chair in Bioethics for the promotion of bioethics.

Konrad Schmid
School of Historical Studies,
Faculty of Theology, University of Zürich,
Zürich, Switzerland
Email: konrad.schmid@uzh.ch
ORCID: https://orcid.org/0000-0002-8968-2604

Konrad Schmid is a professor of the Hebrew Bible and Ancient Judaism at the University of Zürich, Switzerland. His other positions include being president of the Wissenschaftliche Gesellschaft für Theologie (Scientific Society for Theology) and a member of the Swiss National Science Foundation's National Research Council (NRF). His publications include *Genesis and the Moses Story* (2010) and *The Old Testament: A Literary History* (Fortress Press, 2012).

Frederik (Frik) van Niekerk
Unit for Energy and Technology Systems,
Faculty of Engineering, North-West University,
Potchefstroom, South Africa
Email: frik.vanniekerk@nwu.ac.za
ORCID: https://orcid.org/0000-0002-3425-8507

Frederik van Niekerk was awarded his D.Sc in Nuclear Reactor Science from the former Potchefstroom University for Christian Higher Education, now known as North-West University (2004). He also holds postgraduate qualifications in physics and applied mathematics. He is a member of the Academy of Science of South Africa. He is the former Vice-Rector and Deputy Vice-Chancellor of the NWU (2001–2017) for research, innovation, information technology and internationalisation. He also serves as Contracts Director of the Hydrogen South Africa Centre of Competency at the North-West University. He was a scientific collaborator at the Gesellschaft für Reactorsicherheit (Society for Reactor Safety) in Munich, Germany. He held senior positions at the Nuclear Energy Corporation of South Africa, Denel Aviation, on the Rooivalk Mission Helicopter program and Pebble Bed Modular Reactors as the leading power system engineer.

J.M. (Koos) Vorster
The Unit for Reformational Theology and the Development of the South African Society,
Faculty of Theology, North-West University,
Potchefstroom, South Africa
Email: koos.vorster@nwu.ac.za
ORCID: https://orcid.org/0000-0003-4529-5343

J.M. (Koos) Vorster is an emeritus Christian ethics professor at the Faculty of Theology of North-West University in South Africa. He is the editor of the journal In *Die Skriflig/In Luce Verbi* and the North-West book series Reformed Theology in Africa, both published by AOSIS. A major focus of his research is on issues related to human dignity, human rights, personhood, and Christian prophetic witness in secularised societies. He has authored 12 books and more than 160 articles in accredited journals. His most recent publication is *The gift of life: Towards an ethic of flourishing personhood*, published by AOSIS Books in Cape Town, South Africa.

Nico Vorster
The Unit for Reformational Theology and the Development of the South African Society,
Faculty of Theology, North-West University,
Potchefstroom, South Africa
Email: nico.vorster@nwu.ac.za
ORCID: https://orcid.org/0000-0003-2989-2877

Nico Vorster is a professor of Systematic Theology at the Faculty of Theology of North-West University in South Africa. In particular, he studies the intersection between theological anthropology and social ethics in relation to moral identity formation. His most recent book is *The Brightest Mirror of God's Glory: John Calvin's Theological Anthropology*, published in 2019 by Pickwick Publications, an imprint of Wipf & Stock Publishers in Oregon.

Introduction

Nico Vorster
The Unit for Reformational Theology and the Development of the South African Society, Faculty of Theology, North-West University, Potchefstroom, South Africa

The debate between faith and science is an ongoing and quickly evolving field of study, which touches many areas of investigation. This collection of essays informs readers about some of the discourses and themes that are currently driving the faith-science debate. The aim is not to provide a uniform or exhaustive meta-narrative on faith and science nor to focus on micro-level specifics, but rather to create a sense of and interest in newly evolving areas of scholarly interest. Some of the topics addressed include biblical hermeneutics and science, immanence and transcendence, human origins, faith and technology, faith and bioethics, faith and medicine and the question of meaning. Contributors to this volume come from different Christian backgrounds and confessional traditions. While differences in opinion are readily apparent, they all agree that faith and science can complement and enrich each other in a variety of ways.

J.M. Vorster starts off the discussion by reflecting on how science and faith can enrich each other. The *Belgic Confession*, which explains the core doctrines of faith in the reformed theological tradition, commences with the affirmation of the existence of a spiritual being, which we call God. It continues to say that God is eternal, incomprehensible, invisible, immutable, infinite, almighty,

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perfectly wise, just, good and the overflowing fountain of all good. God reveals himself to humankind by way of his word in nature and his written word. This confession calls nature 'God's most beautiful book'. Although science cannot lead us into a personal and reconciled relationship with God, it testifies to God's governance of all things. From this angle of approach, the chapter ventures to construct bridges between the faith community and natural scientists to serve the faith-science dialogue. These bridges can aid a profitable discourse. It includes the post-positivist assumption about the metatheories of theology and natural sciences that honour the plausibility of theology as a science; the mutual hypothesis that there was an origin in the development of the universe and everything it contains; the mutual hypothesis that there is movement and direction in all spheres of reality and the growing hypothesis in cosmology that reality is steering to an end. Vorster contends that the reformed faith and the knowledge produced by natural sciences can be reconciled to a large extent when scholars from both camps cross these bridges within the context of God's revelation in Scripture and the beautiful book of nature. Within this framework, issues such as life and death, evil and suffering, hope and beauty can be explored. Furthermore, the reformed faith can be enriched by findings from the natural sciences and should therefore constantly engage in the faith-science dialogue to explore new knowledge about God and to develop theology in light of this new knowledge within the context of God's revelation in Scripture.

Any discussion on faith and science needs to come to terms with the differences between ancient biblical cosmologies and modern cosmologies. In Chapter 2, Konrad Schmid discusses the intellectual framework and cosmology that undergirds Genesis 1. Although Genesis 1's purposes are primarily theological, he notes that the 'scientific intent' of Genesis 1 must not be dismissed too quickly. From a historical point of view, and when understood in its own terms, the text clearly engages and participates in ancient scientific thinking, not only found in Babylon but the entire Levant region stretching from Mesopotamia to ancient Greece. Whereas parts of Genesis 1 critique ideas found in the Ancient Near East, specifically when it comes to polytheism and the ascription of divine status to human beings, other passages display 'direct literary dependencies' and assimilate ideas commonly found in the region. This is true specifically with regard to the creation of the sun, moon, and stars and the primordial existence of light. Moreover, the Septuagint (Greek translation of the Hebrew Bible) reworks some of the scientific material found in Genesis 1, specifically the genealogies, in light of later Greek insights. Besides Near East cosmological influences on Genesis 1, Schmid contends that Genesis 1 cannot be interpreted independently from the larger intellectual framework of the Priestly narrative that extends through the books of Genesis and Exodus. In fact, Genesis 1 is closely linked to Genesis 6–9. Whereas Genesis 1 deals with God's original creation and his blessings on eight creative acts, Genesis 6–9 deals with the corruption of creation because of violence

and the subsequent re-arrangement of creation after the flood. The cultural mandate in Genesis 1:26–28 is reframed, the relationship between God and humans is adjusted to a legal one understood in terms of a treaty, while humans are allowed to eat animals. Taking all of these matters into account, Schmid concludes that Genesis 1 was, in part, a contribution to ancient science that attempted to explain how the world came into being and how it was structured.

Evolutionary creationism affirms macroevolution while holding that God created the universe and also intervened at strategic moments in the history of the universe. Andrew Loke considers the compatibility of Evolutionary creationism with the biblical account of human origins. With compatibility he does not mean that biblical data should be read into science or scientific data into the Bible, but simply that the results of both do not necessarily stand in conflict with each other. Taking an evolutionary creationist point of view as departure, Loke specifically defends the compatibility of Christian theology and evolutionary theory when it comes to accepting Adam as the common ancestor of all human beings. Those who reject Evolutionary creationism argue that the genetic diversity of *Homo sapiens* indicates that they have descended from a larger population rather than from a single ancestor. Loke responds to this claim by formulating a model of human origins that distinguishes between anatomical human beings who were created possessing the *imago Dei* (AHIOG) and anatomic human beings who did not possess the image (anatomical human being [AH]). He considers the possibility that God took a pre-existing AH and made him AHIOG through the creation of a human soul. The image of God was passed down from this person (Adam) to his descendants through transference of capacities of the soul and some AHIOG's mated with AHs. The offspring and descendants were fully human, while other AH contributed to genetic diversity. In this way, Loke argues, it is possible that all humans could have a common ancestor, even though this ancestor is not our sole ancestor.

Marius Nel provides a Pentecostal perspective on the science-faith debate. He notes that certain aspects of a Pentecostal worldview are based on 'pre-modern' supernatural and enchanted presuppositions that show affinities with the world as perceived in New Testament times by early believers. This stands in stark contrast to the scientific worldview of modernist rationality. Nel poses the difficult question: is engagement between an enchanted worldview and that of the naturalistic and rationalistic presuppositions of modern science possible at all? Nel then proceeds to sketch a short history of the relationship between Pentecostalism and science, distinguishing between Pentecostal sectarianism, conservatism and progressivism. The sectarian strand employed a literalist approach to biblical interpretation and attempted to replicate the early New Testament church. The conservative strand was characterised by a stress on 'biblical morality' as opposed to the values of secular culture, while the progressive segment tried to engage with the

findings of science, realising that an isolationist approach would bring the relevance of faith into jeopardy. Nel provides a variety of reasons why Pentecostals should engage with science. Firstly, science has brought about exciting advances that have become part of everyday life. We cannot ignore living in a scientific age nor can churches leave the positive fruits of science underutilised. Second, Pentecostals need to bring their own ethos, specifically their pneumatic oriented spirituality, to the table in the science–faith debate. Thirdly, we live in a sinful and noetic limited world. Theology provides one perspective among many. Science opens gateways into reality that should be explored by Pentecostals. Finally, Pentecostalism presents a resistance against rationalism. It thus has a calling to present counter-narratives to excessively rationalist methodologies, which deny the existence of non-empiric sources of knowledge such as emotion and experience. Nel opines that Pentecostalism can and does have a distinct and valuable contribution to make to the ongoing dialogue between theology and science. These distinctives, relate to its 'full gospel' theology, with its Christological and Pneumatological (Spirit-Christology) emphasis. It may lead to a theology of science and the environment that supplements the emphasis in trinitarian theology that was developed in the past two decades and that correlates in several respects with recent scientific advances. It requires a counter-ontology of materiality, based on the insight of the essential, constitutive and dynamic presence of the Spirit in the natural world that guarantees God's active participation and presence in the world.

Jaco Beyers reflects on the impact the Fourth Industrial Revolution (4IR) is having on theological discourse and church practices. He contends that technology has replaced religion in becoming the most influential force behind the 'ultimate concerns' of people. Whereas pre-modern peoples turned to religion to answer ultimate questions of meaning, modern people seek to develop technological solutions to the challenges they face. Trust in God has indeed been replaced by trust in technology. The chapter starts off with a definition of the 4IR. Whereas the First Industrial Revolution (1IR) was based on water and steam, the second on the discovery of electricity and the third on electronics and information technology; the 4IR is marked by a 'blurring' between the physical, digital and biological spheres of life. Although Beyers acknowledges that the term 4IR might be an insufficient descriptor of changing reality, he nevertheless holds that a clear revolutionary change is observable in the relation between technology, economy and society. What impact does this massive change have on theology? Beyers contends that the emergence of virtual reality changes the landscape of metaphysics. No longer are we simply speaking about the spiritual and natural realms, but of the spiritual, natural and virtual realms. Another important theological field impacted by technology is theological anthropology. Genetic engineering, robotics and nanotechnologies might in future change the make-up of human nature. Increasingly mention is made of transhumanism as an intermediate

phase leading into a post-human phase where technology will take over physical human functions. Moreover, the rise of the virtual world has already led to reductions in human interaction, and might lead to an ever-widening gap between humans and the natural world. Humans are becoming more 'prone to engage with ideas and images of reality than reality itself'. The theological loci of soteriology and Eschatology are also impacted. Many identify technology with 'transcendence' and redemption while eternal life is strived after by means genetic editing, nanotechnology and post-humanism rather than faith in Christ. The church itself is also rapidly changing as a result of technological advances. The perception of what 'community of believers' mean, liturgy entails and diaconia signifies has changed rapidly with new forms of technological interaction emerging. The body of Christ seems to be becoming a 'virtual reality'. How should theology deal with these challenges? Leaning on Venter, Beyers suggests that theology should embrace technology insofar it assists in spreading the gospel, it must find creative ways in utilising technology and it must resist the dehumanisation of human beings.

Theological ethical reflection has almost always been involved in the broader field of bioethics. Until recently, this has also been the case in ethical considerations of biotechnology and genetic research. Francis Collins, director of the US Human Genome Project from 1992 to 2008, publicly declared the project to be founded on Jesus' ministry of healing, calling it a 'matter of discipleship'. Religious language has also been present in secular discussions, with phrases such as 'playing God' being prevalent in different discourses on biotechnology. With the advent of transhumanism, however, ethicists and theological ethicists in particular, have been urged to 'get out of the way' because they slow down research. Manitza Kotzé traces the shift in faith responses to scientific advances in the public sphere, by focusing in particular on the discourses around human biotechnological enhancement. In the second part of this chapter, she examines whether this shift could be mirrored by a change in the type of theological ethical reflection offered, and whether it goes hand-in-hand with a shift from thicker to thinner theological reactions in the public sphere. She concludes by offering a suggestion for how theological ethics could respond constructively and productively to issues raised in the public sphere by transhumanism.

The Universal Declaration of Bioethics and Human Rights (hereafter UDBHR) adopted in 2005 by UNESCO calls in Article 17 for the protection of 'traditional knowledge'. Most commentators content that 'traditional knowledge' is used in this article in two senses. Firstly, it refers to traditionally oriented environmental knowledge and secondly to traditional medicine. Riaan Rheeder provides a Protestant ethical perspective on the latter. According to Rheeder, traditional medicine refers to a wide variety of health systems and health practises mostly found among indigenous cultures living in 70 countries. About 60–90% of people living in developing countries

depend on traditional medicine (TM) for primary health care. Some traditional healing practises have been scientifically researched and proven as effective, but most of them are still scientifically unexplained. Traditional medical practises are strongly culture bound and often inextricably linked to specific worldviews, spiritual and religious beliefs. Treatments range from medical interventions to non-medical and spiritual therapies. The UDBHR qualifies the reference in Article 17 to respect traditional knowledge in various ways. Article 12 protects cultural diversity of which TM is a particular expression. This right is closely related to autonomy and the right of individuals to choose TM as a means to treatment. Yet, Article 12 also states that the right to cultural diversity does not suspend and may not disregard human dignity, human rights and fundamental freedoms. Article 14 of the UDBHR protects the right to quality health care. Rheeder interprets it as meaning that medical interventions must be to the benefit of the patient. To achieve this, the medical community must maintain best practises, and promote quality health care based on sound research. Article 18.1 furthermore stipulates that all information conveyed to patients and interventions considered must be based on the truth, and the best way to determine the truth is to use scientific methods of verification. In short, the UCDHR recognises the right to practise TM, but it also states unequivocally that it expects such practises to be effective and safe. In the last section of the chapter, Rheeder provides theological ethical guidelines for the use of TM. He grounds the right to cultural diversity in the doctrine of the trinity. As there is one God, there is one humanity, and as there is three persons in the Trinity humankind: humanity exists in diversity. He also contends that the Pentecost and various other passages in the New Testament affirms the importance of respect for diversity. Rheeder moreover grounds the right to effective medicine in God's goodness and benevolence and God's truthful nature. Various biblical passages show the need for discernment when it comes to practices of healing. Rheeder concludes that Protestant ethics can promote respect for TM as an expression of cultural diversity, but truth also demands efficiency.

Nico Vorster discusses the rational plausibility of faith as a buffer against existential society. The question of rational plausible bring science into the debate. Can science assist faith in providing answers to ultimate questions that plausible in light of existing scientific evidence? According to Vorster, the process of self-actualisation and identity formation is characterised by intra-psychic and interpersonal conflicts. At the core of the conflicts lies the inevitable and inescapable threat of what Paul Tillich terms the 'powers of non-being,' namely fate and death, emptiness and meaninglessness and guilt and condemnation. These powers create existential anxiety. Following Kierkegaard and Niebuhr, Vorster holds that anxiety creates a breeding ground for sin, while sin increases anxiety. As anxiety is, by definition, caused by the inability to cope with a threat and cannot be resolved within. We need to root existence in something bigger than ourselves. Vorster proceeds to argue that

the human being is a synthesis of nature and spirit and therefore has the inherent capacity (*sensus divinitatis*) to be cognitively aware of God who is the Ground of Being. The fundamental insight of the Christian faith is that God is love. Love by nature reveals and expresses itself to the beloved. Hence, we must ask whether traces of God's love can be found in the created order. Vorster contends that the natural sciences indeed provide 'hints' of loving creativity at work in creation. He points to the altruistic capacities of human beings, the anthropic nature of the cosmos, the ability of phylogenetic processes to generate organisms with greater abilities and the evolution of morality. However while science provide 'hints' pointing to a cosmic source of love, Vorster contends that empirically derived knowledge is not the only valid source of knowledge. Inductive logic, intuition, phenomenological knowledge and aesthetic awareness are also capable of building on the 'hints' provided by the natural sciences. In the end, though enough to divert our minds to God, the *sensus divinitatis* cannot provide assured knowledge. Christians holds that God's love is the most lucidly expressed in the revelation of Scripture and the historical person of Jesus Christ.

Having surmised the contributions to this collection, some interesting research questions partly addressed in this volume but still in need of further reflection, come to the fore. Are religious worldviews based on transcendent notions of reality still plausible in the contemporary world? Should science engage with questions of meaning, or must it limit itself to describing phenomena on the basis of verifiable empirical evidence? Are scientists appropriately aware of the philosophical assumptions and materialist ontologies that often undergird scientific practices? How do people of faith overcome the seemingly unbreachable gulf between transcendent and immanent views of reality? Are attempts to reconcile theological insights and scientific data not futile and superficial endeavours? When does the search for scientific progress and technological advancement become ethically problematic and morally unsustainable? What is the future of TM and traditional health practices in a world dominated by modern science?

Chapter 1

‘God’s most beautiful book’: A source of knowledge for theology and natural sciences

J.M. Vorster
The Unit for Reformational Theology and the Development of the South African Society, Faculty of Theology, North-West University, Potchefstroom, South Africa

Introduction

The emergence of modernism in the post-Renaissance Western world exerted pressure on theology and the plausibility of faith and religion as prominent forces in human development. Modernist philosophers questioned the pre-modern worldviews with their high regard for God as the centre and controller of reality and the dominant role of faith and religion in epistemology. The immense developments in natural sciences, technology and industrialisation further shaped the emergence of the new paradigm of modernism with a positivist outlook on science. In contrast with the pre-modern worldview, God was no longer perceived as the answer to all problems or faith and religion, the prerequisites for dealing with the issues of life and death, of meaning and

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culture, and of peace and hope. Human reason opened new avenues for human experience and proposed other possibilities that could enhance human development and flourishing. The shift from pre-modernism to modernism, from faith to reason as the main force behind human idealism and hope, has also been attributed to the negative and damaging inhumane actions of kings and queens in the name of God, the colonial endeavours of 'Christian nations' with its slavery and oppression of indigenous peoples and its indifferences to power abuses by the powerful, the rich and the 'Church'. In his impressive survey of the 'Secular Age', Taylor (2007:21) remarks that religion in this new era has lost its 'enchantment' for people living among all the powerful forces of their day.

Modernism introduced a new 'enchantment', namely, human reason. The well-known and influential dictum of Descartes, '*çogito ergo sum*', created suspicion with respect to the plausibility of faith as an angle of approach in understanding the history of humankind and to demarcate the possibilities of human achievements. The way to truth was no longer seen to be founded in faith in God but in rational scientific research. The emerging positivism furthered a view of science that discards the role of faith in creating knowledge. Positivism defines scientific research as a purely rationalistic endeavour embedded in the neutrality and objectivity of the scientist and the sole dependence of research on the information given by the object of research. In this environment of neutrality, objectivity and the dominance of facts, faith is seen as obsolete. The shift from pre-modernism to modernism was immense, and the best way to evaluate this shift is to take cognisance of Taylor's remark when he introduces his concept of the secular age. He contends that a few centuries ago, one could hardly find a person who would question faith in God and the necessity of religion as the driving force of human conduct. However, today you can hardly find people who do not profess the dominance of reason and science as the driving force of human conduct (Taylor 2007:1–11, see also Hölscher 2010:198).

In spite of this scenario, there has been another deep-rooted change in the quest for knowledge over the last five decades that has created a completely new environment for the faith-science dialogue and the plausibility of a faith-based search for knowledge. A new paradigm shift occurred that relativises the dominance of reason by questioning the notions of objectivity and neutrality in the search for new knowledge. Postmodernism entered the domains of human reasoning and conduct. This paradigm shift from modernism to postmodernism was introduced by theorists such as Kuhn (1970) and Lyotard (1991), and many scholars chose to challenge the positivist idea of modernism regarding the dominance of reason and the possibilities of 'objectivity' and 'neutrality' in the search for knowledge. Kuhn (1970:44–46) and his contemporaries made a plausible case for the view that all sciences are paradigm-driven and must take account of pluralism in the search for

knowledge because the time of the huge master narratives has elapsed.[1] Following in the footsteps of some postmodern theorists, they claim that research is not driven by pure reason because human reason is always captured in worldviews and contexts that give rise to presuppositions that drive the search for new knowledge. Postmodernist theorists introduced other influential role players in scientific research besides reason. They claim that the reason is captured by a paradigm and seldom moves outside the angle of approach, presuppositions, meta-philosophy, methods and sets of rules offered by the paradigm. Over and against reason and fixed truths excavated by object-driven research, they make a case for the role of experience, spirituality and contextuality in the search for new knowledge. Furthermore, they oppose the idea of absolute, fixed knowledge and the consequent claim on truth. They argue that our notions of truth are social constructions consistently open to revision. They claim furthermore that truth lies in the heart of the beholder and is therefore relative, and knowledge can only serve as valid for the practitioners working within the confines of a certain paradigm.

In the age of positivism, the role of faith, experience and context was not recognised in the search for knowledge. Human reason was accepted as the only determinant of truth. Postmodernism argues that absolute truth can never be presented because not only reason but also faith, experience and context influence the search for knowledge and truth. What you see depends on where you stand. I do not intend to engage further in the discourse on postmodernism in this chapter. The claim of the relativity of truth and morals can, indeed, be questioned from a Christian point of view. My intention is rather to indicate that these theorists set a new stage for the science-faith debate. They object to the modernist and positivist view of the dominance of reason and natural sciences, and affirm that reason and natural science are also paradigm-driven and question the notions of objectivity and neutrality.

1. Reformational philosophy, which developed in Netherlands in the early twentieth century at the Free University of Amsterdam and spread to Christian reformed universities over the world, contends that all science is driven by certain worldviews. Calvinist philosophers debated the thesis long before the publication of the epoch-making books by Lyotard and Kuhn. The main exponents of this Christian reformational philosophy included Bavinck (1854–1921) who introduced his *Philosophy of Revelation* in 1908 (see Bavinck 2012:52–67), Dooyeweerd (1894–1977) in his *A New Critique of Theoretical Thought. The Necessary Presuppositions of Philosophy* (Dooyeweerd 1969), Vollenhoven (1892–1978) in his *De Wijsbegeerte der Wiskunde van Theïstisch Standpunt* (Vollenhoven 1918) and Stoker (1899–1994) in his *Beginsels en metodes in die wetenskap* (Stoker 1961). These philosophers differed on some important issues in their pursuit of a reformational philosophy; however, they all agreed on the thesis that all sciences are paradigm driven. Stoker (1961:145), in the footsteps of Bavinck, Dooyeweerd and Vollenhoven, built all epistemology on the foundation of the relation between life and worldview and science. Worldview precedes science because it answers the metatheoretical questions: it presents the universal framework for science, which occupies itself with producing the exact knowledge. The exact knowledge can influence worldviews but cannot displace it as a guide for scientific research. The worldview presents holistic knowledge and science-partial knowledge. However, the part receives its meaning from the whole.

The surge of post-positivism also disputes the modernist suspicion of religion and faith and restores theological research as a plausible science.

It is this contribution I use the new emerging paradigm as my angle of approach to the topic of this book. My contention is that the faith-science discourse can be beneficial for both natural sciences and theology if they approach reality and seek new knowledge as equal partners in an interdisciplinary debate and make use of all the capacities and realities of the human person – reason, faith, experience and context. As a theologian, I am not able to evaluate the findings of natural scientific research or to prove theological positions using natural sciences. Such a venture usually results in pseudo-science and pseudo-theology. I would rather opt for an argument that theologians and natural scientists can build bridges based on their respective understandings of cosmology and life. The central theoretical argument of this contribution is that bridge-building is indeed possible when the classical reformed theological confession on knowledge about God and the means to come to this knowledge are revisited and applied to the faith-science discourse today. My argument rests on the *Ecumenical Creeds* and particularly on Articles 1 and 2 of the *Belgic Confession*. These articles express the foundation of reformed faith, namely, the belief in the existence of God, God's self-revelation and God's creation, sustenance and restoration of the universe and everything it entails

God exists

All the aforementioned creeds take faith as the point of departure. The *Ecumenical Creeds* commence with the expression 'Credo' (I believe). The content of this belief is faith in the triune God, the Father, the Son and the Holy Spirit. This belief is the main tenet of Christian faith (Christian Reformed Churches 2021). The *Belgic Confession* commences with this main tenet in its explanation of the reformed faith. Article 1 of the confession (Christian Reformed Churches 2011b) reads:

> The Only God
> We all believe in our hearts and confess with our mouths that there is a single and simple spiritual being, whom we call God eternal, incomprehensible, invisible, unchangeable, infinite, almighty; completely wise, just, and good, and the overflowing source of all good. (Art. 1)

Nowhere do the creeds aim to provide a rational argumentation to prove the existence of God and God's attributes, despite many attempts in philosophy through the centuries to do so, commencing with the Aristotelian view of the original mover. In his remarkable book, Küng (1980) explains the contributions made by various philosophers to present a reasonable explanation of the existence of God (see also MacIntyre 1981; Rocca 1986). The classic reformed confessions also refrain from proving the existence of God by any reasonable or ontological argument. They merely state that the recognition of the

existence of God is a matter of faith alone. Christian theology stems from this axiom, and this belief motivates everything for which Christianity stands. Modernism, with its high regard for a positivist approach to scientific research, rejected the validity of any axiomatic foundations for epistemology. This modernist idea is still present at many universities that regard theology as below reason and a pseudo-science, with no place in academic scholarship.[2] However, the authority of reason and the notion that theology is below reason are gradually becoming less accepted in the current academic research because of the paradigm shift from the positivism of modernism to the post-positivism of the emerging paradigm termed as postmodernism. As mentioned earlier, this development is because of the influence of Kuhn's account of paradigms in doing science and postmodernism's devaluation of the dominance of reason in science and 'scientific methods' (see Kuhn 1970; Foucault 1970; Lyotard 1991). Postmodernism reinvigorates the plausibility of axiomatic angles of approach in scientific research as long as there is a scientific agreement about the ruling paradigm. The postmodernist (post-positivist) view of science thus provides space for doing theology based on the foundation of the reformed creeds' axiom about the existence of God. The academic use of this axiom has become plausible and invigorates the place of belief, spirituality and religion in the quest for knowledge.

Arguing from the postmodernist view of epistemology, scholars taking part in the faith-science debate agree that all sciences depend on certain axioms as part of their metatheoretical framework. It is not only the case in theology. Acknowledgement of these axioms by the various disciplines is a beneficial step in the transdisciplinary discourse between theology and the natural sciences. When natural sciences and theology search for common axiomatic presuppositions, they can enrich each other. When these axioms are obscured because they are regarded as below reason, no discourse between theology and natural sciences will be possible. Welker (2012:19ff.) raises certain concerns about this approach. In his view, the proposal that the theology and science discourse could search for common metatheoretical presuppositions, which means that it might concentrate on a sphere 'above' theology and science in which the abstractions from the theoretical foundations of both overlap, has certain limitations. He argues that in our time of multidisciplinary enthusiasm in academic research, academics from different disciplines tend to overlook the fact that they each belong to a network of established, recognised and proven methods and practices that must not be ignored during academic contact with other fields and disciplines. The search

2. Welker (1994:40ff.) makes valid arguments that theology today is still influenced by old forms of thought that inhibit the translation of biblical ideas in a society today. These outdated forms stem from the modernist paradigm where reason, objectivity and neutrality guided science and devalued faith and religion. Theology today should in his view be liberated from these old forms of thought in order to become a vibrant and inspiring force in human life (for an illuminating explanation of his critique of the old forms of thought, see Van der Westhuizen 2017).

for common metatheoretical presuppositions has dominated the international discussion over the last 50 years and has led to the emergence of several models of the discourse. In this respect, Welker refers to the conflict model, the complementary model, the dialogue model and the integration model. However, he is concerned about the fact that the metatheoretical approach becomes primarily interested in debating the 'big questions' and then comes to vague answers.[3]

His concern is valid to some extent, but I would argue that the metatheoretical approach is beneficial in the sense that it sets theology and natural science on an equal footing and discards the idea that theology is below reason. New epistemology restores faith as a source of knowledge. Acknowledging axioms in natural sciences invalidates the argument that theology is below reason and cannot feature as a science. To my mind, the postmodernist view of science is promising and advantageous for the faith-science debate precisely because it recognises the plausibility of theology (and other sciences in the humanities) as a science driven by the axiom of the existence of God, and that humans can come to know about God. Learning science from such a point of departure is plausible. For example, both theology and evolutionary sciences depart from a belief – either belief in God or a belief in coincidence in the development of species. When this post-positivist view of epistemology is applied to the faith-science discourse, it adds value to the metatheoretical approach. Recognition of the plausibility of the belief system underlying theology and recognition of the axiomatic approaches in natural sciences can pave the way for sharper answers to the 'big questions' arising in the faith-science discourse. Following Welker's (2012:53–62) proposal regarding the building of small bridges between theology and natural sciences, I would argue that the new metatheoretical theory can serve as a bridge between faith and science.

This approach could be augmented by reformed theology's second axiomatic presupposition, which entails that persons can know God because of God's self-revelation. Bavinck (2012:5, 52) in his historic review of the concept of revelation reminds theologians that philosophers over the ages have agreed that reality is not mere naturalist material but contains movement

3. Welker (2012:53) proposes a fifth possible answer, namely, that the dialogue between theology and science could endeavour to build small bridges at the boundaries of each other's areas of knowledge. In this respect, he refers to anthropology as one example to build his argument. He contends that the human relationship with God is a point of departure, and this fundamental idea of theology ought to be respected in the theology-science discourse. However, the concept of relationship is vague and has abundance of meanings, and in the discourse, we must look for precision in our reflections on human relationships and the relationship with God. The theologian must, therefore, seek to find the simplest presentation of the human relationship with God and his relationship with humans as a point of contact with science. Welker refers to Luther and Barth's anthropologies; Polkinghorne's idea that large-scale cosmology could serve as a framework for scientific and theological anthropology; the doctrine of creation; and the relationships portrayed by the Holy Communion. He then concludes that a theological anthropology 'from above' can serve as an advantageous framework and a creative impulse for the theology–science debate (Welker 2012:62). Anthropology can be one of the bridges between theology and natural sciences that can be built to serve the discourse.

according to certain laws. Every person can see and experience that behind the movement and natural order lies power. The power has been described and defined in different ways by philosophers and scientists; however, most of them concede that the universe is more than mere senseless and dead material. Christian philosophers and theologians ascribe this lively movement to God, and by the power-driven movements in creation, people can know God. God is alive, creation is alive and humans can relate to God because God introduces himself by self-revelation. The concept of revelation is the backbone of reformed theology, although 20th-century theologians differ on the means of God's self-revelation.[4] In the following section, I argue that the idea of revelation as presented by Calvin (*Inst*. I:3:1:9) and the classic reformed confessions could also be a bridge for the current postmodernist faith-science debate.

God reveals

Although God is incomprehensible and complete knowledge of God is not possible, humans can gain some knowledge about him. Deeper and all-embracing knowledge of God and his attributes is possible because of his lively and pulsating self-revelation. Belief in the self-revelation of God is the second foundational tenet of reformed faith. Drawing on the theology of the church fathers, particularly on Augustine, Calvin chose this belief as the key to his theological design and by doing so, established the point of departure in reformed theology. True religion rests on the innate ability of humans to know God, and this knowledge is the foundation and guide of human existence and conduct (*Inst.* I:2:1:7). Firstly, people can believe that God exists, and secondly, that God reveals knowledge about Godself for the benefit of humankind in search of a life of meaning in relationship with God and nature. Following the theological design of Calvin, reformed theology departs thus from the axiom that God exists and that God reveals Godself in God's creation and caring immanent reign. The perfect knowledge of God is a creational gift, implanted in the human mind, but it has been distorted and corrupted by sin. However, every human person still 'has a seed of religion, divinely sown in all' (*Inst*. I:4:1,12). This seed of religion brings about in every person the light of reason and a moral sense (*lex naturalis*), which is sufficient to prevent humankind and society from falling into total chaos (*Inst.* II:2:13:166). However, this gift is not enough to come to the knowledge needed for salvation and reconciliation

4. Bavinck (2012) furthered the concept revelation as it featured in early Calvinism and defended in his Stone Lectures at Princeton in 1908 the concept of reasonable faith as a response to modernism's claim that faith (and theology) is below reason. On the contrary, the neo-orthodoxy of Barth (1938) and some of his contemporaries, on the other hand, rejected the idea that reason can create any relationship with God. God is the author of a relationship with the human being and God can only be known by way of his self-revelation in Christ. Barth was hesitant to deal with nature as a source of knowledge about God, and he rejected any form of natural theology (see his discourse with Brunner in Brunner & Barth 1946).

with God. To know God more comprehensively, that is to the extent that persons should know him to find salvation and for living under God's transforming reign, a second source of knowledge is necessary. This knowledge comes from God's self-revelation in Scripture. As an act of free grace, God reveals this knowledge in Scripture. Scripture is God's particular revelation and teaches humans how to be reconciled with him and how to live under his transformative reign. A relationship with God is possible by way of the cross of Jesus and can be realised by faith alone. Knowledge about salvation and faith can only be gained from God's written Word.

The reformed creeds echo Calvin's idea of this *duplex cognito Dei,* in other words God's general revelation in the 'book of nature' and his revelation in 'the written word' (Scripture). Article 2 of the *Belgic Confession* testifies the following about the sources of knowledge of God (Christian Reformed Churches 2021: Art. 2; see also Beeke & Ferguson 1999: Heid. Cat. Q/A 122, Canons of Dort, Head III and IV, Arts. 6 & 7, *Westminster Confession of Faith*, I, the Westminster Larger Catechism Q/A 2. Also see the references to Scripture in these statements.):[5]

> We know God by two means:
> First, by the creation, preservation, and government of the universe, since that universe is before our eyes like a beautiful book in which all creatures, great and small, are as letters to make us ponder the invisible things of God: God's eternal power and divinity, as the apostle Paul says in Romans 1:20. All these things are enough to convict humans and to leave them without excuse. Second, God makes himself known to us more clearly by his holy and divine Word, as much as we need in this life, for God's glory and for our salvation. (Art. 2)

Over the centuries, especially pertinent to the huge strides of the natural sciences, reformed theology consistently expressed the belief that nature is a source of knowledge about God. Although creation does not present knowledge about the way to reconcile with God, it pictures God's governance of the universe, which is there for everyone to see. Similar to the reformers, the reformed theologians who formulated the *Belgic Confession* and the *Westminster Confession* drew on Romans 1:20 as proof for God's self-revelation in nature. In the New International Version (NIV), the passage reads (Rm 1):

5. The equally influential *Westminster Confession* is less implicit on God's revelation in nature and more explicit on the revelation by the Scripture. This may be a reason why God's revelation in the 'beautiful book' of nature is often neglected in the faith-science debate. Chapter 1 of the *Westminster Confession* reads: 'Although the light of nature and the works of creation and providence do so far manifest the goodness, wisdom, and power of God, as to leave men inexcusable; (1) yet are they not sufficient to give that knowledge of God and of his will, which is necessary unto salvation. (2) Therefore, it pleased the Lord, at sundry times, and in divers manners, to reveal himself, and to declare that his will unto his Church; (3) and afterwards, for the better preserving and propagating of the truth, and for the more sure establishment and comfort of the Church against the corruption of the flesh, and the malice of Satan and of the world, to commit the same wholly unto writing: (4) which make the Holy Scripture to be most necessary; (5) those former ways of God's revealing his will unto his people being now ceased.(f)'. (1) Romans 2:14, 15; 1:19, 20; Psalms 19:1, 2, 3; Romans; 1:322:1. (2) 1 Chronicles 1:21; 2:13, 14. (3) Hebrews 1:1. (4) Proverbs 22:19, 20, 21; Luke 1:3, 4; Romans 15:4; Matthew 4:4, 7, 10; Isaiah 8:19, 20. (5) 2 Timothy 3:15; 2 Peter 1:19. (6) Hebrews 1:1–2.

> For since the creation of the world God's invisible qualities – his eternal power and divine nature – have been clearly seen, being understood from what has been made, so that men are without any excuse. (v. 20)

The idea of nature as a 'beautiful book' presenting knowledge about God is also embedded in the 'nature Psalms'. Psalm 8 sings about the work of God's fingers that set in place the universe; Psalm 19 proclaims the glory of God discernible in the skies and which pours forth speech and display knowledge; and Psalm 29 lauds the power of God in nature – the same power that provides strength to his people. In the Old Testament, God in nature is often used to motivate humans to endure their suffering and despair because he controls nature and history. The concept 'God in nature' is part and parcel of the biblical idea of the reign (kingdom) of God. Recently, Van den Brink (2017:79–87) published a concise but well-documented survey of the reformed discourse about this doctrine (see also Van den Brink 2007; Van der Kooi & Van den Brink 2017) and concludes that reformed theology over the years acknowledged that nature is, to a certain extent, a source of knowledge about God. Van den Brink (2007:2) indicates that the metaphor of a book implies even more than nature and can include human history also. It refers to all reality that can be read like a book in such a way that God's eternal power and divinity come to the fore. He also presents a concise history of how this idea was debated in reformed theology and how it even motivated natural scientific research wherever the reformed Protestant tradition set foot. The idea of the two sources of knowledge was argued in not only reformed theology but also natural philosophy at that time. As a prominent natural scientist, Lennox (2019:66) defends the doctrine of the two books nowadays with reference to the philosophy of science presented by Francis Bacon (1561–1626). Bacon also distinguished two sources of knowledge, namely creation and Scripture. He maintained that 'natural philosophy' (natural scientist) could study nature and theology could study Scripture. Nature and Scripture set two sets of data that can be followed by scientific research.

With certain different nuances, reformed theology furthered the idea that God's self-revelation in the beautiful book of nature and history emerges in the powerful act of creation and continues in God's active continuing sustenance and restoration of his creation. During the development of reformed theological cosmology, these powerful divine actions were presented as a point where theology and natural sciences can find a common ground.[6] This argument is argued in subsequent sections. Firstly, I deal with the idea of creation itself.

6. Van den Brink (2007, 2017) presents an informative survey of how reformed theologians dealt with this point of view, especially since the Darwinian and neo-Darwinian pattern of reasoning in Western thought. I would not venture a discussion of the various perspectives here, because Van den Brink has done so adequately. Where applicable, I would refer to the earlier ideas that can still serve the discourse today.

God creates

The idea of creation became a huge point of difference between theology and natural sciences after the emergence of Darwinism and subsequent neo-Darwinism. Evolutionary biology obscured the belief in a creator God and posited that such a belief is actually part and parcel of the evolution of the human species. God exists only in the mind of the human species, and the sense of religion lies in a faculty of the human brain. The discourse about creation and the creator that followed the Darwinian age produced several theories about the origin of the universe, especially the development of life. Some scholars in the natural sciences resorted to a total rejection of any idea of creation and built new theories in the light of the findings of their scientific research. Prominent theologians, however, rejected Darwinism because they were convinced that these ideas undermine the authority of Scripture and obscure the major tenets of the Christian faith (cf. Van den Brink 2017:110). Because of a lack of evidence in some areas of evolutionary biology, other scientists and theologians resorted to the 'intelligent design' theory, which holds that the universe and life developed according to a certain design, and this design is the creative work of God. They founded this idea on the 'anthropic principle', which can be considered 'a bridge between science, philosophy and theology'. The anthropic principle says, roughly, 'that the existence of life (specifically, human or "anthropic life") in the universe can place constraints on the scientific understanding of how the universe is now and how it got to be the way it is'. The universe contains everything that is necessary for the phenomenon of life; however, this occurrence cannot be explained (see Carter & McCrea 1983:347ff.). It can point to a creator. This view acknowledges that God as a creator was the initial architect, and that he set the natural laws that cause and steer evolutionary biology and mathematics. Some other natural scientists and theologians argued that theology and science should move in separate trajectories because they have different foundations and aims, and do not have to engage in a discourse about the origin of the universe and species. In his reflection on some of the theories, Welker (cf. 2012:22) raises a very important argument that concerns both natural sciences and theology, namely, that theologians and natural sciences should refrain from making caricatures of each other's theories, in doing so relegating the discourse to a defence and rejection of these caricatures. He maintains that theology in its discourse with the sciences ought to present and unfold central theological themes to prevent the sciences from developing false perceptions of theology, as has been the case in many instances in the past – especially around the idea of creation.

Welker (cf. 2012:23) refers, in this respect, to the reading of the creation narratives in Genesis 1 and 2 from a creationist perspective that excludes any notion of compatibility with natural scientific findings about the age of the Earth. Such a reading creates false perceptions and makes dialogue impossible

because it obscures all natural scientific findings about the age of the universe and all living species. With reference to the studies of several Old Testament scholars, Welker (cf. 2012:24ff.) points to several problematic interpretations in the creationist perspective. In his view, Genesis uses two-time systems and connects very different domains of life and action. It describes God's intervention in that which has already been created for the purpose of further specification and embeds the creature's activities in the process of creation and God's participation in that process. Welker also reasons that the mandate of dominium implies much more than a mere human dominium over nature when read within the context of the 'creation of the human person in the image of God'. Creationism presents a false perception of theology and complicates the discourse between theology and science. His concern is to the point. In many evangelical and biblicist traditions today, interpreters of the creation narratives regard the genre of these passages as factual and historical material that should be interpreted and understood in a literalist way. In such a reading, the Bible then serves as a guide for all science and as a reflection of human history. This historical-literal interpretation gave rise to the notion that the universe is 6000 years old, and the 'days' were days of 24 h each. Exponents of this line of reasoning often force proven natural scientific findings into this framework to prove the young-age theory. The result is then pseudo-theology coupled with pseudo-science.

Just as with the case of creationism, readings of the creation narratives in liberal theologies are also responsible for creating false perceptions about theology. Some liberal interpreters regard Genesis 1 and 2 as myth and not of any use in the faith-science discourse. They contend that the creation argument should rather be abolished completely. Instead of debating a 'mythological' view of the origin of the universe, other plausible and relevant aspects of theology that can serve the natural sciences should be investigated, such as nature, human life and moral agency. In addition to Welker's critique on creationism, I would question this liberal pattern of reasoning. Theology is incomplete and powerless without the doctrine of creation. The idea of creation is indispensable for Christian theology because these creation narratives deal with so many foundational details, including the character of God, his reign over everything, the nature of creation and life, and the milieu for how we understand sin and redemption. Both the extremes of creationism and liberalism obstruct a fruitful and honest discourse between theology and natural sciences.

The genre classification of Genesis 1 is, indeed, very important for the faith-science discourse as it can prevent the foregoing false perceptions flowing from erroneous readings of the creation narratives. Modern text studies in biblical sciences made a plausible case for defining the genre of Genesis 1 and 2 as primeval or protological material (see Goldingay 2016:70; Westermann 1982:87). The protological material corresponds with the Eschatological

material in biblical material, such as the books of Daniel and Revelation. Protology and Eschatology frame the narration of the transcendental universe, and cannot be interpreted and applied according to immanent historical frameworks. When interpreting the creation narrative as protological material, we can conclude that God created in his time and space. Westermann (1982) contends that the authors of Genesis 1 and 2:

> [*W*]ish to express that the God of the people of Israel is not limited in his working by the boundaries of that people, but that he is the Lord of universal history and the Lord of the cosmos. Everything that happens between Israel and its God, everything that happens between an individual and God stands in this broad context. (p. 87)

The authors went beyond history and explained creation by symbols, metaphors, stories and real events.

The reference to a 'day' in the process of creation is metaphoric and indicates a moment in the eternal activity of God. The day probably indicates long periods of time – even millions of years in our timeframe, but moments in God's eternity and space. God is not limited by time and space (cf. Collins 2007:7). Scientific evidence for the 'Big Bang' theory, the age of the universe, the evolution of species and patterns in natural development fits into such a reading of the creational narrative and should not be viewed as a threat to Christian faith. The revelation of God in Scripture informs us that God created the whole universe and everything that we as humans see and experience. He did it by means of the *Logos* (Jn 1:1), which later became flesh and resided among people with the aim to recreate. More knowledge of creation is possible by heeding God's revelation in the 'beautiful book' of nature. The human person is gifted with the reasonable abilities and curiosity to investigate the work of God by carrying out scientific research. Natural scientific research provides more knowledge about the creational work of God. Reading the creation narratives as protological material also provides space to the many other foundational issues linked to the creation such as Harmatology, Christology, Pneumatology and Eschatology, which can all shed light on the findings of the natural sciences.

These insights indicate that the belief in creation and some theories regarding evolution can be compatible and can indeed enrich both theology and natural sciences. Theologians can stand in awe and astonishment when seeing the findings of palaeontology, life sciences and cosmology and how these fit into the powerful art of creation. Recent research in the fields of ecology and climatology presents astonishing findings about the circles of life, the inextricable link between living species and nature, the necessity of death for the conservation of life, the fine balances in the environmental setup and the role of the human psyche in the biological and mental health of the person. A person can flourish only when functioning as part of the ecological machine in a fixed relation with the natural and ecological patterns. Disturbances in these patterns, cycles and relationships have detrimental

effects on personhood and denigrate the beauty of creation. Theology could shed light on the miracle of life and could enhance a moral agency that can pursue flourishing personhood and a respect for the environment as the only stage where a flourishing life can burgeon to its fullest extent.[7] Theology today understands life better because of the contributions of ecology and climatology and can therefore exert a more foundational moral agency with respect to the ecocidal lifestyles of humans today. Scientists can experience the same astonishment when they perceive the fine patterns of cosmic development along the lines of inexplicable laws. They could hear the 'language of God', as Collins (2007:6) explains eloquently in his popular book.

For a profitable discourse with science, theology ought to unfold similar theological topics that speak of potential common areas of research. Welker (2012:30) regards this task of theology as crucial for the discourse. In line with his point of view, I want to reiterate the importance of a hermeneutic of congruent biblical theology (see Vorster 2020:7–8). When the creation narrative is read within the context of the wholeness and unity of Scripture and the overarching continuous themes in the biblical revelation, such as the themes of kingdom, covenant, salvation, consummation and others, it can be unfolded as one such common area for the faith-science discourse.

Rightly, Welker (cf. 2012:31) also addresses mistakes and inconsistencies in the way in which natural sciences present theological and religious issues. He asks: '[d]oes the research about physical, chemical and biological processes in natural space-time, however impressive these might be, offer any perspectives on theological issues?' When dealing with this question, he addresses Stephen Hawking's view of God and creation. Hawking, in considering the 'Big Bang' theory, concludes that this discovery brought the 'beginning of the universe into the realm of science' and deviates from any idea of a creator. Moving his attention away from the first moment, Hawking, using 'quantum mechanics and the general theory of relativity', proposes a 'theory that posits that space-time is completely self-contained, with no singularities or boundaries'. What is then the role of a creator? Hawking takes the beginning away from the creator. Furthermore, he implies that a creator can only create the universe mathematics that would permit the creator to create. Welker (2012:35) considers Hawking's view on creation and the creator to be ambivalent because Hawking himself later began to consider 'that there might be limits to forming theories and conceiving reality in mathematical terms' only. Welker then asks how we can develop theories about the world

7. I have discussed the biblical concept of life in a recent book in a modest attempt to raise awareness for a concept of life that is more than just biological life, but the 'breath of God'. The 'breath of God' implies that human life is closely connected to all the features of creation, and this connection determines whether humans can pursue a flourishing personhood – a life of holistic health, joy, peace, compassion and dedication (see Vorster 2021).

that stimulate the disciplines of natural sciences and theology to engage in a possible synthesis of theoretical conceptions and allow the differences to emerge clearly?

The recent study of Van den Brink (cf. 2017:325) also echoes the idea of the necessity of a plausible harmonisation of some results of evolutionary biology with certain interpretations of the doctrine of creation in reformed theology today. He maintains that the results of scientific research on evolution cannot be denied, nor can the idea of God as the creator and his reign over the universe or his divine involvement in the origin of the human person and human life be refuted. Based on the thorough research on what he terms the neo-Darwinist theory of evolution, the voices of the past in reformed theology about evolution and creation, and the questions posed to theology by modern research in evolutionary research, he indicates that the discourse boils down to the following three basic topics that theology should address:

- *Progressive creation*: This is the idea that diverse forms of life developed over enormous stretches of time according to a geological timeframe.
- *Common descent*: This is the idea that forms of life develop independently but from a common source.
- *Natural selection on the foundation of coincidental mutations*: This is the idea of a dominant mechanism behind biodiversity that enables certain organisms to adapt better to their environment because of coincidental mutations.

Viewed in the light of the doctrine of creation, Van den Brink (cf. 2017:326) concludes that the scientific proof for the first thesis is strong and a rejection will be irresponsible. Thesis 2 has a well-established standing in evolutionary biology, although the scientific proof is still insufficient because of uncertainties. Thesis 3 is still being discussed in earnest in evolutionary scientific research circles. Currently, theologians reflect on these topics and feel comfortable with either accommodating a single thesis, or a combination of some, or to reject all of them. Van den Brink (2017:339) opines that theology can indeed move out of 'post-evolutionary apologetics' in the direction of a constructive engagement with evolution. The dialogue can be constructive and he finds no reason why the main tenets of theology, such as creation, fall, redemption and Pneumatology, ought to be reviewed to accommodate the proven aspects of evolutionary biology.

The reading of the creation narratives as protological material and an openness in the natural sciences to consider the role of the creator could steer the faith-science debate in a direction where both can add value to others' understanding of the origin of the universe and life. Both the theologian and the natural scientist will then be in wonder of the artistic and meticulous work of the creator as it is lauded in the nature Psalms and in the laboratories of open-minded natural scientists. The idea of creation and origin could serve as

another bridge in the faith-science dialogue. It is not only creation that can be beneficial in this discourse but also the biblical idea of God's continuous presence and sustenance of the creation. In this respect, reformed theology offers a plausible contribution.

God sustains

Biblical theology links God not only to the origin of the universe but also to the sustenance of his creation. Natural science makes a valid case for ongoing evolution. The idea of ongoing evolution could serve as another bridge in the faith-science discourse. Two fundamental biblical themes highlight God's involvement in the created order and God's sustenance of nature and guidance of human history. The first theme is encapsulated in the concept of the kingdom of God, and the second one in the idea of God's covenant with nature, especially with humanity. These topics also clarify the reason why nature and history 'are as letters to make us ponder the invisible things of God: God's eternal power and divinity' (Beeke & Ferguson 1999; *Belgic Confession* Art. 2).

The metaphor kingdom of God points to the eternal reign of God over the created order. In a previous publication, I dealt with the concept and its relevance for a Christian-ethical theory of human dignity and human rights (see Vorster 2017). In this chapter, I only use some aspects of these ideas, explained in the specific publication. What I deem relevant for the science-faith dialogue is the idea of the reign (Kingdom) of God and the Covenant. The idea of the 'Kingdom of God' is a continuous theme in the biblical revelation in both the Old and the New Testaments (Barrick 2012:190). The phrase as such does not appear in the Old Testament but the idea is imminent. In addition, the idea does not enter the Old Testament late, but already upon creation, long before the establishment of an earthly messianic kingdom (Barrick 2012:174). The fact that the idea of God's kingdom was well-known in the Old Testament is evident from the fact that John the Baptist's proclamation of the imminence of the kingdom was familiar to the Jews of his time, according to the well-known publication of Ridderbos (cf. 1962:3). In the Old Testament, Yahweh is often proclaimed as a king, and this expression concerns the universal power and dominion of God over the whole world and all nations (Ridderbos 1962:4; Spiecermann 1997:123). This kingship is founded on the creation of heaven and earth. The history of the kingdom of Israel is used as a historic symbol of the reign of God and his communion with his people. The reign of God is also an important topic in the prophetic books and wisdom literature, as is evident from Psalms 22:28; 47; 93; 96; 97; 99; 103 and 145 (Vorster 2017:3 of 8). God is not only the God of Israel (present kingship) but also the God of all nations. It is proclaimed as a reign that will be manifested in the coming of the Messiah future kingship (Ridderbos 1962:6–8). The kingdom of God is a present and future reality. This idea became prominent in

Protestant thought. It is what Küng (1992:56) describes as a 'futurist-presentist Eschatology'. Beach (2012:66) speaks of the 'Already' and the 'Not yet' of the kingdom. According to this point of view, the kingdom was realised in principle with the coming and resurrection of Christ. With Christ, the kingdom has come. The reign of God over all creation was established, but the final victory of God's reign will take place with the consummation. In the meantime, signs of the kingdom will be erected everywhere where the name of God is confessed. 'The prominent sign is the church, and although churches deformed at certain stages in history, the miraculous history of the church can also be read as the letters describing God's divinity and power'.[8] Evolution is ongoing and God's involvement in creation is ongoing. The reality of movement in corporeality and life could also be a bridge between theology and natural sciences.

The concept of the covenant between God, creation and his people is also a prominent topic in Scripture, especially in the Old Testament literature. 'A covenant is an unchangeable, divinely imposed legal agreement between God and man that stipulates the conditions of their relationship' (Grudem 1994:515). This concept illustrates 'God's self-commitment to the people' (Perlitt 1997:710) and to his creation. Because of God's commitment to the people, new relationships are formed between God and the people, among the people themselves and with creation. In his extensive study of the theology of the Old Testament, the Dutch scholar Vriezen (cf. 1962:167) indicates that the communion between God, creation and the human person flowing from the covenant is the essence of biblical religion (Vorster 2017):

> God is seen as the God of history who exercises God's reign over creation in and through people. Humans can know God because God reveals Godself especially to the people of the covenant. Furthermore, the covenant determines the way in which the people can express their obedience to God, and it is therefore the foundation of Israel's faith and life. Covenant and conduct are closely linked. (p. 8)

In certain traditions of reformed theology, the concept of the covenant has been developed into a paradigm for the understanding of God's actions in creation, his relationship with humankind and eventual salvation. Grudem (1994:515) provides a resume of this position with his discussion of the different covenants in the biblical history of salvation. However, his investigation does

8. Consider the following: All major religious and philosophic movements emanated in prominent cities, were promoted by books and military conquests, protected by dynasties and empires, and were limited to certain civilisations and cultures. Christianity emerged in a low-profile region called Galilea. Jesus wrote nothing, was not a leader of an army, was not attached to an influential institution of learning, had only 12 learners (disciples), preached for only three years and was executed. His followers were persecuted for three centuries. Yet, Christianity became the most potent movement the world has ever seen, crossing linguistic, cultural and social borders, and it has been influential in all spheres of human development over the centuries. Also, the Bible was written over a time span of 1300 years in many ancient languages by various authors in different socio-historical contexts. Yet, the biblical revelation is consistent in its messianic message of salvation and renewal.

not follow the idea of different covenants but distinguishes between two manifestations of the one covenant between God and humankind, namely, the universal covenant with creation and the covenant of grace with people. 'These are not different covenants, but different manifestations of the one covenant signifying the development of the relationship between God, humankind and creation' (Vorster 2017:8). The one covenant 'is the internal basis of creation and creation is in turn the external basis of the covenant' (Barth 1969:42). The universal covenant (also termed the 'covenant of works', 'the covenant of nature' or 'the covenant of creation') was established by God, with Adam and Eve as an expression of his love and universal grace and his continuous involvement in the development of the created order. The universal covenant with creation and humankind contains the promise of God's providence, the blessings God has given to humankind, and the liberties and responsibilities they have before God. All creation is under God's providence and humans have the duty to execute the law given by God. This manifestation of the covenant also designates humankind's ability to do justice because of God's 'creational gifts' to humankind. God created the natural law to enable people to do God's will and to exercise their dominium over creation. Thus far, the reference is to my previous publication (see Vorster 2017:5).

The concept of the reign of God and God's covenant with creation and humanity depicts movement in creation. God journeys with creation to a new point in history. Why? This is because creation has become infested with evil. God's bondage to humanity and creation and his relationship with what belongs to him are driven by incomprehensible divine love. The movement has two effects: to liberate creation from destruction, hate and death and to nurture what is constructive, loving and good. Theology and natural sciences can add value to each other's treasures of knowledge by crossing the bridge and sharing ideas about the constant movement in creation.

Such a discourse will immediately be forced to reflect on the reality of evil in the world. Natural sciences struggle with the reality of evil. Many theories about evil in the natural and life sciences have seen the light over the years. The most popular theory maintains that the struggle of species to survive in biological evolution resulted in strife and the urge to destroy and conquer. To survive, the species must destroy. There can be no life without death. Evolution depends on destruction. Human history can be presented as a good example of this theory. Human history is a history of mobility, conquest and strife among people and groups to gain control of the means of survival. The search for survival is then the source of the hostility between the 'in-groups' and the 'out-groups', the 'us' and 'them', and hence the many wars. When theology considers this theory, the first question is: what will be the outcome of this perennial struggle for survival? If this struggle, which forms the basis of evil, is inherent in the environment we are living in, where are we going? Are we on the way to total annihilation? Climatologists are very concerned about the

price humans are paying in the quest for more and better at the expense of the natural environment. Is there any hope?

Just as with the doctrine of creation, the doctrines of sin and salvation in reformed theology offer plausible solutions to consider. Sin emerges because of the human person's revolt against God in an act of disobedience and as a rejection of the call to take care of creation along the lines of the universal covenant. The choice for evil has resulted in an innate nature that is driven by evil – a nature that became inclined to hate God and fellow humans (see Gn 6:5; 8: 21; Jr 17:9; Rm 2:3; 7:23; 8:6; Tt 3:3). Despite the creational gifts of the *sensus religionis* and *sensus moralis,* the human person is inclined to evil. This inclination is the root of selfish claims, of destroying to possess, of oppressing to prosper and of killing to live in abundance. Human history portrays these processes over and over, and science and technology have not been able to change this aspect of human nature. It is amazing how the marvellous technology today sometimes becomes tools of destruction and oppression in the hands of the modern person. Are we more civilised than people 3 000 or 4 000 years ago? Technologically yes, but morally no! War has not disappeared; the weapons are better. The innate nature of the human did not change but the tools of destruction improved.

Reformed theology built the doctrine of salvation and Christology on the confession of the total depravity of the person. Although bestowed with the creational gifts of the *sensus divinitatis* and the *sensus moralis*, humans do not have the ability to shake off the innate inclination to evil. They cannot change, they must be changed. Question and Answer eight (8) of the Heidelberg Catechism articulate this foundational belief (Christian Reformed Churches 2011a):

> Q & A8
> Q: But are we so corrupt that we are totally unable to do any good and inclined towards all evil?
> A: Yes, unless we are born again by the Spirit of God (Gn 6:5; 8:21; Jb 14:4; Is 53:6 Jn 3:3–5). (Lords Day 3)

God's redemption of humankind and creation in the midst of the realm of evil offers another plausible argument for reflection in the science-faith discourse, because it sheds light on the cause and direction of the movement in creation.

Collins (2007:21), following the footsteps of Lewis (1952:21), raises from the side of natural sciences the argument of the existence of the Moral Law in humans as proof of the existence of God and his involvement with the person. He contends that in contradiction to other species, humans can be altruistic; in other words, they would sacrifice to save. For example, when a toddler falls into a deep swimming pool, bystanders will have the natural inclination to save the child. This inclination does not depend on religious or cultural values but is part of human nature. Where does this inclination come from? In Lewis's view, this inclination cannot be regarded as part of evolution but must be attributed

to God's creation of the human being. His idea corresponds with the reformed theology's notion that God bestows the created person with the gifts of *semen religionis* and *sensus moralis* for the reasons explained earlier. He raises a valuable point that can serve as another bridge in the faith-science discourse.

Besides the concepts of creation-origin and God's sustenance-ongoing evolution as bridges between faith and science, the future and end of the universe and life on Earth could serve as another bridge in the discourse. Some remarks about the restorative work of God may be of value in this respect.

God restores

God is involved and under way with creation. Romans 8:18–27 pictures creation as a groaning entity 'as in the pains of childbirth'. Humans are also groaning, waiting for redemption. But in this process, the Spirit of God is also groaning 'with groans that words cannot express'. However, the groaning creation is on the move to full restoration. Eschatology is a foundational theme in reformed theology and the basis of hope as Moltmann reminds us in his seminal *Theology of Hope* (see Moltmann 1965). History will end with the consummation when creation will be totally liberated from evil and restored to its full beauty just as God created it. As there was a beginning, there will be an end to this reality and a new beginning – a new heaven and earth.

Natural science in the late 20th century moved from the notion that the universe has no beginning and no end to the Big Bang theory that holds that the beginning of the universe was according to calculations about 14 billion years ago (Collins 2007:64). The theory flows from evidence gained by Hubble when he investigated the movement of galaxies away from our own. This theory was refined by cosmologists and mathematicians afterwards as new inventions became available. Today, the consensus in natural sciences is that there was a beginning. I suggested earlier in this chapter that theology's idea of the beginning and the new natural scientific idea of a beginning could be a regarded as an important bridge in the faith-science discourse.

What should we make then of the notion of an end as the theological concept of Eschatology advocates? Collins (2007) says:

> A currently unanswered question is whether the Big Bang has resulted in a universe that will go on expanding forever, or whether at some point gravitation will take over and the galaxies will begin to fall back together, ultimately resulting in a Big Crunch. Recent discoveries of little-understood quantities known as dark matter and dark energy, which seem to occupy a very substantial amount of the material of the universe, leave the answer to this question hanging, but the best evidence at the moment predicts a slow fade, rather than a dramatic collapse. (pp. 65–66)

The hypothesis of a Big Crunch and the belief in a new heaven and earth could serve as another bridge between natural science and theology. Not much has

been published in this respect, especially from the side of theology; however, at this point of time, the natural scientific hypothesis of and end because of the Big Crunch could be appraised as another example of how God's revelation in nature and history can be discerned by scientific research. The concept of an 'end' (and a new beginning), immanent in God's restorative work, provides further evidence of God's beautiful book for everyone to see and to read. 'The ideas of an 'end' in theology and natural sciences' is a topic that should also be debated in the faith-science dialogue.

Conclusion

Arguing from the premise that all science is paradigm-driven and that theology is not below reason, I conclude at this stage that the faith-science discourse can be beneficial for both natural sciences and theology when they approach reality and seek new knowledge as equal partners in an interdisciplinary debate and make use of all the capacities and realities of the human being – reason, faith, experience and context. I stated as my central theoretical argument for this contribution that such a mutual understanding is, indeed, possible when the classical reformed theological confession concerning knowledge about God and the means to come to this knowledge are revisited and applied to the faith-science discourse today. These confessions profess the existence of God, and humans can know him through his self-revelation in nature and his revelation in the written Word.

As equal partners in the process of studying God's revelation, theology and natural sciences can build bridges in the faith-science discourse, and the following four theses could form a framework for bridge building:

- The postmodernist assumption about the metatheories of theology and natural sciences.
- The mutual hypothesis that there was an origin in the development of the universe and everything it contains.
- The mutual hypothesis that there is movement and direction in all spheres of reality.
- The growing hypothesis in cosmology that reality is steering to an end.

Within this framework, other issues, such as evil, suffering, altruism, conscience, beauty, life and death, love and hope, can be debated. The confession of nature as God's 'most beautiful book' makes it possible for theology and natural science to assist each other in the quest for new knowledge about the origin, essence and future of the world we are living in.

Chapter 2

The biblical creation account (Gn 1) as ancient science

Konrad Schmid
School of Historical Studies,
Faculty of Theology, University of Zürich,
Zürich, Switzerland

Introduction

There are three items of common knowledge about the biblical creation account: firstly, God created the world in seven (7) days; secondly, this took place approximately 6000 years ago; and thirdly, this account is factually incorrect according to modern scientific insights (Benz 2009). In its essence, there is nothing wrong about both the summary of the chronology of the biblical cosmogony and its assumed age of the world, as well as the assessment of it from a scientific point of view. At the same time, this perspective does not exhaust the potential of such a biblical text.

Even though the position of American creationists or proponents of so-called intelligent design is impossible to maintain, one must not dismiss too rashly that there is a scientific aspiration behind the biblical creation account (Weder 2008). Of course, we can confidently say that the current

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knowledge of astrophysical theory about the origin of the world by far exceeds that of the time during which the biblical texts were written. However, two issues ought to be taken into account nevertheless: it can be shown clearly that, in a functional sense, the line of argument and the aspiration for the understanding of the biblical creation account could be regarded as coming close to being 'science', if it is considered on its own terms from a historical point of view (Pichot 1995; Schmid 2015; Schmid & Uehlinger 2016). Moreover, we can safely assume that also the modern theories of cosmology are bound in time and will become obsolete sooner or later.

If we consider the manner in which the biblical text describes creation against the prism of science in antiquity, it becomes clear on the level of methodology that we should not treat these texts any differently than any other ancient source (Rogerson 2001). The Hebrew Bible is a product of the ancient Near East and was exposed to the influences of its cultural and intellectual history. While noting this circumstance still had the potential to enrage the scholarly community only 100 years ago, it has become commonly agreed upon since (e.g. Hartenstein 2009; Tilly & Zwickel 2012). Today, there is a consensus that the literary production in ancient Israel was not *sui generis* and was the result of an exclusive divine revelation to Israel. Rather, these texts, which would become the holy scripture of both Judaism and Christianity, are rooted in manifold ways in the cultural history of the ancient Near East. There are a multitude of cases where there was engagement with and reception of other ancient Near Eastern sources and ideas, while the biblical texts, in turn, also exerted influences on the literature outside of the land of Israel. Modern scholarship views the innovative force of the Bible not in its materials themselves but in the manner in which it interprets pre-existing materials (Schmid 2011b, 2021a).

The creation account of Genesis 1 in its literary context

The structure and intellectual framework of Genesis 1

Genesis 1 is arguably one of the best-known texts not only in the Bible but also in the world literature, in general (cf. ed. Schmid 2012:71–120; Schmid 2015). However, there are two common fundamental misconceptions, which are quite detrimental to understanding it well. One is that Genesis 1 is often read as though it was a text standing on its own. In fact, it was never an independent entity but rather the beginning of a larger literary unit, the so-called *Priestly Code* (P) (cf. De Pury 2007; Hartenstein & Schmid 2015; eds. Shectman & Baden 2009). Modern scholarship assumes that the Torah, the first five books of the Hebrew Bible, were composed of different sources that were redactionally linked and expanded, and P is the most important and

prominent of these sources. To be sure, P is a reconstruction, and we do not have this text any longer, except as a part of the current Torah. However, P is a generally accepted hypothesis in biblical research, and therefore, a legitimate starting point.[9] The text of P extends at least through the books of Genesis and Exodus, and contains an account of the development of central cultic institutions, regulations and ways of life, which are derived from the history of the world and the history of Israel from creation up to Israel standing at Mount Sinai. Given this *introductory* nature of Genesis 1, any interpretation of this text must fall short if it fails to take into account the intricate connections of the creation account with the rest of P.

Secondly, the somewhat peculiar arrangements in the world described in Genesis 1, notably that both animals and humans only eat vegetarian food and that they coexist peacefully alongside each other, have been taken to convey a moral paradigm, especially by ecologically minded ecclesiastical groups. They take this primal state of humans and animals to be a normative guideline for the present. While Genesis 1, in its literary and historical contexts, certainly seems to establish the killing of animals and humans as one of the fundamental problems in the world, it should not be forgotten that we are dealing with a narrative text, which does not contain admonitions but tells a story. Both these misconceptions need to be considered and avoided in the following (see also Schmid 2019:304–326).

Genesis 1 reports how God created the world in seven (7) days. In the first six (6) days of creation, there are eight creative acts. The exact number of these acts can be established by the formulaic structure that the text uses, that is, the naming of created things and the divine approval of them ('and God saw that it was good'). The following are the units within this creation:

1. the separation of light and darkness, which constitutes 'day' and 'night'
2. the creation of a firmament, which is called 'heaven'
3. the gathering of the waters under the firmament, separating 'land' and 'sea'
4. the creation of plants
5. the creation of lights on the firmament, namely the sun, the moon and the stars
6. the creation of aquatic animals and birds
7. the creation of land animals
8. the creation of humanity.

This discrepancy between eight acts and six days of creation has compelled some interpreters of the text to regard the arrangement of creation in six days

9. For a discussion of the current state of research on the composition of the Pentateuch, cf. e.g. Dozeman, Schmid and Schwartz (2011), Römer (2012), Gertz et al. (2016), Kratz (2016), Dozeman (2017). It should be noted that the thought about creation in the Bible emerged relatively late in the history of religions, cf. Schmid (ed. 2012) and for the first epigraphic attestation Avigad (1972).

to be a secondary addition to the text in a literary critical or tradition historical sense, arguing that one would expect a coherent author to have arranged for the text to describe one creative act per day, that is, six acts in six days. However, such lightly-argued speculations can be clearly falsified, as shown by Odil Hannes Steck in a ground-breaking study from 1975, which still constitutes the most important perspective on the matter (Steck 1975; Gertz 2018:26–79; Smith 2010). Already from considerations of cultural history, it becomes probable that Genesis 1 relied on pre-existing traditions. Indeed, spreading out eight creative acts over six days is deeply meaningful, as Steck has shown, and not solely the result of a poor attempt to balance traditions that the text transformed. Initially, we should note that, on a purely numerical level, the eight acts are not divided at random, but appear in a particular order in the account of the six days of creation (see Table 2.1).

Genesis 1 arranges the creative acts in a consistently repeated pattern: 1:1:2. Their content indicates that this is, in fact, more than the result of aesthetic playfulness, as the formal division between the two units after Day 3 is also of fundamental significance on the level of substance. It becomes apparent that there is a correspondence between the second and the fifth day of creation, as well as the third and the sixth day of creation. On Day 2, God creates the heavenly firmament, separating the waters above and below it, thus creating the habitat for both birds and aquatic animals, which are created on Day 5. Likewise, the gathering of the waters in the sea, which makes dry land appear on Day 3, brings about the habitat of the land animals and humans that are created on Day 6. This connection also explains why the plants are already created on the third day, thus being older than the luminaries in the structure of Genesis 1. Without them being connected to the dry land from the beginning, the Earth could not have been regarded as a habitat for lack of vegetation.

Besides this connection of the creation of living creatures to their habitats on the second and third days, as well as the fifth and sixth days, the correspondence between Days 1 and 4 is rather obvious. While the general structure of the day, and thus also measurable time more generally, is established through the division of light and darkness on Day 1, this structuring

TABLE 2.1: Six days of creation.

Day	Act	Creation
Day 1	One act	• Division of day and night
Day 2	One act	• The heavenly firmament
Day 3	Two acts	• Division of land and sea • Plants
Day 4	One act	• Luminaries
Day 5	One act	• Aquatic animals and birds
Day 6	Two acts	• Land animals • Humanity

of time stands at the centre of the creation of the luminaries on Day 4, which function as 'signs for seasons, and for days and years' (Gn 1:14).

Genesis 1 thus describes the fundamental aspects of the order of time and life as a result of the creation of the world. At the conclusion of the sixth day, Genesis 1:31 recapitulates: '[a]nd God saw everything that he had made, and behold, it was very good'. 'Good' should here be taken in the sense of indicating a functional usefulness of creation for life. Along the lines of the generally rather functional connotations of the Hebrew adjective *ṭōb* [good], *ṭōb mᵉʾod* [very good], here means that creation is primarily oriented towards enabling flourishing life (Höver-Johag 1982).

The openness of the context of Genesis 1 and its continuation in Genesis 6–9

We need to remind ourselves that Genesis 1 does not result in the creation of the realities of life for humans and animals as they can be perceived today or when the text was written. The world of Genesis 1 *resembles* ours in many respects, but it is *not identical* with it. While the cosmology and biology of Genesis 1, in general, correspond with the circumstances of how the world was and is experienced, its essential arrangements of order are notably different. For instance, the notion of an exclusively vegetarian diet of both humans and animals differs from the usual habits in both antiquity and modernity. In this sense, Genesis 1 paints a picture of an *idealised* world (Janowski 2012). At the same time, the following literary context shows that this ideal state did not last for very long. Genesis 6:11–13 describes how God's assessment of creation was quickly turned on its head (see Box 2.1).

Genesis 6:11–13 establishes that the creation, which had initially been regarded as 'good', was compromised because of the corruption of the Earth by violence [*ḥāmās*]. The term *ḥāmās* primarily connotes 'violence against another's life', and in this context, especially envisages bloodshed (Gesenius 2013:367, in more detail Schellenberg 2011:45). The group of concern, *kål bāśār*, 'all flesh', in its biblical sense has both humans and animals in view.

BOX 2.1: Genesis 1:31 and its reversal in Genesis 6:11-13.

Genesis 1: 31	Genesis 6:11–13
And God saw everything that he had made, and behold, it was very good.	And the earth was corrupt before God, and the earth was full of violence [*ḥāmās*]. And God saw the earth, and behold, it was corrupt, as all flesh had corrupted its ways on the earth. And God said to Noah: The end of all flesh is coming before me, for the earth is full of their violence. And behold, I will destroy the earth.

It excludes fish, however, which in the Bible are not grouped as 'flesh' and therefore – rather understandably – are not subject to punishment in the flood. Contrary to some rather widespread, yet misleadingly narrow interpretations of this text, it should be emphasised that Genesis 6:11–13 sees the fault for the flood not solely with humanity but equally with humans and animals, who have equally engaged in bloodshed (Stipp 1999).

The re-arrangement of creation after the flood in the divine speech of Genesis 9:1–6, then, deals precisely with this issue of violence and mutual bloodshed (Janowski 2012; Schellenberg 2011:60–67; see Box 2.2).

Genesis 9:1–6 takes up what Genesis 1:28–30 says about humans ruling the Earth and its dietary sentiments, but modifies them insofar as the rule over the animals now carries negative undertones, while the consumption of meat is now permitted. Humans are now allowed to eat land animals, birds and fish, besides vegetarian food. The diet of the animals is not explicitly dealt with; however, the text seems to approve tacitly of animals eating meat as well. Only for those cases where animals, or humans for that matter, turn against other humans and *human* blood is shed, a death penalty is put in place.[10]

The permission to eat meat and the introduction of a death penalty are the central issues in respect to which Genesis 9 is a modification of the order of creation that was established in Genesis 1. Only with this amended order of Genesis 9, the text establishes a reality that corresponds to the historically experienced world. To put it more pointedly, the biblical creation account does not end with Genesis 1, or indeed Genesis 1–3, but extends at least until Genesis 1–9.

The insight that Genesis 1 is an 'open text', which is geared towards and dependent on being continued in Genesis 6 and 9, can be shown by considering a small detail within Genesis 1, namely the blessing motif (Leuenberger 2004:384–392). We can find this motif in two instances in Genesis 1, that is, in vv. 22 and 28, while Genesis 2:3 also speaks of the blessing of the seventh day. In Genesis 1:22, we find the blessing of the aquatic animals, whose creation had been described in the previous verse: '[*a*]nd God blessed them, saying: "Be fruitful and multiply, and fill the waters in the sea, and the birds shall multiply on the earth"'. Curiously, the birds do not seem to be blessed here.

10. The way in which Genesis 9:6a is phrased leaves some uncertainty as to who ought to execute the death penalty: '[*i*]f one sheds the blood of a human, his blood shall be shed by a human / according to the value of a human'. The answer to this question depends on how one renders *bā'ādām* in the Hebrew. The Hebrew preposition *b* can either be read as a *b instrumentalis*, that is, 'by a human' or as a *b pretii*, which would be translated as 'according to the value of a human'. The structure of Genesis 9:6a suggests that the latter is more plausible in order to show that there is a correspondence between the human blood that is shed in the first half of the verse and the blood which is referenced in the second half. We can then take the passive voice ('it shall be shed') to be a *passivum divinum*, that is, that God is the executioner of the death penalty. But both possible meanings cannot be fully separated from each other (Zehnder 2010).

BOX 2.2: Genesis 9:1-6 modifies the creation order of Genesis 1:28-30.

Genesis 1:28–30	Genesis 9:1–6
And God blessed them, and he said to them: 'Be fruitful and multiply and fill the earth and have dominion over it, and rule over the fish of the sea, and the birds of the sky, and every animal that creeps on the earth'. And God said, '[b]ehold, I have given you every plant yielding seed that is on the face of all the earth, and every tree which has fruit on it yielding seed. They shall be food for you. And to every animal of the earth, and to every bird of the sky, and to everything that creeps on the earth, which has the spirit of life in it, I have given every green plant as food'. And it was so.	And God blessed Noah and his sons, and he said to them: 'Be fruitful and multiply and fill the earth.' And the fear and terror of you shall be on every animal of the earth, and on every bird of the sky. They are given into your hand with all that creeps on the ground, and with all the fish of the sea. Everything that creeps which has life shall be food for you like the green plants I give everything to you. But you shall not eat the flesh with its soul, [that is] its blood. But surely the blood of your spirit I will require from you. From every animal I will require it, and from every human, from the brother of a man I will require the spirit of a man. If one sheds the blood of a human, his blood shall be shed according to the value of a human, for God made humanity in his image.

The divine speech addresses the aquatic animals in the second person, while it shifts to the third person when speaking about the birds ('the birds shall multiply on the earth'). Do the birds not get a blessing?

This oddity is certainly in correspondence with the second blessing, which is set during the sixth day, which shows this peculiarity to be at least in keeping with the structure of the other example. In Genesis 1:28, only the humans are being blessed, of whose creation we learn from Genesis 1:26ff. while the land animals were also created on the sixth day (Schellenberg 2011):

> [*A*]nd God blessed them [*i.e. the humans*], and he said to them: 'Be fruitful and multiply and fill the earth and have dominion over it, and rule over the fish of the sea, and the birds of the sky, and every animal that creeps on the earth'. (pp. 46–59)

The verse does not say anything about the land animals that had been created on the same day? Do they also not get a blessing?

Indeed, Genesis 1 seems to develop the notion that humans and aquatic animals are the only living creatures that are being blessed.[11] Why is that? An answer can be found by considering how Genesis 1 establishes a structure of the word: The sky, the sea and the vegetated land are created on Days 2 and 3, with the creation of birds, aquatic animals, land animals, hand humans on Days 5 and 6 in view, for whom they serve as habitats. Now, it should be obvious that one of these habitats can only be inhabited by the aquatic

11. Plants were not regarded as living beings, but are counted as furnishing in the logic of Genesis 1.

animals, namely, the sea, over which they accordingly have dominion. While the birds exclusively populate the sky, they are nevertheless dependent on the land for food consumption and procreation. Thus, the land must be shared between the birds, the land animals and humanity. Accordingly, a problem emerges in the text's conception of order: As not every group of creatures has a habitat that they can inhabit exclusively, there is a potential for conflicts. Even though Genesis 1:31 characterises the creation at large as 'very good', its order seems to remain a vulnerable one. The lack of a blessing for birds and land animals thus seems to make a conscious reference to this issue: Humanity receives its blessing at the expense of the birds and land animals with whom they share their habitat. Only in Genesis 9, we learn of the implications of this discrimination, namely, that they are given to humanity as food.

Even from Genesis 1 itself, we can see that the initial account maps out a utopian *Gegenwelt*, whose inherent instability allows for the development at whose end we encounter the more stable *Lebenswelt*, which we ourselves can experience. Genesis 1–9 tells us of the *evolution* of creation, that is, of its development up to the ambivalent nature in which we find ourselves. Especially in light of modern discourses, it is remarkable that evolution seems to have been an important intellectual category already in attempts to understand the world during antiquity. Admittedly, this phenomenon is linked with ancient mythological thinking, which unfortunately cannot be discussed in further detail here (cf. Waschke 2001). It should just be said that, like other items of ancient literature, the Bible frames questions of nature as questions of origin, which is why the description of the nature of the experienceable world is presented as the result of a process of transition from an unstable and unreal original state towards its stable and real state in the present.

The cosmology of Genesis 1–9

Sociomorphic interpretations of reality

We have now established that Genesis 1–9 does not only contain a cosmogony in a *technical* sense, but that this cosmogony is interspersed with aspects of the experienced realities of life. By means of a sociomorphic worldview, Genesis 1–9 explains what the word is and how it became what it is (Topitsch 1958). This worldview does not distinguish in principle between issues of cosmology and sociology, nor between science and theology.

However, there are fundamental differences regarding the permanence or transformation in cosmology and experience in Genesis 1. The cosmological architecture of the world is established once and for all in Genesis 1. Even during the flood, the heavenly firmament does not collapse, only its windows are opened (Gn 7:11). The circumstance that heaven and earth will exist forever is never raised as a question in the Torah; for instance, in Deuteronomy 31:28,

they are invoked by God as apparently everlasting entities in the cosmos to stand as witnesses against Israel. Of course, there are some prophetic and later some apocalyptic texts (esp. Is 65ff.; Schmid 2011a, 2016) that go beyond the cosmological understands of the Torah, but the core of the canon of the Hebrew Bible has no notion of ephemerality regarding heaven and earth.

On the contrary, there is a fundamental change in the experienced order of life during the narrative development of Genesis 1–9 that concerns the relationship of humans and animals. The original arrangement of a peaceful coexistence of vegetarians within the same habitat does not last very long. This change, however, is rather predictable, as we have seen in the discussion of the blessing motif. The order of the world is amended in Genesis 9 and may be regarded as a kind of second creation: Humans are now allowed to kill animals in order to eat them, and it is tacitly acknowledged that animals kill other animals.

Another fundamental change occurs in the arrangements regarding the relationship between God and humanity. In Genesis 1:26ff., humanity is created in the image of God [*ṣælæm*] – literally as his effigy –, thus being God's representative and taking on his role of ruling over the world, as is explicated in Genesis 1:28 (Janowski 2004; Schellenberg 2011; Schüle 2006a, 2006b, 2009; Weippert 1998; Wöhrle 2009).

The relationship between God and humanity is thought of as one where no conflicts are anticipated; rather, it envisages a *free* commission. However, this unstable arrangement for the order of the world leads to problems, which are called 'violence' [*ḥāmās*] in Genesis 6:11–13. In the Flood narrative, which constitutes the point of transition between the unreal *Gegenwelt* and the real *Lebenswelt*, the relationship between God and humanity is adjusted, now in *legal* terms. In 6:18, and subsequently in greater depth in Genesis 9, God establishes a covenant with Noah, who is taken to be the representative of humanity: 'But with you I shall establish my covenant [*bᵉrīt*]. Go to the ark, you and your sons, and your wife, and the wives of your sons with you' (Gn 6:18).

The Hebrew term *bᵉrīt* – which is usually translated as 'covenant' – should rather be taken to mean 'treaty', even though this 'treaty' appears in a rather theologised form, as it consists only of a one-sided commitment on the part of God, who now pledges to abstain from violence against the creation. This is explicated in Genesis 9:

> [/] shall establish my covenant with you: Never again shall all flesh be destroyed by the waters of the Flood, and never again shall there be a flood to destroy the earth. (v. 11)

The covenantal pledge is then illustrated through the image of the bow [*qæšæt*], which is hung in the clouds (Rüterswörden 1988).

This treaty motif is already remarkable by itself, as it shows that humanity's relationship with God was thought of in legal terms. There are some important

historical precedents to this in the history of religions, which are presupposed here. Firstly, the Bible's reception of neo-Assyrian vassal treaties must be mentioned, whose dynamics are transposed there to describe the relationship between God and his people. We see this, especially, in the book of Deuteronomy (Koch 2008; Otto 1996, 2012–2016). This theory was further substantiated in 2009, when a copy of a vassal treaty of the king Esarhaddon was found at Tell Ta'yinat near Antakya in southern Turkey. This finding serves as evidence that this kind of vassal treaties, which the Bible adapts, was also used in the western parts of the neo-Assyrian empire and therefore probably also in Judah (Lauinger 2012).

Secondly, we observe a unilateralisation of such treaties. As we can also see in other texts of P, which are critical of Deuteronomy, for instance, the covenant with Abraham in Genesis 17, the treaties contain only a commitment of one of the involved parties, that is, of God.

Finally, we should note the universal dimension of how the covenant with Noah in P envisages the relationship between God and humanity (Schmid 2011b). Considering this from the perspective of political history, we can see that the covenantal theology of Genesis 1–9 exhibits not only neo-Assyrian but also Persian influences. God's treaty with Israel here is no longer only a subversive transformation of contractual practices in the neo-Assyrian empire but reproduces features of the universal, pacifistic and federal world order that came to the Levant in the Persian period.

Disenchanting the world

The first sentence of the Bible in Genesis 1:1 '[i]n the beginning God created the heavens and the earth', which we can take to be the superscription of Genesis 1 (cf. the discussion in Stipp 2013), is so well-known that its theological nuances are often overlooked. Considering the verse from a historical point of view, it is rather clear that the heavens and the earth – which we should read as a merism to denote the entirety of the world, that is, the sum of the heavens and the earth – being established as the object of creation lead to the oddity that the heavens, which are usually regarded as part of the numinous, are here relegated to being part of the created world (Gn 1):

> [*A*]nd God said: Let there be a firmament (*rāqîa*) in the midst of the waters, and it shall separate waters from waters. And God made the firmament, and he separated the waters which were under the firmament from the waters which were above the firmament. And it was so. And God called the firmament 'heavens' (*šāmayim*). (vv. 6–8a)

The heavens are thus no more and no less than a cosmological edifice. This is particularly remarkable in light of the Babylonian traditions, which are made use of in Genesis 1. As has been established for a long time now, the creation account of Genesis 1 stands in proximity to the Babylonian epic

Enūma eliš [When on high],[12] which has – rather misleadingly – at time been called a creation epic, probably not least because of its contact with Genesis 1 (Maul 1998). In fact, it establishes the supremacy of the Babylonian deity Marduk over all the other gods, which is explained through his role in creation. The biblical notion of the world being an air bubble within the cosmic waters seems to have been inspired by *Enūma eliš*; moreover, the Hebrew term for the primeval flood, *t^{e}hōm*, seems to resonate with the proper name *Tiāmat* in the *Enūma eliš*. However, a *direct* etymological relationship between *t^{e}hōm* and *Tiāmat* cannot be established (Bauks 1997:122–124; Waschke 1995).

We can observe in *Enūma eliš* that the gods would inhabit both the heavens and the underworld after they were created (Ee VI, 39–44.79.144). The key difference – besides Genesis 1 speaking of only one God, being a monotheistic text – is that the heavens cannot be the place where God dwells, not to mention the underworld, which is not part of this creation account and accordingly does not exist at all. Rather, God stands *ex situ* vis-à-vis his creation in Genesis 1. He speaks from off stage and cannot be located in cosmological terms (Schmid 2006; Stolz 1996; Zenger 2003).

It thus becomes apparent that the creation and its creator are entirely separate from each other in Genesis 1 (contra Keel & Schroer 2008). God has no worldly properties, and the world has no divine properties. In the traditions of Judaism and Christianity that developed over time, this position has prevailed as the orthodox one, while it remains subject to discussion and relativisation. Especially, there are gnostic and mythical notions that seek to find a 'divine spark' or a 'divine essence' within humanity, which can be expanded by meditation, contemplation or inspiration. The position of Genesis 1 in contrast to these views, however, is very clear. Humanity is part of the created world, and there is nothing divine about its biological substance. This anthropological notion is rather different from *Enūma eliš*, where humans are created from the blood of Kingu, the consort of *Tiāmat*, who is killed by Marduk (Ee VI, 5.31–35).

This radical dichotomy of God and the world, of creation and its creator, necessarily entails a 'disenchantment of the world' – to speak anachronistically with Weber ([1919] 1992:86ff.) – which again has a prehistory in the Mesopotamian tradition. We see this most clearly in the relegation of the heavenly bodies to being mere lamps on the heavenly firmament. Genesis 1:16 deliberately does not use the typical Hebrew words for 'sun' [*šæmæš*] and 'moon' [*jāre^{a}ḥ*], but speaks merely of the 'greater' and 'lesser light'. This might be to avoid any association of the luminaries with the corresponding deities

12. The edition of this text can be found in TUAT III/4 567–602, for the history of research on the connection between Genesis 1 and *Enūma eliš*, cf. Sparks (2007:629 n.11).

but might just reflect astronomical considerations. We return to this in the section 'The reworking of scientific matters in genesis 1–9 in the *Septuagint'*. To think of this in more drastic terms, we could take the way in which Genesis 1 speaks about light to mean that these 'lamps' might even be mere 'reflectors', as the light itself was already created on the first day (Gn 1:3), meaning that it is not an inherent property of the luminaries, which were only created on the fourth day to reflect the light onto the Earth.

The specific worldview of Genesis 1 is likely also the reason for the choice to take divine speech to be the medium of creation (Schmid 2021b). Because of the potency of the Bible in both eastern and Western cultures, the notion of creation by divine speech is no longer seen as an oddity. However, it is a quite revolutionary concept that is developed in this opening chapter of the Bible. On the one hand, we see that God is not a 'demiurge', that is, an 'artificer', in creation, who could physically approach creation to work on or in it. Rather, God is not fundamentally different from his creation that he stands in ontological opposition to it. Nevertheless, he can bridge this gap to tangentially touch upon creation, which can have radical implications. By speech alone, the heavens are created, just like the air, water and land, which serve as the habitat, and the living creatures that are going to live therein. Genesis 1 does not yet envisage a *creatio ex nihilo*, which is first attested in 2 Maccabees 7:28; however, it becomes evident that the entirety of the perceivable world is the result of divine speech. Without it, the world would merely be a wholly senseless and useless 'formless void' [*tohū wabohū*].

On the other hand, the account of creation by speech shows that the structure of creation can be conceptualised in words. It is not merely a conglomeration of random elements but developed step by step through verbal utterances, which makes it readable as though it was a text, while its original state remains no longer immediately accessible.

The stabilisation and pacification of the world

The internal trajectory from Genesis 1 to the covenant with Noah in Genesis 9 – via Genesis 6 – carries a specific theological nuance: For P, to which all of these texts belong, any kind of future divine judgement of humanity is inconceivable. Accordingly, it is certainly appropriate to interpret the bow in the clouds with Rüterswörden (1988) as an *undrawn* war bow, implying that God will henceforth refrain from violence against the world. This divine pacifism is not only remarkable in comparison with the text's ancient Near Eastern context but also in light of other biblical literature. By stating that a divine judgement had taken place once and for all during the primeval history, Genesis 6:13 draws upon quite drastic oracles of judgement in Amos and Ezekiel ('The end has come' Gn 6:13; cf. Am 8:2ff.; Ezk 7:2ff.; Smend 1981; esp. Pola 2013) and breaks them up through this recourse to primordial

times: It argues that the end had already come, namely in the primordial days, which was thus set in the past already at the time when these texts were written. Genesis 9 consists of a distinctly theocratic and non-Eschatological worldview that pervades the entire Torah, but was challenged again in prophetic traditions during the Hellenistic period (cf. Is 26:20ff.; Bosshard-Nepustil 2005).

The international dimensions of the interpretation in Genesis 1–9

The intellectual traditions of Mesopotamia

Based on a number of observations, it can be shown that the text of Genesis 1 was – just like the works of creation which it describes – not a *creatio ex nihilo* but made use of a range of intellectual traditions. Initially, it must be noted that it would be impossible anyway to think of ancient cosmologies as something which was contrived out of thin air. Rather, it must be expected that any kind of notion about the origin of the world that written down drew upon earlier traditions on the subject and grappled with them. This, too, is the case in Genesis 1: Genesis 1 is not the ingenious fiction of an author but reflects the state of the art of cosmological thinking of its time (Kratz & Spieckermann 1999; Seebass 1996:93ff.).[13] The intellectual horizon for this was apparently the entire intellectual and cultural realm in the ancient Levant, ranging from Mesopotamia to Greece, which can be shown in great detail.

A first hint can be found in the description of the world *prior* to any creative activity in Genesis 1:2: '[a]nd the earth was a formless void, and darkness was upon the primeval flood, and the Spirit of God was hovering above the waters' (Bauks 1997).

This description in Genesis 1:2 is somewhat enigmatic; however, it becomes evident that the text draws upon ideas of Babylonian origin, as was already observed by Hermann Gunkel ([1901] 1964). The initial state of the world is entirely liquid, and one might think of it as a gigantic flood. It was a cornerstone of regular experience in Mesopotamia that life was impossible where there was flooding and that waters had to be controlled in order to establish good living conditions for plants, animals and humans. Flooding was not, however, commonly experienced in Israel. Jerusalem, which was the centre of ancient Israelite scribal culture, is situated 800 m above the sea level. While there is some precipitation in the region, there was no potential for flooding of such a level that it would become part of accounts of cultural tradition.

13. Cf. also Hvidberg (1960). Some connections to the Gilgamesh tradition have been noted by Steymanns (2010a, 2010b). On comparative studies within the Hebrew Bible, cf. Jeremias (1990) and Kratz and Spieckermann (1999).

On the contrary, we can see in Genesis 2, the beginning of the second creation account, how the initial state of the world was conceived of in domestic Israelite traditions:

> [*O*]n the day when God made the heavens and the earth, before all the bushes on the field were on the earth, and before all the grass of the field had grown – for YHWH Elohim had not yet let it rain upon the earth and there was not yet any human to work on the dry ground – a mist would rise from the earth and water all of the dry ground [...]. (vv. 4b–6; author's own translation)

In this chapter, we find the opposite set of preconditions: the world was originally completely dry and was in need of irrigation in order for there to be a potential for life.

This general impression that Genesis 1:2 reflects Babylonian perspectives can be further substantiated. We have seen that the Hebrew term for the primeval flood is *t^{e}hōm*. It is intriguing that this term appears in Genesis 1:2 without the definite article, which we would expect here. Accordingly, it appears as though it is used like a proper name, as only proper names do not take the definite article in a definite noun phrase.

It is notable then that the word '*t^{e}hōm*' rather sounds like the proper name *Tiāmat* in *Enūma eliš*, which is used there to describe a goddess which is the embodiment of the waters of chaos, besides being able to assume the form of an animal. Philologically, it is impossible to derive *t^{e}hōm* directly from *Tiāmat* (instead, we would rather expect *t^{e}'ōmāh* in Hebrew); however, the thematic similarity as well as the assonance of the words makes it quite plausible that both at least go back to a common tradition of Babylonian origin.

The term *t^{e}hōm*, moreover, suggests not only a general link to Babylon but more specifically to Babylonian cosmological knowledge. *Enūma eliš* contains rather detailed cosmological thinking. For our purposes here, it is notable that it views the cosmos as an air bubble surrounded by water, in correspondence with Genesis 1, while the Babylonian model is far more complicated and differentiates between several discrete levels within the heavens and the earth.

Another classical example that is common to ancient scientific thinking which is picked up on in Genesis 1 is the creation of the sun, the moon and the stars, which we touched upon earlier.

Genesis 1:16: 'And God made the two great lights, the greater light to rule the day, and the lesser light to rule the night, and also the stars'.

We have already seen that this passage can be understood to be critical of ancient Near Eastern mythology, as Genesis 1 avoids the typical Hebrew words for the sun [*šæmæš*] and the moon [*jāre^{a}ḥ*], which were also used as names for the corresponding deities in north-west Semitic contexts.

In contrast, Genesis 1 deliberately speaks only of the greater and the lesser light so as to circumvent the theological potency otherwise associated with the luminaries.

While this is correct to some extent, it is notable that the lamp metaphor is not original to Genesis 1 but already attested in a commentary to the epic *Enūma eliš* from the seventh-century BCE (Gertz 2009, KARKAR 307). Livingstone (1989) describes it as follows:

> The middle heaven, made of *saggilmud*-stone, is that of the Igigi gods. Bel sits there in a high temple on a dais of lapis lazuli and has a lamp of electrum, and alloy of gold and silver, which shines there. (pp. 32, 39)

This shows that the term 'greater light' is not solely a biblical critique of Babylonian mythology but, in fact, a borrowing of Babylonian thought on cosmological matters. This makes it sufficiently plausible that Genesis 1 does not polemicise *against* Babylonian science but rather adopts it.

There are a series of motifs and ideas in Genesis 1, which indicate that this text engages in a discourse with the intellectual traditions of Mesopotamia. These include that the original state of the world is being covered by water, the term *t^{e}hōm*, the notion of the world as an air bubble and the conceptualisation of the heavenly bodies as lamps.

Connections to the pre-Socratics

It is even possible to go one step further and consider other scientific discourses, namely Greek ones, which may have been integrated into Genesis 1, although ascertaining this relationship of traditions is rather difficult. Nevertheless, some points of contact are rather notable (Gertz 2009; see also Halpern 2002a, 2002b, 2003). They show that Genesis 1 does not only follow one foreign tradition, that is, that of Babylon, but also engages discourses of scientific thinking that span the entire known world of the time, by critiquing and participating in them. We can probably not prove that there were any direct literary dependencies but we can see a mutual awareness of the traditions and the objects of their enquiries.

For instance, we find a quite enlightening approach to explaining the light of the heavenly bodies in the work of the pre-Socratic philosopher, Anaximander (610–546 BCE) (DK 12 A 11, Gemelli-Marciano 2007):

> The heavenly bodies came about as a circle of fire, which separated itself from the cosmic fire and was enclosed by air. [*On the heavenly bodies*] there are certain tube-like passages, serving as vents, through which they become visible. Accordingly, when these are obstructed, there is darkness. (p. 43)

While comparing this text with Genesis 1, it must especially be observed that Anaximander apparently thinks that the luminaries do not possess their light by themselves, but that it is connected to a primordial light. Likewise, Genesis 1

assumes that the light as such is created on day 1, while the luminaries are only created on Day 4, and that they only reflect the light that was created before, rather than producing their own.

In the work of the slightly later Anaximenes (approx. 585–525 BCE), we find ideas that are rather unspecific, but nevertheless indicate that there was a common scientific discourse on basic cosmological theory in the eastern Mediterranean (Gemelli-Marciano 2007):

> Anaximenes [says] that the heavenly bodies are fixed like nails into the ice-like heaven. But some [argue] that the heavenly bodies are fiery leaves, like paintings. (DK 13 A 14)
>
> He says that the heavenly bodies do not move under the earth, as others have assumed, but around the earth, like a felt hat can turn around our hat. (DK 13 A 7). (p. 79)

Of course, it is quite obvious that the heavenly bodies are thought of as hanging in the sky. It is noteworthy, though, that there are contemporaneous sources from Greece besides Genesis 1 and its Babylonian counterpart, which envisage the technicalities of the arrangement of the luminaries in similar terms, taking them to be gadgets on the heavenly firmament, while conceptualising this firmament itself as a boundary to the waters above it. The second quote above shows that the heavenly bodies were thought of as always being located above the Earth, just like in *Enūma eliš* and in Genesis 1.

Genesis 1 shares the conviction with the pre-Socratics that the heavenly bodies are not self-contained entities but rather gadgets in the sky which pass on a primordial fire, which itself, however, is prior to them. The luminaries are not flying objects but affixed to the firmament, which now, however, does not consist of 'solidified matter' as in Genesis 1 but of 'ice'.

The overlap between these concepts is admittedly limited, but nevertheless a connection can be shown, which indicates that there were engagement and mutual discourses between the cultures of the eastern Mediterranean. Ancient science, accordingly, was not a regional endeavour but rather subject to intercultural exchange about theories, which at times would converge on each other.

The reworking of scientific matters in Genesis 1–9 in the *Septuagint*

There are two conspicuous aspects about the translation of Genesis 1–9 into Greek, which show that the progress of scientific discourses in antiquity continued to shape aspects of the biblical creation account.

The prolongation of the history of the world in Genesis 5

From a Greek perspective, the biblical calculations as to the beginning of the world leave rather too short a time span to find time for the plethora of their mythological traditions set in primordial and early history. This is why the Septuagint raised the age at which the 10 primordial forefathers in Genesis 5 begot sons by 100 years each, adding 1000 years to the age of the world in its tradition. We can see this by just considering one randomly selected example from this passage, namely Genesis 5:6–9 (Box 2.3).

Seth died after a lifetime of 912 years (Gn 5:8) in both the Hebrew and the Greek versions of the text. However, he is told to have begotten his son Enosh 100 years later in the Greek version than in the Hebrew version at the age of 205 years instead of 105. This stretches out the overall chronology of the generations, which is tied to the begetting of children, from generation to generation by 100 years. Accordingly, after having made this change for 10 generations, the world is now overall 1000 years older. The Greek chronology of Genesis 5 aims at harmonising the underlying Hebrew tradition with the Greek worldview that more elaborated the events that were assumed to have taken place in the pre-diluvial age. Thus, Genesis 5 in its Greek version opens itself to the international system of ancient knowledge.

Genesis 1 and Plato's Timaeus

Another piece of evidence for the cultural contact with Greece can be found in the terminology that the Septuagint uses in Genesis 1. In it, there are

BOX 2.3: Genesis 5:6–9 in Greek (LXX) and Hebrew (MT).

Original passage	Translated
ἔζησεν δὲ Σηθ διακόσια καὶ πέντε ἔτη καὶ ἐγέννησεν τὸν Ενως	Genesis 5:6 LXX: And when Seth was 205 years of age, he begot Enosh.
אֶת־אֱנוֹשׁ׃ וַיּוֹלֶד שָׁנָה וּמְאַת שָׁנִים חָמֵשׁ וַיְחִי־שֵׁת	Genesis 5:6 MT: And when Seth was 105 years of age, he begot Enosh.
καὶ ἔζησεν Σηθ μετὰ τὸ γεννῆσαι αὐτὸν τὸν Ενως ἑπτακόσια καὶ ἑπτὰ ἔτη καὶ ἐγέννησεν υἱοὺς καὶ θυγατέρας	Genesis 5:7 LXX: And after Seth had begotten Enosh, he lived for another 707 years, and he begot sons and daughters.
שָׁנָה מֵאוֹת וּשְׁמֹנֶה שָׁנִים שֶׁבַע אֶת־אֱנוֹשׁ הוֹלִידוֹ אַחֲרֵי וַיְחִי־שֵׁת וּבָנוֹת׃ בָּנִים וַיּוֹלֶד	Genesis 5:7 MT: And after Seth had begotten Enosh, he lived for another 807 years, and he begot sons and daughters.
καὶ ἐγένοντο πᾶσαι αἱ ἡμέραι Σηθ ἐννακόσια καὶ δώδεκα ἔτη καὶ ἀπέθανεν	Genesis 5:8 LXX: And the whole lifetime of Seth was 912 years, and then he died.
וַיָּמֹת׃ שָׁנָה מֵאוֹת וּתְשַׁע שָׁנָה עֶשְׂרֵה שְׁתֵּים כָּל־יְמֵי־שֵׁת וַיִּהְיוּ	Genesis 5:8 MT: And the whole lifetime of Seth was 912 years, and then he died.

MT, Masoretic text; LXX, Septuagint.
Note: The left column of the table contains both Greek and Hebrew text, the Greek appearing above the Hebrew in each instance.

terminologies and implied conceptual notions that are borrowed from Plato's *Timaeus*, apparently aiming to harmonise biblical and platonic cosmologies (Rösel 1994:31, 36, 60, 81–87). According to the Septuagint, the world that is described in the Bible is no different from that of Greek philosophy and science. We first consider the proximity to *Timaeus* in Genesis 1:2: The Septuagint renders the original state of the world prior to creation – which in the Hebrew is described as *tohū wabohū* [a formless void] – as *ἀόρατος* καὶ *ἀκατασκεύαστος* [invisible and unformed], likely hinting at the distinction between a material world and a world of ideals which we find in *Timaeus*. Moreover, we can explain the rendition of *rāqîa* [firmament] as *στερέωμα* [firm frame] in the same vein, as the corresponding adjective *στερεός* [firm, solid] is used repeatedly in the *Timaeus* in connection with heavenly bodies (31b; 43c et al.). Not only the Hebrew but also the Greek version of Genesis 1 is eager to present itself as ancient science and to live up to its international standards.

Conclusion

If we want to think of the world in a broad sense, we can speak of an attempt in Genesis 1–9 to interpret the world in a holistic way, which strives to establish connections between the fundamental circumstances and principles of order that extend to the world, humanity and God. This account is aetiological in principle and reaches its preliminary end point in Genesis 9, which does not fix everything in perpetuity but does set down the central features of creation. Its result is the *Lebenswelt*, at which creation arrived after *its* primordial evolution. According to Genesis 1–9, this world is governed by a God who has himself arrived at the end point of *his* evolution and became a reliable, yet distant ruler of an ambivalent, pluralistic world, which in its essence corresponds to the experienced reality of the early Persian period, that is, the time of the authors of P during which they developed their idea of a theocratic end of history (De Pury 2007). Genesis 1–9 may be termed to be a 'mythological' account from a today's perspective (which is even true given its own genre; see Lohfink 1978; Pola 2013; Schmid 2018). Interpreted in its own time, however, it is rather a contribution to ancient science, explaining how the main constituents of the world came to be and how they are structured and organised.

Chapter 3

Evolutionary creationism and human origins

Andrew Loke
Department of Religion and Philosophy,
Faculty of Arts, Hong Kong Baptist University,
Hong Kong

Introduction

Different Christians have different views concerning the creation–evolution controversy. In this chapter, I provide an overview of different responses to this controversy. I begin by distinguishing different views concerning evolution, before considering the compatibility of Evolutionary creationism with the biblical account of human origins. Many have rejected the latter because evolutionary population genetics apparently indicate that the genetic diversity of current *Homo sapiens* requires that they descended from a large population rather than from a single ancestor. I demonstrate that this rejection is unwarranted by formulating a model of human origins.

Overview of responses

By 'evolution', I mean the process by which the present living organisms came from a common ancestor ('macroevolution').

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The notion of evolution should be distinguished from the other following notions of evolution:

- *Weak Naturalistic evolution*, which affirms macroevolution and claims that a natural process is sufficient to explain how the present diversity of living organisms came from a common ancestor (without denying that the common ancestor or the universe may be created by God).
- *Strong Naturalistic evolution = atheistic evolution*, which affirms macroevolution and denies that there is a God who is involved at any stage in cosmic history.
- *Deistic evolution*, which affirms macroevolution and also affirms that there is a God who created the universe and perhaps fine-tuned the initial conditions of the universe to such an extent that a common ancestor would form and evolve into other organisms, but does not intervene after the universe is created. This view is inconsistent with the Scripture, which affirms that God acts in creation after the beginning of the universe[14].
- *Theistic evolution or evolutionary creationism*, which affirms 'macroevolution and affirms that there is a God who created the universe and also intervened in the history of the universe' (Ter Ern Loke [2020] 2021:2 of 3). Different interventions have been affirmed by different proponents, for example (see Ter Ern Loke [2020] 2021:2):

  1. God intervenes in the creation of the first common ancestor (the first living thing).
  2. God intervenes in the process of macroevolution.
  3. God intervenes in the creation of the first human.
  4. God intervenes in the acts of special revelation (e.g. resurrecting Jesus).

  For example, Francis Collins acknowledges that there are variants of theistic evolution, but defends a version that affirms 3 and 4 and opens to 1. In particular, he states that (Collins 2006):

  > Humans are also unique in ways that defy evolutionary explanation and point to our spiritual nature. This includes the existence of the Moral Law (the knowledge of right and wrong) and the search for God that characteri[s]es all human cultures throughout history. (p. 200)

  Collins calls on the view of Pope Pius XII who affirms that 'the spiritual soul is created directly by God', an 'enlightened' one (Collins 2006:202). He also writes that 'the precise mechanism of the origin of life on Earth remains unknown' but rejects intervention 2 by stating that 'once evolution got under way, no special supernatural intervention was required' (Collins 2006:200). On the contrary, intervention 2 is affirmed by the American botanist Asa Gray (1876) who used the term 'theistic evolution' in his *Essays and Reviews Pertaining to Darwinism* and argued that a number of beneficial variations were brought about by God.

14. Grudem 2017 argues that the affirmation that God 'rested' in Genesis 2:1–2 implies that there was some special activity of God in the creation of different kinds of fish, birds and land animals portrayed in Genesis 1 from which he rested.

> The contemporary Harvard astronomer Gingerich (2006) has likewise affirmed intervention 2 by arguing that:
>
> > Most mutations are disasters, but perhaps some inspired few are not. Can mutations be inspired? Here is the ideological watershed, the division between atheistic evolution and theistic evolution, and frankly it lies beyond science to prove the matter one way or the other. Science will not collapse if some practitioners are convinced that occasionally there has been creative input in the long chain of being. (p. 69)

Methodological Naturalistic evolution, which affirms macroevolution and denies the scientific detectability of divine intervention in the history of macroevolution. Theistic evolutionists may or may not subscribe to this. Those who subscribe to this would claim that God intervened in scientifically undetectable ways, as Gingerich does when he says in the quote above that 'it lies beyond science to prove the matter one way or the other'. Those who do not subscribe to this would embrace evolution and argue for (say) evidence of intelligent design in biology (e.g. Kojonen 2021).

From the aforementioned clarifications, it is evident that while atheistic evolution involves evolution, it is not equivalent to it. Darwin himself was never an atheist (in various editions of *The Origin of Species* he stated that the first life was created by a creator), and scientists who accept evolution might not accept atheistic evolution.

It is evident with the antecedent clarification that 'evolution' is compatible with divine intervention at the creation of the universe and the first life. Thus, it is understood that evolution is compatible with the cosmological argument for the existence of God (e.g. Loke 2017a, 2022c), teleological argument (e.g. Loke 2022c) and a number of other arguments for Christian theism (Loke 2017b, 2020). It is also compatible with certain projects by proponents of intelligent design, such as arguing that it is improbable that life originated without a designer (e.g. Meyer 2017).

Whether evolution (in particular, human evolution) is compatible with *biblical* theism has been hotly debated, and a variety of responses have been offered:

1. Rejects evolution: Young Earth Creationists (YECs) (e.g. Ham 2017) and progressive creationists (e.g. Ross 2017).
2. Affirms that evolution and Christian theology are compatible but rejects the existence of Adam as a historical individual (e.g. Lamoureux 2013).
3. Affirms that evolution and Christian theology are compatible, accepts the existence of Adam but denies that he is the ancestor of all human beings today (e.g. Walton 2015).
4. Affirms that evolution and Christian theology are compatible, accepts the existence of Adam and affirms that he is the ancestor of all human beings today (Blocher 2009).

The objections which have been raised against responses 1–3 include the following.

Concerning 1, Old Testament scholar John Collins has argued that there could be gaps in the biblical genealogies, Genesis 1:1 can be understood as describing 'the initial bringing into existence of all things,' verse 2 gives the condition under which the first day (Gn 1:3) began and allows for a gap between verses 1 and 2, and the six days are analogical for six durations of time, during which God shaped physical reality to provide a suitable place for humankind to live, to love and to serve (Collins 2018). Given this understanding, the Scripture does not warrant a Young Earth Creationist's interpretation. On the contrary, scientific evidence has been offered for Old Earth and evolution (Rusbult 2008). In particular, on the basis of various methods of calculation that provide multiple independent confirmations, scientists have concluded that the universe is approximately 13.8 billion years old, the Earth 4.5 billion years and *Homo sapiens* at least 300 000 years old. These methods include starlight from faraway galaxies,[15] radiometric dating of rocks from both the Earth and outer space,[16] study of sedimentary rocks, coral reefs, fossil patterns, seafloor spreading and magnetic reversals, volcano layers and annual ice layers, genetic molecular clocks, migrations of life forms (including humans), and dating of Palaeolithic and Mesolithic fossils and tools (for responses to YEC's analysis of the evidence, see Rusbult 2006).

In response to the evidence for Old Earth, YECs such as Ham (2017:67) claim that historical science is fundamentally different and less reliable than experimental science, and that 'all Old Earth origin scientists ignore (or worse, twist) God's eyewitness testimony in Genesis in their efforts to interpret the physical evidence from events of the past' (Ham 2017:212).

Old Earth creationists would object that Ham's statement concerning 'God's eyewitness testimony in Genesis' assumes that the Bible teaches YEC, but this is not proven. Ham's dismissal of the evidence of 'historical science' is unjustified, as explained by Haarsma (2017):

> Historical and experimental sciences are closely tied together. For example, astronomical observations of gasses in galaxies, the light of which originated millions of years ago, are regularly compared to lab experiments on similar gasses today. Genetic methods that have proven reliable in studying today's cancer are the same methods used to measure genetic changes in evolution. (p. 56)

Ham's point concerning 'eyewitness testimony' seems to assume that unless we were there to see it (as he claims God did), we cannot be justified in coming

15. This method uses distances of galaxies and the speed of light to calculate that the light has travelled from distant galaxies for billions of years before reaching the Earth (Gordon 2014; Ross 2017).

16. Gordon (2014) notes: 'There are more than 40 different radiometric dating methods in common use as well as a number of non-radiometric methods, all of which allow for independent cross-checks of the date yielded by any given method.'

to a conclusion; however, the assumption is unwarranted, as explained by Haarsma (2017):

> If no people were there to see it, how can we even study the universe scientifically? The short answer is, using the evidence left behind. A scientist is like a detective who gathers evidence to determine how a crime was committed. Even without an eyewitness, a detective uses evidence such as footprints, DNA, and phone records to build a strong case. Similarly, scientists can piece together what happened from the evidence we measure today. While such historical science has differences from experimental science (one can't bring a galaxy into the lab for an experiment!), it is similar in the most important respects. Just like an experimental scientist, the historical scientist builds a hypothesis, tests it against observations, then modifies the hypothesis as needed. And like the detective, when multiple lines of evidence all confirm the same hypothesis, scientists become confident that we know what happened. Historical science is reliable. (p. 134)

Some YECs have claimed that the universe is young even though it appears to be old, because it was created in a mature state. Others object it is implausible that a God of truth would create a universe with a multitude of evidence that provides multiple independent confirmations of old age when it is in fact young (Rusbult 2006). One might agree with YECs that in some cases, a mature state would have been functionally necessary given their scenario. For example, if God wanted Adam to be able to have dominion immediately as indicated by Genesis 1:26–28, God would have to create Adam as a mature adult rather than as an infant. However, evidence such as starlight coming from 170 000 light-years away indicating a supernova explosion (Rusbult 2006) is difficult to explain from YEC's perspective. Young Earth Creationists might say that God desired humans to observe supernova explosions that declare his glory (Ps 19:1). However, Psalm 19:1 does not indicate that declaring God's glory has to involve supernova explosions. On the contrary, given that God foreknew that scientists would discover supernova explosions one day and calculate an old age on this basis, a 'Young Earth view' would imply that God wanted to mislead us by providing so many independent evidence to the contrary without providing an indication of his intention for doing so.

Young Earth Creationists have also raised the difficulty concerning the existence of creaturely suffering before the sin of humankind portrayed in Genesis 3. For a response to this difficulty, see Loke (2022a:ch. 2). I shall consider whether Christian Theology requires a rejection of evolution below.

Concerning 2, Walton notes that the ancient Near Eastern (ANE) genealogical lists found so far have only included real people, 'consequently there would be no precedent for thinking of the biblical genealogies differently from others in the ancient world. By putting Adam in ancestor lists, the authors of Scripture are treating him as a historical person'[17]

17. Walton 2015:102; contrary to Lamoureux 2013 who acknowledges this but rejects the existence of Adam nevertheless on the basis of Divine Accommodation, such an accommodation does not entail the affirmation of scientific errors; see Loke 2022b.

Concerning 3, this view is inconsistent with biblical verses such as Acts 17:26–31 (Van Kuiken 2015).

A transdisciplinary approach

In what follows, I shall consider the fourth view, viz., affirms that evolution and Christian theology are compatible, accepts the existence of Adam and affirms that he is the ancestor of all human beings today. Defending this view would require a transdisciplinary approach, that is, one that integrates different disciplines (in this case, involving natural sciences, philosophy, history and Christian theology) to create a new methodology that moves beyond discipline-specific approaches to address a problem (Loke [2020] 2021).[18]

It may be asked whether such an attempt to demonstrate the compatibility between science and theology would result in Concordism. There are different definitions of Concordism (Alexander 2017b):

> Concordism Type A seeks to extract modern scientific information from Scriptural passages, such as claiming that Big Bang cosmology can be inferred from Biblical verses in an attempt to prove that 'The Bible taught it first!' Alexander observes that such an approach is very common in the Muslim community with respect to the *Qu'ran* where it is known as *I`jaz `ilmiy* ('miraculous scientific content') theory (Guessoum 2011). For example it is maintained that the speed of light can be calculated from *Qu'ranic* verses, and that other passages reveal the genetic code and the second law of thermodynamics.
>
> Concordism Type B seeks to interpret Scriptural texts in the light of modern science. Concerning Genesis 1, Alexander lists gap theories and day-age theories as attempts to 'impose a scientific understanding on the Genesis text that supposedly bring it into harmony with the geological record. (n.p.)

Types A and B reflect the common understanding of the term 'Concordism' among many scholars. The problem with Concordism Type A is that in every purported case either:

- 'The supposed derivation of scientific insights from religious texts occurs only after the scientific discovery in question, not before' (Alexander 2017b).
- There were a range of possible interpretations and views, and the proponent merely picks and chooses the one that fits our current understanding of science; the foregoing considerations make it dubious whether the Bible or Quran really 'taught it first'; it is more likely that Type A Concordists are guilty of reading meanings into vague texts which can have alternative interpretations.

18. For response to objections based on scientism, radical postmodernism and compartmentalisation (e.g. the Non-Overlapping Magisteria advocated in Gould (2002), see McGrath (2016), Ter Ern Loke (2017a, Chapter 1).

- Similar scientific ideas were already previously known (e.g. to the ancient Greeks).

Wielandt (2002) observes that the scientific method of interpretation did not find general approval among Muslim scholars who object that it is lexicographically untenable as it falsely attributes modern meanings to the *qur'ānic* vocabulary and neglects the contexts of words or phrases within the *qur'ānic* text.

Against Concordism Type A and B, Alexander (2017a, 2017b) argues that it is unhelpful to impose modern scientific meanings onto texts that were never intended to bear such a weight. To interpret any text properly, one should follow hermeneutical principles, such as considering the literary genre, literary context, meaning of words, grammatical relationship, and the background and concerns of the authors (historical, cultural and theological; Klein, Blomberg & Hubbard 2017).

The biblical authors obviously have to use ways of expression common to their era in order to be understandable to their audience. Against those who expect a divinely inspired Scripture to reveal modern scientific explanations ahead of time, Lennox (2011) writes:

> Suppose, for instance, that God had intended to explain the origin of the universe and life to us in detailed scientific language. Science is constantly changing, developing [...]. If the biblical explanation were at the level, say, of twenty-second – century science, it would likely be unintelligible to everyone, including scientists today [...]. Rather than scientific language, the Bible often uses what is called phenomenological language – the language of appearance. It describes what anyone can see. (p. 30)

While Lennox does not believe that the Bible contains modern scientific explanations, he does argue that numerous passages in the Old and New Testament imply certain conclusions about the physical world (e.g. the beginning of the cosmos), and that these conclusions are also well supported by scientific evidence (Lennox 2011).

Alexander (2017b) advocates Concordism Type C, which affirms that the Bible should be interpreted according to proper hermeneutical principles such as taking into consideration its ancient Near East context and literary genre, rather than according to modern science. Rather, it acknowledges science and theology to have their own 'integrity as methods of enquiry' to construct their own models of reality without mutual interference, and having completed that process, it proceeds to see what types of concord or discord there may be between these 'two forms of knowledge', and how both of them may inform our understanding of the past by complementing each other (Alexander 2017b).

Alexander (2017b) observes that 'Concordism Type C is typical of much of the present academic discussion between science and religion'. It is interesting

to note that Walton, who apparently rejects Concordism which he understood as the belief that the Bible 'must agree–be in concord with–all the findings of contemporary science' (Walton 2009:19), argues that there is no incompatibility between Genesis 1 and the scientifically well-established 13.8 billion-year age of the universe (Walton 2009:92; see the discussion in ch. 3). Likewise, saying that the Bible does not contain science beyond the culture of the biblical authors (Walton 2009:19) is compatible with saying that the Bible does not indicate that God did not create through an evolutionary process (Walton 2009:168).

There is a distinction between arguing that there is 'agreement' and arguing that there is 'compatibility'. To argue for 'agreement' is to argue that the Bible teaches that the universe is 13.8 billion years old, whereas to argue for compatibility is to argue that the Bible does not affirm a time period that is contradictory to the universe being 13.8 billion years old. Walton's argument is not Concordist Types A or B, because he argues for his interpretation of Genesis 1 on the basis of hermeneutical principles such as consideration of ANE context. He proposes that the seven days of Genesis 1–2 can be understood as seven solar days, in which the cosmos and living things were organised (or reorganised) by God for the setting up of a 'cosmic temple' in the Garden of Eden (Walton 2009, 2011, 2015). Where Task (C) is concerned, 'the implication of Walton's view is that Genesis does not exclude the possibility that the universe began billions of years ago before it was reorganised'.[19]

Moreover, on the basis of hermeneutical principles, there is no basis for concluding that the biblical genealogies are intended to be a complete record. The Hebrew terms for 'begat', 'father' and 'son' in the genealogies do not necessarily express a relationship separated by a single generation. While some have argued that 'the seventh from Adam' in Jude 14 requires an absence of gaps between Adam and Enoch, others have replied that in the biblical genealogies (McGrath 1997; cf. Steinmann 2017):

> [*O*]nly prominent names are sometimes recorded. For example, St. Matthew refers to three lots of 'fourteen generations' (Mt 1:17) meaning significant generations; and I see no reason why on this precedent Jude 14 should not likewise mean the seventh significant generation. (n.p.)

Stott (2011) observes that the genealogies never claim to be complete, and that the purpose of the biblical genealogies was more to establish the line of descent (e.g. Jesus was descended from David) than to provide a comprehensive family tree.

Young Earth Creationists argue that evolution is contrary to the biblical expression God created 'according to their kinds' (Gn 1:11, 20). However, this

19. I reply to various objections against Walton's functional creation interpretation and develop it further in Loke (2022b).

expression can be understood as saying that God created various biological life forms following the kinds which he had planned. This does not specify the process of creation, nor does it imply the fixity of kinds and nor does it exclude the possibility that God could allow certain creatures of a particular kind to evolve into another kind so as to bring about various kinds of creatures which he had planned (Hess 2012).

Concerning the creation of human in Genesis 2:7,[20] Walton observes that Psalm 103:14 'for he knows how we are formed, he remembers that we are dust' implies that other humans are also formed from dust, yet (obviously) born from women. This implies that even though Adam is formed (Hebrew *yatsar*) from dust, he could still have been born (Walton 2015:75–76). 'Formed from dust' therefore does *not* mean formed *directly* from dust. Moritz (2013; cf. Grudem 2017:800) observes concerning the Hebrew words *yatsar*, *asah* and the biblical description of the creation of animals and humans and the nine-month-long process of formation of a human being in the womb (Ps 139: 13–16, Is 44:24, 49:5, 44:2) that:

> The exact same Hebrew words (*asah* and *yatsar*) that describe God's forming of embryos in the womb, and God's forming of plant and animal life, are used to describe God's forming of the human species. The use of these words implies (or at the very least, does not rule out) that God's forming of humankind was a process and not an instantaneous event. (n.p.)

In order to demonstrate that the scientific and the biblical models of reality are not contradictory (say) with respect to natural history, one does not need to provide an actual model of the past ('it was like this …'). Rather, all that is required is to provide a possible and plausible model of the past ('it could have been like this …') to show how the scientific and biblical models could coexist. It is evident that to show this, a degree of conjecture is justified.

One should also note a number of important distinctions, namely, the distinction between Task (A) 'interpreting the Bible', Task (B) 'showing that the biblical account is true' and Task (C) 'showing that there is no incompatibility between evolution and Bible' (Loke 2016:162, 2022b).

For Task (A), one might ask for positive evidence to show that a proposal is what the human biblical author holds and expresses in the text; 'likewise, for (B), one would have to provide positive evidence (scientific, historical, etc.) to show that the biblical account is true' (Loke 2016:162).

However, for Task (C), it is sufficient to suggest a possible and plausible[21] (but not necessarily actual) model that is not contradictory with the evidence

20. 'Then the LORD God formed the man of dust from the ground and breathed into his nostrils the breath of life, and the man became a living creature'

21. For example, the model should not include ad hoc claims such as interference by aliens. I thank Bethany Sollereder for this comment.

of science nor with well-established interpretations of the Bible and then say, 'for all we know, this is how it could have happened' (Loke 2016:162). For Task (C), it would be 'perfectly legitimate to suggest a possible scenario which the biblical authors may not have thought of, as long as the possibility is not contradictory to what the biblical authors expressed' (Loke 2016:162).

It should be noted that (Loke 2016):

> [*t*]he doctrine of divine inspiration of Scripture does not require the human Biblical authors to be omniscient just as the Divine author is, and it does not require God to reveal to the human Biblical authors an exhaustive knowledge of everything (such as an exhaustive knowledge of Adam). (p. 162)

In particular, the doctrine recognises that the Bible is not intended to be an encyclopaedia of science. The main concern of the authors of the books in the Bible is not to write such an encyclopaedia but to record what they regard as the revelatory and salvific acts of God in human history, such as what God accomplished through Jesus Christ, in particular his death and resurrection.

If I were to claim (A), '[t]he Bible teaches the evolutionary Adam model that is described in my book', then, I would be guilty of committing the error of saying that the Bible says or implies certain things when in fact the Bible does not say or implies those things, that is, I would be guilty of 'twisting' the verses in the Scripture (cf. Ham 2017:106). However, that is not what I claim. What I claim is (C), '[t]here is a possible (not necessarily actual) model of reality described in my book, which shows that there is no incompatibility between evolution and the Bible. This model contains details (including scientific details) not found in the Bible, but that is okay because (as explained earlier) God did not provide an exhaustive knowledge of reality in the Bible.'

In the following sections, I discuss both Task (A) and Task (C), keeping both tasks distinct and mentioning modern scientific knowledge for the purpose of Task (C) when appropriate.

The challenge of evolutionary population genetics

It has been argued that evolutionary population genetics indicates that the genetic diversity of the current human population requires that humans descended from a large population of 8000–10 000 and not from only two people (Venema 2014). Does this contradict the biblical account of Adam and Eve?[22]

One of the crucial issues is how human beings are defined in the biblical account, viz., the *Imago Dei*. A virtual consensus among Old Testament scholars

22. Because of the limitation of word count, I sketch the outline of a response utilising a transdisciplinary approach; for details, see Loke 2022b.

concerning the meaning of the *Imago Dei* in Genesis regards it as a royal function of human beings as God's representatives in the world, given the authorised power to share in God's rule over the Earth (Middleton 2006). God's decision to designate humans as Imago Dei is not arbitrary, such that he could just have designated any other creatures (e.g. banana slugs) as Imago Dei; rather, it is related to a unique combination of capacities in humans that would enable them to freely fulfil the responsibility to benevolently exercise dominion (Barrett & Greenway 2017) and which is fitting for the incarnation (Fergusson 2017:245–246). Against those (e.g. Clough 2009) who object that the difference between human beings and other creatures is of degree only, it is this unique combination of capacities which sets humans apart (Barrett & Greenway 2017).

With respect to Task (C), I propose a modified *Homo divinus* model that distinguishes between 'anatomical *Homo*' possessing the image of God (AHIOG) and 'anatomical *Homo*' which did not possess this (AH). In my model, God took a pre-existing anatomical *Homo* and made him to be an AHIOG through the creation of a human soul, and that this person (Adam) was the common ancestor of every human being today (for recent defences of substance dualism, see Loose, Menuge & Moreland 2018). The image of God was then passed down from Adam to his descendants through the transference of capacities in the soul, in a manner consistent with what has traditionally been proposed by the classical theological view of Traducianism (see Crisp 2006). With the aforementioned understanding, it can be shown that all humans today could have a common ancestor even though this ancestor is not our sole ancestor. In particular, by combining the exegeses of Genesis by John Collins with a biblically-grounded theological view (viz., Traducianism),[23] one can argue for the possibility that God took a pre-existing AH and made him AHIOG, and the image of God was passed down from this person (Adam) to his descendants some of whom mated with AH. Their descendants were fully human, while other AH contributed to the genetic diversity. Thus, all humans today could have a common ancestor, even if it is not their sole ancestor. Scientific studies concerning our most recent common ancestor (MRCA) indicate that this conclusion is plausible (Swamidass 2019; for details and replies to various objections, see Loke 2022b:ch. 5).

The biblical account also affirms that all human beings today are descendants of one family (Noah's) after the Flood, which is obviously way below the population of 8000–10 000 indicated by the recent population genetics. In response, many scholars have argued that the flood can be interpreted quite literally as a localised phenomenon (Longman & Walton 2018). With respect to Task (C), it is possible to interpret it as localised to the extent sufficient for wiping out the *Homo divinus* group and their possessions (including animals within their areas of dominion), leaving Noah and his family.

23. A detailed defence of Traducianism is beyond the scope of this chapter; see Loke (2022a, 2022b).

That was the main 'function' of the flood, and as Walton (2009) has argued, ancient Jewish people were generally more concerned about function than ontology. If the flood was local, then many other animals around the globe, including many anatomical *Homo*, would have survived, and it is possible that a number of Noah's descendants (AHIOG) mated with non-human anatomical *Homo* (perhaps in disobedience to God) after the flood, thus accounting for the genetic diversity we observe today.

For the purpose of Task (C), the model proposed here is compatible with the recent Adam view and ancient Adam view. With regard to the recent Adam view, scientists have calculated that the answer to the question 'how far back in time must we go to find an individual who was the ancestor of all present-day humans' (MRCA) is surprisingly recent (Hein 2004:518). Given the uncertainties about migration rates and mating patterns, the date of MRCA cannot be identified with great precision (Rohde, Olson & Chang 2004:565). Nevertheless, the results suggest that 'the most recent common ancestor for the world's current population lived in the relatively recent past – perhaps within the last few thousand years' (Rohde et al. 2004:565). My model does not require Adam or Noah to be MRCA; it only requires Adam and Noah to be a common ancestor of all human beings (not necessarily the most recent one). Nevertheless, an MRCA existing a few 1000 years is compatible with my model.

On the contrary, following Blocher (2009) and others, Adam and Noah could be placed well before the Neolithic period, such that all present humans descended from them and that cultural degeneration might explain the low level of cultural achievements during the many subsequent millennia prior to the Neolithic period (Loke 2016:164). While the author of Genesis' account may have utilised the language and expressions (e.g. to rear cattle, to 'handle the harp and pipe', to be 'an instructor of every craftsman in bronze and iron') of his contemporary surrounding Neolithic ANE culture, this does not imply that he intended the story which he was telling to refer to the period around that time. On the contrary, palaeontologist Stringer (2011:237–238) has noted the importance of climate and population densities for technological advancement and the potential to express and accumulate 'signals of modernity'. It could be the case that long periods of harsh climate during the Last Glacial Period (110 000–10 000 years ago) and/or decrease in population densities because of catastrophic events or tribal wars caused a degeneracy of culture and that prior to that there were brief scattered periods of more advanced culture involving a few individuals which were relatively too short and limited in scope to have left traces in the archaeological record (Loke 2016), which (as Christian 2011:185 observes) at present is still vastly incomplete. The degeneracy model would explain the anthropological puzzle that agriculture did not spread from a single centre, but apparently appeared

independently in many different regions of the world. That is, if the degeneracy model is correct, the descendants of Cain and Abel would already have the capacity for agriculture, and they restarted agriculture in different parts of the world when the weather improved after the end of the Last Glacial Period.

Moreover, some of the terms found in the Bible might not have the same meanings that we have today (e.g. the Hebrew word *iyr* translated as 'city' in Gn 4:17 can mean an apparently fortified place of any size). The biblical authors may have used expressions that were more familiar to his first readers (cf. the notion of accommodation defended in Loke 2022b), and thus, these expressions should be understood as approximations rather than as precise literal descriptions. It should also be noted that there are significant differences between the flood stories in the Sumerian 'Gilgamesh Epic' and the Genesis account. For the purpose of Task (C), it is possible that the Babylonian and the biblical versions descended from a common tradition and that the Babylonian version became corrupted to conform to the polytheistic religions of its people' (Longman & Dillard 2006:52). It could be the case that the Sumerian version conflated and adapted the stories of Gilgamesh and earlier versions of 'Noah's Flood' (the date of origin of which is unknown) or borrowed details from earlier versions of 'Noah's Flood' for their own flood hero, so as to give their account the impression of antiquity and credibility.

Conclusion

I have argued that one can address the creation and evolution controversy using a transdisciplinary approach, which involves science, history, philosophy and theology. This should be done in a manner that respects each discipline as having its own integrity as a method of enquiry to construct its own model of reality without interference from other disciplines, before attempting to integrate the models constructed by different disciplines together. Concordism Type A (which seeks to extract modern scientific information from ancient Scriptural texts) and Type B (which seeks to interpret Scriptural texts in the light of modern science) should be avoided, because they arguably involve such a mutual interference by imposing modern scientific meanings onto Scriptural texts, rather than interpreting these texts using proper hermeneutical principles, such as considering the literary genre and context.

With regard to the so-called Concordism Type C advocated by Alexander, the name Concordism probably should be dropped because, as Alexander (2017b) himself notes, 'as a category it's so broad that one wonders whether the use of the term "Concordism" in this context does any useful work', and that it is open to the possibility of discord. Moreover, as noted earlier, what Alexander advocates is not what most scholars understand by the term

Concordism; thus, to use the term is to invite misunderstanding. Nevertheless, the project itself is a worthy one, and as Alexander notes, it is widely practised in academic discussions on science and religion. One should perhaps call it Conversation rather than Concordism, as the project is open to the possibility of discord.

On the Conversation model, compatibility between Science and Christianity is not simply assumed, and it has to be argued for. The project does not submit the Bible to the authority of science nor science to the authority of the Bible; it does not read modern science into or out of the text, nor 'manipulate' the interpretation of the Bible so as to say 'God is right again'. Rather, it affirms that the Bible should be interpreted according to proper hermeneutical principles and that science should be done according to proper scientific methodology, and having accomplished these tasks, one proceeds to examine whether the results are in conflict or not and whether they might complement each other.

To argue that the results are not in conflict in this manner is distinct from Concordism Types A and B. It is one thing to argue that the Bible is conveying modern science, and it is another thing to argue that it could be the case that the Bible is not inconsistent with modern science. The former arguably brings modern scientific ideas into Scripture, and the latter argues that Scripture is not inconsistent with modern scientific ideas. To show that the scientific and the biblical models of reality are not contradictory, one does not need to provide an actual model of the past ('it was like this …'). Rather, all that is required is to provide a possible and plausible model of the past ('it could have been like this …') to show how the scientific and biblical models could coexist.

Moreover, one should note the distinction between Task (A) 'interpreting the Bible', Task (B) 'showing that the biblical account is true', and Task (C) 'showing that there is no incompatibility between evolution and Bible' (Loke 2016:162). For Task (A), it is illegitimate to bring in scientific details for which we have no adequate evidence to think that the ancient biblical authors would have thought of. However, as explained earlier, for Task (C), it is perfectly legitimate to suggest a possible and plausible scenario that includes scientific details that the biblical authors may not have thought of, as long as the possibility is not contradictory to what the biblical authors expressed (Loke 2016:162). Just as modern historians studying ancient warfare can draw from modern-day knowledge (e.g. of infectious disease, a knowledge that was unavailable to the ancients) to explain historical events (e.g. why soldiers die from contaminated wounds); it can be argued that later knowledge can be employed in the study of earlier history to fulfil an explanatory function (Kitcher 1998:43). Here, the explanatory function is to show whether the scientific and biblical account of origins are compatible.

In this chapter, I have sketched an outline of how a transdisciplinary approach can be used to address the challenge of evolutionary population genetics to Christian anthropology. In my book, *The Origins of Humanity* (Loke 2022b), I explain in detail how the creation and evolution controversy can be resolved.

Chapter 4

Freedom to speak in tongues, even in the laboratory!

Pentecostal hermeneutic encountering science

Marius Nel
The Unit for Reformational Theology and the Development of the South African Society, Faculty of Theology, North-West University, Potchefstroom, South Africa

Introduction

Pentecostalism's hermeneutical and theological stance can make a valuable contribution to the interaction between religion and science; however first, some context: the historical relationship between Pentecostalism and science. Pentecostals did not participate in the discourse for nearly a century, mostly because of their supernaturalistic and enchanted worldview that excluded explanations of some natural events in terms of scientific theory. The worldview is an enchanted or en-Spirited naturalism rather than an interventionist supernaturalism. While scientific endeavours cannot exist in terms of an interventionist supernaturalism because it disrupts the 'natural' order of cause

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and effect, Pentecostals' engagement with science is based on an ontology that is non-reductive and incarnational, affirming that created matter exceeds itself and exists only insofar as it participates in the transcendent creator. The transcendent inheres in immanence, implying that the created order does not exist autonomously because it participates in the being of the creator (Smith 2008:880). The ontology of materiality is not a closed, immanentalist system but provides the basis for re-enchanting the world in dialogue with science. It is submitted, however, that its hermeneutic requires and even compels Pentecostalism to participate in the interaction with science. In the next section, a short introduction into the current dialogue with science from a Christian theological perspective is offered in terms of a more tradition-specific mode of enquiry, with its emphasis on a Christological and trinitarian perspective, before the proposed Pentecostal angle is discussed, in terms of a Pneumatological emphasis and perspective.

Pentecostalism and science

Pentecostals inhabit an enchanted world, showing certain agreement with the 'mythical' world of the New Testament. They live in a world filled with signs and wonders, expecting miraculous healing and divine intervention in response to their prayers and faith. Their spirituality is characterised by divine revelation in *glossolalia*, prophecy and the Spirit's illumination of Scriptures. It is radically open to transcendence, emphasising the continued revelation of God in the world (Smith 2010:86).

When Pentecostalism engages science, their worldview disqualifies them from participating in the discussion between theology and science because of the paradigm that regulates the discussion. While Pentecostal practice and belief presuppose a universe and natural world that is an open system, leaving room for divine revelation and intervention, science presupposes a closed, immanent system of natural processes. Their ontological claims differ, leaving little room for a Pentecostal contribution because the discourse between science and theology is also defined by a closed system. For most of other Christian religious traditions, such a system does not pose any challenges because of their cessationist belief that miracles and wonders ceased at the end of the apostolic age.

Most scientific endeavours cannot accept an interventionist supernaturalism. Their assumption is that an autonomous world operates for the most part according to a repeatable causal order. It does not leave room for interruptions and interventions from outside the system by a transcendent God (Smith 2010:95). Science does not accept that normal cause-effect structures can be suspended by divine interruptions. Science's success is the product, after all, of the identification of such normal causal structures. Natural sciences are viewed as the objective arbiters of the way things are in terms of causes and effects.

The ontology accepted by science's naturalism is not necessarily implicit in Pentecostal practice and spirituality.[24] Smith (2010:96) suggests that Pentecostalism is characterised by a noninterventionist supernaturalism that he designates as an enchanted or en-Spirited naturalism.[25] Such a naturalism does not accept that the world is autonomous and self-sufficient and refuses to contrast the natural with the supernatural in a dualistic manner. Nature is seen as charged by grace because of the presence of the Spirit of God in all the created world. The Spirit's care of and activity within nature are not exceptional, and it does not represent interruptions of the 'natural' ordering of the universe. The 'miraculous' is normal and not interventional; it is rather a material supernaturalism or supernatural materialism that contests the natural or supernatural distinction. Nature is oriented towards the supernatural insofar as it participates in and is indwelled by God. Pentecostals use a participatory ontology, defined in terms of a dynamic sense of the God-world relation. Matter, as created, exceeds itself because the transcendent in a very real sense inheres in immanence. The created order does not exist autonomously but as a gift from the transcendent creator, participating in the being of the creator, who finds being in goodness. That creation is radically dependent implies the impossibility of holding to the idea that materiality can exist independently or order itself without showing any need for God (Kärkkäinen 2015:50). It establishes a counter-ontology that does justice to materiality and embodiment and re-enchants the world in the discourse between theology and science. According to Smith (2010):

> [*P*]entecostal spirituality does not expect that God would interrupt the so-called 'order' of nature but rather views the Spirit as at work in creation, taking up aspects of creation to manifest the glory of God. (p. 102)

The 'miraculous' does not imply that God 'breaks into' the world as if God were outside of it; rather, it consists of unique nodes of participation that characterise creation. It is neither interventional nor 'super'-naturalist but acknowledges nature's regularity and predictability, which is the recipe for science's success, although it does not subscribe to it any law-like character. The Spirit's presence in the world is characterised by the steady, law-like manifestation of its mundane operations, which does not imply that the world is a discrete, autonomous realm and closed system that God needs to 'interrupt' to 'intervene'. The Spirit's essential, constitutive and dynamic presence in the natural world guarantees the active participation and presence of God in the world. God is not a visitor nor an alien to the world; creation is primed for

24. 'Naturalism', materialism or physicalism can be defined as the notion of nature and as a closed system entirely sufficient unto itself, existing autonomously (Hart 2013:17). Naturalism provides a picture of the cosmos that is a purely mechanistic reality that is utterly deterministic. This deterministic machine floats upon a quantum flux of ceaseless spontaneity and infinite indeterminacy (Hart 2013:82).

25. He prefers not to speak of supernaturalism because it reflects a dualism. His view accommodates both immanence without reduction and transcendence without dualism.

the action of the Spirit. Nature is en-Spirited but it does not exclude special or unique singularities of the Spirit's manifestation. However, it is not 'anti-nature' because nature cannot exist autonomously apart from the indwelling of the Spirit. Such indwelling is sometimes referred to as 'miracles' that remind of the ordinary world's 'miraculous' nature. Miracles do not break any law of nature but manifest the Spirit's 'extraordinary' presence and demonstrate that the ordinary is always already a miracle (Kärkkäinen 2015:187; Smith 2010:105).

While the discourse with science requires theologians to only hold what all rational people hold in common, it implies that it would be expected from Pentecostals to forsake the essentials of their spirituality, which includes miraculous surprises of the Spirit's manifestation. However, it is argued that this represents illegitimate inflation of scientific respectability as ontological monism (Kärkkäinen 2015:306).

Hermeneutics

Pentecostalism was born at the beginning of the 20th century during the stormy period when many Protestant churches reacted to what they perceived as the threat that modernism and evolutionism held for Christianity (Marsden 1980:93–96). Although the early Pentecostal movement represented a conservative voice and utilised the Baconian common sense inductive method of interpreting the Bible, its hermeneutic was not fundamentalist. Common sense assumptions accept that human beings are capable of positive knowledge based on sure foundations and yielded a great deal of certainty on the condition that it is rationally classified. When fundamentalism combines these assumptions with biblicism, it leads to supreme confidence that the Bible can answer all questions (Marsden 1991:117).

Pentecostals also read the Bible as literally as possible but used another angle of interpretation. They read the Bible to hear and understand what the Spirit was saying to them in their situation, starting from their perception of the work and revelation of the Spirit in their context, listened to the Spirit's voice while reading the Bible and applied his interpretation to their current situation. Their high view of the authority of Scriptures was subjected to this angle, directly relating the message of the Bible to the experience of their encounters with the Spirit's work in their midst. This represents a hermeneutical cycle: their practice informed their reading of the Bible that informs their practice, repeating the cycle.

When Pentecostals joined hands with fundamentalist sentiments, it was not because they were against science but of sharing in the distress about the 'threats' that modernism, secularism and evolutionism posed. Early Pentecostal expectations of the second coming of Christ led to Eschatological urgency that found evangelical fundamentalism more congenial to their commitment than

modernists, especially those that supported historical-critical interpretations of the Bible (Yong 2011:2).[26] Eighteenth-century German scholarship developed historical criticism (source, form, redaction, tradition and radical criticism) to discover the text's historical context by attempting to reconstruct the text.

Many of the first-generation Pentecostals also accepted a dispensationalist interpretation of history, a view that Marsden (1980:62) describes as anti-humanist, pessimistic and anti-developmental because it views humans not as the main actors in the drama of Earth but as participants in a cosmic struggle due to solely divine intervention. History consisted of the dispensation of Innocence, ending with the Fall (Gn 3); Human Government disrupted at Babel (Gn 11); the Promise ending in Egypt; the Law ending with the rejection of Christ; Grace ending with the great tribulation; and the Millennium ending with Satan set loose for a short while before his final fall from grace. The civilisation was perceived as becoming increasingly corrupt and the church declining from its original purity. While human and natural forces shaped the course of history for modern historiography, dispensationalists used the assumption that forces that shaped history should be explained as ongoing warfare between God and Satan, an apocalyptic view of history shared with parts of the New Testament, and presumably also the proclamation of Jesus (Boring 1992:336; Royalty 2013:536). To understand what is happening in nature and history, supernatural knowledge gained from Scripture is necessary. It explains why Pentecostals were not interested or involved in scientific endeavours; they attended to the conflict that God and Satan were engaged in, eliminating the need for any other explanation of the natural world.[27]

As a result of their biblicist mindset, Eschatological haste and emphasis on a 'full gospel' message (Jesus Christ as saviour, sanctifier, healer, Spirit-baptiser and coming King) as their magisterium, they were anti-intellectual towards liberal education and reluctant to engage modern science. Scientific research was suspected because they did not distinguish between evolutionist science and science as such.[28] A Pentecostal scholarship only developed since the 1970s and 1980s (Nel & Janse van Rensburg 2016).

26. In their Eschatological haste, they permitted anyone whose life showed the 'anointing of the Spirit' to preach the gospel, without requiring further theological qualifications (Anderson 2007:42).

27. This view of history divides history into distinct periods, as done by Darwin and Marx. Each period, era or dispensation was dominated by a prevailing principle or characteristic and ended in conflict and judgement that served as introduction to a new age. According to Marx, the laws of change are governed by natural factors, in contrast with dispensationalism's supernatural laws (Marsden 1980:63–64).

28. Early Pentecostalism did not distinguish between the areas of competence of science and theology. Polkinghorne (1988:xii, 1994) explains that the two disciplines explore different aspects of human experience, the physical world – *contra* – a world that transcends us; using different methods, experiments that test matters *contra* personal encounters with the divine; and asking different questions, to know how and by what process things happen – *contra* – why and for what purpose it happens (teleology).

Science as an enemy

Science was viewed as an enemy, based on the misconceived perception that evolutionary scientists, as a rule, were atheistic.[29] The common belief that has remained strangely persistent was a direct conflict between Christian belief and the scientific understanding of the world. According to Barrett (2000:96), the notion grew from a championing of Darwin's evolution theory by Thomas Huxley (1825–1895) and others in the 19th century to counteract the influence of the 'dogmatic and conservative' Church of England. Huxley strove for the worship of naturalism void of any divine, 'supernatural' ('spiritual') Being/Ultimate Reality by scientists, the high priests at the altar of secularism. Darwin's theory was clearly incompatible with the literal biblical creation accounts and their worldview. Pentecostals did not distinguish between different methodologies and interests of geologists and palaeontologists because of their suspicion of natural sciences and did not have the expertise to compare the different theories of the origins of life and the development of the geological face of the planet. Because they rejected the Darwinian theory of evolution as antithetical to their literalist reading of the creation account in Genesis, many adopted a gap theory of temporally ambiguous intervals between the different days of Genesis 1:5–2:3. Their interpretation was reinforced by the inordinate influence of the *Scofield Reference Bible* (1909) (Bertone 2012:63) that led to their support of antimodernist fundamentalism's establishment of the Scientific Creationism movement with its advocacy of an anti-evolutionary scientific paradigm as an alternative to mainline natural sciences (Kärkkäinen 2015:25). Since the 1960s, they reintroduced the idea of 'special creation' into the public arena,[30] based on literally

29. They limited science to evolutionary theory, as mentioned. Science was limited to a mechanistic model of nature that limited theories by way of unprejudiced observation and experiments and attempted to provide mathematical descriptions of nature's phenomena, ignoring protological and teleological considerations (Barrett 2000:15). Geology's findings of the layered structure of the Earth's crust and the fossil contents of rock strata revolutionised scientific thinking (Cutler 2003:202–204), accompanied by a fundamentally new overall conception of motion (kinematics) and a new conception of the universe itself. Instead of interpreting motion as a goal-oriented process, it was viewed as a value-neutral state of the body (Cohen 1994:75). The new world picture questioned the idea of design in nature. Darwin provided a new way of understanding the remarkable well-adaptedness so evident in nature, creating uncertainty about the reality of divine providence and leading readily to a deistic-mechanistic or even atheistic picture of the world and the conception of humanity as a species without any special status, derailing a place for established moral values (a difference is made here between worldview, that refers to an evaluation of the world, whether it possesses meaning and purpose, and world picture, referring to the model of the physical structure of the universe, following Barrett 2000:170). By limiting 'science' to the evolutionary theory, Pentecostalism used an attenuated perspective and understanding of a highly complex subject.

30. Both creationism and scientism are monistic views at the extremes of the spectrum that interpret the world entirely and exclusively in terms of a single overriding principle, seen as the key to the universe (Houghton 1995:87). Both do not do justice to the complexity of the object of investigation, which is nature.

interpreting the Bible and supported by archaeological or paleontological 'evidence' in support of a Young Earth theory.[31]

The *Dake's Annotated Reference Bible* (1963) that supported the gap and day-age interpretations influenced them as well. Come progressive Pentecostals rejected Young Earth Creationism, including the influential society for Pentecostal studies (established in 1972) (Numbers 1993:307). They developed a hermeneutical angle since the 1970s, which showed an affinity with early Pentecostalism's hermeneutic, *contra* most Pentecostal pastors and members that functioned with a literalist-biblicist hermeneutic that originated in the 1930s and 1940s. In vying for acceptance by society and mainline churches, second- and third-generation Pentecostals exchanged the ethos of their spirituality, distinctive theological viewpoints and hermeneutic for a conservative evangelical perspective. They embraced the view that God only needed 624-hour days to create the Earth and rejected both the principle of evolution because it contradicted the Bible and theistic evolution (macroevolution with divine guidance). Their literalist interpretation did not recognise the genre of the biblical creation narratives and the influence of similar myth in surrounding cultures of the ancient Near East on them.[32]

However, Pentecostals' alliance with evangelicalism also had positive effects. They participated in the concerns of the establishment and some turned to the study of the sciences, especially biology that had been frowned upon because of the perceived danger that it might lead to an atheist worldview. They also realised the importance of medical mission in their outreach to unreached people.[33] Their acceptance in evangelical circles brought more of their members in contact with the positive contributions that science was making to society.

31. Its most well-known early advocate was Morris (1974, 1977) who founded the Institute for Creation Research (http://www.icr.org).

32. It seems that progressively more Christians are accepting a Young Earth position in the light of the growth of conservative evangelical and renewal forms of Christianity.

33. Early Pentecostals' biblicist teaching of divine healing led them to trust God fully for healing. When it did not happen, most did not consult primary health care practitioners but remained placing their trust on God; at times leading to fatal consequences, also for their children. Some of them also refused vaccination for their children. In early days, medical interventions were less successful and medical services were frequently inaccessible and unaffordable. In Africa, some Pentecostals combined their belief in divine healing with some ritual practices indigenous to the culture and religion of the continent. While few Pentecostals today reject any medical help (one study shows that 93.7% of British Pentecostals accept medical help as a blessing from God's hand; Kay 1999:121), some still experience the tension of praying over an illness and using medical care at the same time, arguing that an overreliance on medicine may undermine authentic faith in God. Some also criticise what they perceive as medical materialistic overemphasis at the expense of a holistic health care strategy (Nel 2001).

Africa and science

In Africa, most indigenous Pentecostal and neo-Pentecostal groups and leaders probably subscribed to this hermeneutic. They focused on the spiritual imagination, neglecting the scientific imagination with its natural interpretation of events (Ngong 2014a:83). The African imagination was enchanted and strongly contrasted with the Western imagination's emphasis on rationality. Africa was suspicious of engaging in the scientific imagination because it might imply an uncritical embrace of Western *Aufklärung* rationalism.[34]

African Pentecostalism expected to see the Spirit at work in miraculous healings and similar activities, rather than hospitals and technological inventions. Such a distinction, however, was not viable and tenable because the technical imagination (as a spiritual imagination) was common to all societies. As far as Western rationality diminished the importance of the spiritual in Western Christianity, Africa's emphasis on spirituality remained important. However, a distinction between the rational and spiritual or supernatural denies Africa's holistic worldview that does not view the world in dualistic terms as in the Western world. The rational cannot be avoided to the benefit of the spiritual; the Spirit is not only concerned with what is supernatural or miraculous and God's work in the world cannot be justifiably limited in this way. Such a distinction employs the exact problem that African Pentecostalism has with Western *Aufklärung* rationality, with its dualistic distinction that limits (and condemns) the spiritual to the non-verifiable and hence the unscientific (Ngong 2014a:85).[35] African Pentecostalism needs to recognise that it is the same Spirit answering prayers by showering rain at work in mechanised farming that staves off famine as a result of drought, and who works in 'miraculous' conceptions as well as artificial insemination (Ngong 2014a:88).

Distinction of stances

The Pentecostal movement was already diversified in the many denominations established because of leadership and doctrinal conflicts, and it manifested also in the way it considered science. It is possible to distinguish between at least three stances, although it is important to note that such a distinction is artificial and that a lot of overlap existed between the different viewpoints

34. It must be remembered that missionary 11 meant that becoming a Christian was about practising Europeanism, dressing and performing things in the European way. What was needed, was a contextualisation of the gospel into the African culture, something that started with the African Indigenous Churches (AICs) at the end of the nineteenth century (Daswani 2012:82).

35. Western critique of rationalism does not debase the place of reason in human life and replace it with something else; it is rather concerned with advocating other important elements of human life, such as spirituality and feeling, as essential to being human (Gyeke 1997:266).

(Yong 2010:27). The distinction is made to bring theological issues at stake in sharp relief. The earliest Pentecostals represented mostly sectarianism in sociological (not pejorative) terms, motivated by a primitivist-restorationist urge to replicate the early apostolic church, millenarianism, perfectionism and literalist biblicism with varying degrees of intensity.[36] They rejected the established mainline churches as 'dead formalism' and tried to retrieve and reappropriate a biblical way of life, deduced primarily from the book of Acts. They defined holiness and perfection, an ethical system that they brought with them from their predecessors, the holiness and dispensationalist movements, in a biblicist way that led to rigorous and world-denying ethics, characterised by a ban on tobacco, alcohol, cinemas, shows and most entertainment.[37] Their 'higher Christian life' was an extension of Keswickian theology and contrasted them to the lax ethical standards supposed to be characterising a large part of mainline churches and modernism. Like some Methodists before them, they were characterised by a 'come-outism' and separatism, as a result of their negative estimate of major churches (Marsden 1991:71). Among mainly Oneness Pentecostals,[38,39] women wore long dresses as in biblical times, did not apply any cosmetics, wear jewellery and cut their hair according to the Pauline injunction in 1 Corinthians 11:6. They justified their world-denying and culture-resisting morality as 'holiness' that resisted 'worldly' value systems and 'sinful' accommodation to the surrounding culture. Some of them also handled serpents and even drank deadly things to prove the promises in Mark 16:18 that nothing would hurt them (Hood & Williamson 2008).

A second distinction that Yong makes is called Pentecostal conservatism, mainly among trinitarian Pentecostals; the only difference with sectarianism is that conservative Pentecostals were more consciously counter-cultural and counter-ideological in terms of morality and culture formation. It is characterised by a vocal and active endorsement of 'biblical' morality marked by the rejection of abortion, homosexuality, gambling, alcohol consumption and 'worldly' entertainment. Conservative Pentecostals normally did not partake in politics although they might alliance with far-right politics and maintain a patriotic nationalism. The culture was interpreted as the relative,

36. Pentecostal sectarianism was found in diverse manifestations, shaped by different historical and cultural contexts and influenced by the processes of secularisation in various ways.

37. Synan (1971) is the standard work on the influence of these traditions on Pentecostalism.

38. White non-trinitarian Pentecostals called themselves Oneness, while African American and Latino non-trinitarian believers called themselves Apostolic.

39. This is confusing as many of the classical African Pentecostals also referred to themselves as 'Apostolic', while many of the 'Spirit churches' within the broader African Indigenous Churches also used the term in their names alongside 'Zion', especially in Southern Africa, reflecting the influence of the Apostolic Faith Mission of South African on their origins.

fallen and sinful order of the world around them, and conversion implied the rejection of most cultural ways and values. The rejection sometimes translated into a moralistic and legalistic set of norms as the means of forming a distinctive cultural and religious identity. Neither sectarian nor conservative Pentecostals showed much interest in approaching science; they were generally absent in any such discussions.

However, an increasing number of Pentecostals have developed into a more progressive form of engagement with the world around them. They realised, in the words of Nürnberger (2011:269), that churches that do not engage with the findings of science 'lose their integrity and their message loses its credibility'. In Africa, the important role that Pentecostalism started to play in politics serves as a good example. In several countries, Pentecostals have established political parties, and hence, Zambia has had two Pentecostal presidents (Anderson & Pillay 1997:238).[40] In some cases, they also established close alliances with certain political leaders, in the process even endangering their credibility (Burgess 2012:31). South African Pentecostal churches were slow to catch up but eventually, some megachurches became involved.[41]

These churches defined their spirituality in part in terms of the socio-structural transformation of the community, and they were characterised by involvement in the world around them, including scientific enterprise. At the core of their spirituality was still the experience of conversion and charismatic piety but they reacted against a premillennialist scepticism about progress in the world and an 'otherworldly' mentality requiring their non-participation in culture. They used a hermeneutical cycle of interpreting the Bible and culture that emphasised the interaction between situation/praxis, social analysis/criticism, normative biblical and theological reflection and pastoral action (Yong 2011:36). Miller and Yamamori (2007:6) reckon that about 15% of all Pentecostal churches were socially engaged by focusing on issues that defined their respective communities and providing food, clothing and housing for needy people and other projects of community development, apart from their involvement in the personal emotional and spiritual needs of individuals, including issues such as abortion, divorce, domestic violence, addictions, etc.

40. The two presidents were Fredrick Chiluba and Edgar Lungu. Chiluba declared his country a Christian nation in 1991, while Lungu called his people to pray and fast. He even proclaimed a National Day of Prayer and Fasting in 2015 (http://www.times.co.zm/?p=66547; https://eliasmunshya.org/2015/10/15/after-we-have-said-amen-towards-a-Pentecostal-theology-of-politics-in-zambia/; accessed 2018-07-19). When Christian political leaders participate in anything that may be seen as morally wrong, the press uses their Christian beliefs to discredit them.

41. For example, Pastor Ray McCauley of Rhema Bible Church headed the National Interfaith Leadership Council (NILC) and invited key politicians to speak at the worship services of his church, as Bishop Moso Sono of Grace Bible Church also did, arguing that members of their churches should participate in political processes to ensure that Christians were elected into key political positions (Frahm-Arp 2018:5).

The early approach of animosity towards science and rejection of any scientific advances as incompatible with God's word and a threat to belief in the reality and power of the Holy Spirit changed among progressive Pentecostals to the acceptance and application of applied sciences. However, it was not accompanied by any thorough reflection about scientific and technological matters because serious Pentecostal scholarship only developed since the 1970s and started with an interest in the history of the movement, advancing to biblical studies and, since the 1990s, to theological studies as such. Pentecostals in the academy concentrated on the humanities and social and behavioural sciences that are more advantageous to their sensibilities and interests, ignoring the discourse between religion and science.

The relationship between Pentecostalism and science, with three stances, namely Pentecostal sectarianism, conservatism and progressivism, was sketched. The next question is concerned with the way forward. The assumption is that Pentecostalism can and does have a distinct, valuable contribution to make to the ongoing dialogue between theology and science. A tradition-specific mode of enquiry is used to provide a model for how the discussion can proceed.

How the theology and science discussion can proceed

The reasons why Pentecostals should engage with science

Pentecostals should have an active interest in the sciences and engage in a discussion with scientists from various fields for several reasons. The first reason is that no Pentecostal can live without taking note of exciting scientific advances (and challenges), such as artificial intelligence, IT and cosmological astrophysical discoveries. Early Pentecostals defined their approach to science based on their joint resistance with fundamentalist circles to modernism and liberalism; as a reactionary movement, they accepted elements of a fundamentalist hermeneutic.[42] Today's Pentecostals value the fruits of scientific endeavours, especially in their utilisation of communications and media technology. They realise the reality that science has defined life on the planet for human beings.

The second reason why they should revisit their approach to science is to empower adherents to participate in scientific endeavours from a perspective

42. Other aspects were not accepted, notably fundamentalism's (hard or soft) cessationism that accepted that the gifts of the Holy Spirit were given only for the foundation of the Church during the period of 33–96 CE. Pentecostals represented a continuationist stance that argued that the supernatural gifts of the Holy Spirit were for today as well and would only cease co-terminously with the second coming of Christ (Govorounova 2012:26).

that reflects their Pentecostal ethos and distinct theological emphases.[43] A bifurcation might exist between spiritual life and vocational praxis, requiring of believing scientists that they leave their spirituality at the door of the laboratory to partake in science. A commitment to faithful living and empirical research should, however, be able to coexist. That requires the engagement of Pentecostal scientists in the conversation between Pentecostalism and science. While they do not accept the philosophical presuppositions of a redemptive messianism of science (Govorounova 2012:32), scientific materialism, metaphysical naturalism or positivistic empiricism, they need to be able to engage from their perspective of pneumatic faith in the discourse, providing a critical reflection on the relationship between Pentecostal spirituality and science. They can also provide a balance where methodologies are based exclusively on purely rationalistic-positivistic presuppositions that are limited to the logical-analytical. It should emphasise that the rational function of human beings is only one function among others, and it only plays its effective function in complementing the other functions. There is more to faith than meets 'the eye of reason'. Human experience illustrates the presence of other perspectives and influences, such as emotion, volitional impulses and psychic abilities, which are precipitated in trust, morality, justice, frugality, reasonableness, sensitivity, etc.[44] Although faith is different from reason, it does not compete with reason. They are irreducibly different entities that complement each other in the totality of being human (Van der Walt 2002:59–60).

The third reason reflects the realities of human creaturely finitude and the noetic effect of sin. Humans can, out of necessity, view things from limited perspectives because of their finiteness and fallenness. While theological discourse is one of the perspectives among several in engaging the relations between God and the world, it should remain open to the results of other disciplines. These disciplines open vistas not necessarily available to the theologian. Theology may itself be mistaken in some of the views it may hold, as church support for slavery, sexism and patriarchy over many centuries demonstrated (Ngong 2014b:205).

The last reason to become involved in science is Pentecostalism's ability to reflect the primal spirituality (consisting of primal speech, piety and hope) that postmodern human beings lately rediscovered anew (Cox 1995) after a near consensus has emerged of the human need for more than conceptual analysis for understanding human existence (Tracy 1996:207). Its spirituality accommodates a cry from deep within the human spirit that provides in the emotional and religious needs of the African masses in a way that missionary Christianity could

43. See the next part of article describing elements of a such distinct Pentecostal contribution.

44. It must be remembered that people do not *have* but *consist of* experiences, while experience refers to the complex integration of perception-mentality-affectivity-volitionality in the words of Yong (2000:171).

never do. At the same time, it represents resistance to an emphasis on the rational and cerebral at the expense of emotion and experience, as argued previously, providing a counter-modernist discourse to people overwhelmed by a world characterised by modernism, urbanisation and the resultant alienation. It signifies (Yong 2010):

> [*A*]n eruption in the modern world of the nonrational (not *ir*rational) elements of human feeling, expression, and experience that oppose not the methodologies of science and engineering disciplines but the overextended claims of science. (p. 11)

Yong suggests that its spirituality and epistemology that is related to the affections and always exists in an embodied manner represent a Pentecostal alternative to the world of science that he defines in terms of the dualism of materialism-spiritualism; rationalism-empiricism; intellectualism-emotionalism, individualism-communalism; this worldliness-otherworldliness, naturalism-supernaturalism; modernism-postmodernism; absolutism-relativism; and positivism-fideism. Although a Pentecostal worldview has some supernaturalist aspects, their engagement with reality is defined by an embodied faith that leaves room for human affections and emotions in the context of an experiential and pragmatic orientation that also represents rationality (but not rational*ism*). For them, to do theology outside the context of 'worship and prayer is rather like doing science without laboratories' (in the words of Polkinghorne 1988:86). Pentecostals need to respond to reductionistic interpretations that some scientists may offer because they recognise the limits of scientific rationality.

Theologians and science

A working definition of science as used by Yong (2010:13) is that 'science' consists of enquiring after the cause-and-effect relations of the natural world. It involves observation, hypothesis formulation, theory formulation, peer review, continuous testing or experimentation, replicable results as well as the communication and application of such findings. A philosophical presupposition is that science limits itself to the exploration of the natural world, implying that there are other domains of reality that are not (and cannot be) investigated by science.[45] However, science does not require a dichotomy between the

45. Today, New Physics studies the realm of the very small (particle physics), the very large (astrophysics and cosmology) and the very complex (nonlinear dynamics or dynamical systems theory). The counter-intuitive features of the micro-world changed the world picture so that the world is viewed as essentially non-mechanistic and open to novelty in its development. The discovery of this strange world, of particle behaviour, constitutes the greatest revolution in physics since the time of Newton (Barrett 2000:115). The new world picture consists of the anthropic principle, that the properties of the universe may allow the emergence of biological life; the interplay between novelty-producing 'chance' and law-maintaining 'necessity'; the degree of correspondence between mathematical theories and the physical reality they describe; and the emergence of a broad spectrum of levels of complexity (Barrett 2000:125). The weak anthropic principle states that given the remarkable structure of the universe and its suitability for life, it was tailor-made for humans. The possibility is not ignored that it might be one of a multiplicity of universes (multiverses) which just happens to fit the requirements (Houghton 1995:38–39).

natural and supernatural to function; it only needs to recognise that its investigations are limited to one aspect of human existence, without denying the existence of other aspects. The conflict model that historically characterised most interactions between religion and science, requiring one to choose between the two, has been exchanged for a dialogue based on the realisation that theology and science are concerned with separate aspects of reality and human life.[46] The two-worlds approach that requires believing scientists to separate their spiritual and vocational lives needs to be revisited to ensure that the working scientist can integrate faith and occupation in the laboratory. Faith may be seen not as an impediment to rigorous scientific work but as an important aspect to be studied by other scientific endeavours. Unfortunately, it seems that most Pentecostal churches do not address an appropriate approach to science and hence do not empower Pentecostal scientists to integrate faith and vocation.[47]

The question that needs to be answered is how God can create a world out of nothing [*ex nihilo*] when there is no 'nothing'. Barrett (2003:200) refers to the response of the 16th-century Jewish mystic of the Kabbalah tradition, Isaac Luria, who stated that God withdrew or contracted from Godself to make ontological space for that which was to be created (notion of *zimzum*). *Kenosis*, the Greek word for self-emptying, is a keynote of the inner-trinitarian *perichoresis* and ongoing work of God in creation (Althouse 2009:182). By creating people free to be and make themselves, God had to limit Godself. It required from the God of love a voluntary curtailment of total control over all that happens (Polkinghorne 2011:84). For instance, God emptied and limited God's omnipotence to make room for human free will, allowing the natural world the freedom of process in its essentially open-ended ways of *becoming*. It applies to God's omniscience as well, associated with the temporality assumed to be an aspect of God, consisting in the capacity to know the things that happen, not in a single frozen instant but in their temporal succession. It implies that even God does not yet know the unformed future. The *kenosis* consists also in terms of causal status so that the creator's handiwork evolves through laws that reflect the faithfulness of the creator. The implication is that

46. Karl Barth and neo-Orthodoxy chose for a distinction between theology and science as separate realms based on the fideistic elevation of divine revelation as the judge of all matters of knowledge, the rejection of natural theology, the discontinuous linking of God and world and the acceptance of classical liberalism's categorical separation between nature and history. It rejects any dialogue with sciences, depriving believers of a public voice and an own contribution to science (Kärkkäinen 2015:27).

47. Exceptions included Pentecostal physicist and New Testament scholar Elbert (1996, 2006), who formulates new theistic evidences in light of recent experimental findings in the cosmological sciences and Lamoureux (2008), a Pentecostal-charismatic biologist who defines evolutionary creationism, a variant of theistic evolution, as an alternative to Young-Earth and intelligent-design creationism. They both insist on divine involvement and intervention in human reality through the work of the Spirit. Elbert thinks that pre-human history of the universe was the result of the Spirit's direct work while Lamoureux rather refers to evolutionary continuities with the Spirit's involvement in an imminent rather than intermittent manner.

the divine activity of creation is costly to God, making God vulnerable and precarious of authentic love. Through the Holy Spirit, God is ever at work on the inside of creation, allowing it room for growth and development (Polkinghorne 1988:31).

It was remarked that Pentecostal spirituality does not represent an interventionist supernaturalism but views the continuous activity of the Spirit in the natural world as normal. How should it be seen in terms of the 'normal' cause and effect relationships that scientific endeavours are focused on? What is the causal joint that allows a bridge to be set up over the ontological gap between the creator and created? In the mechanistic worldview of the Renaissance, God was depicted as a clockmaker or engineer, a kind of mind or life force within nature (Du Toit 2003:3). In a semi-deistic worldview, God occasionally intervened in the processes of the material world. Pentecostalism, however, supports the idea of continuous divine action and agency within the world's processes, as part of the *creatio continua*, in response to particular circumstances and needs.[48] It exchanges the widespread dualism of mind and matter for a dual-aspect monism, of mind-matter, analogous to the dual-aspect nature of wave-particle of any of the fundamental particles of the material world, such as electrons or photons (Polkinghorne 1988:73). As in quantum theory, a wave-like state is one in which there are an indefinite number of particles, a mental state is one that is associated with an indefinite degree of organisation of a material system. The mind is not some kind of extra ingredient added to matter, but an internal property that emerges when the matter achieves sufficient complexity (Barrett 2003:203).

Active engagement of providential agency occurs at the level of the micro-events of quantum phenomena or macro-events of complex physical systems, or both, but never violates the laws of physics. Some limit the influence of God to a downwardly causational manner employing information in a world that is interconnected and interdependent, within a panentheist model.[49] Polkinghorne (2000:99–101) agrees but limits God's action to the macroscopic level, with the mind that causes intentions to take effect on matter and analogously the mind of God on the material world and its processes, made possible by a graciously bestowed freedom of process as part of divine

48. The concept of *creatio continua* is also useful in explaining theodicy because it suggests that suffering is not gratuitous. It contributes to a greater good which could only be realised in what humans necessarily experience as mysterious ways, as necessary to make the present world the building material appropriate for the next world (Barrett 2003:212). Another important aspect in theodicy is Eschatological hope, providing encouragement for the believer to persevere even in tough times, in the trust that a better world will see that justice reigns over the new Earth. Polkinghorne (2011:109) emphasises the importance that an Eschatology should not consist of a simplistic kind of 'pie in the sky when you die' approach that crudely argues that the joys of heaven will be enough to recompense for any degree of earthly suffering.

49. In panentheism, the whole world is permeated by God. While every part of the universe is filled with God, the being of God comprises more than the universe (Peacocke 1993:371).

kenosis. Genuine freedom of process, however, requires an ontological gap between the creator and created which is deleted in panentheism. In line with Heisenberg's quantum indeterminacy in terms of the position and speed of a specific particle being measured simultaneously, an epistemic indeterminacy leads to an ontological indeterminacy, as described by chaos theory, as a possible site of divine agency. Polkinghorne's model provides a coherent model to think about how God holistically acts in the present world, utilising 'active information' of a pattern-forming kind (Barrett 2003:207).

Natural theology and theology of nature

The discussion between science and religion has recently been marked by those who support natural theology and others who propose a scientifically informed theology of nature, both lying on the same spectrum.[50] Elbert represents natural theology; he finds God's fingerprints in experimental science. However, due to Karl Barth's rejection of Emil Brunner's reference to God's fingerprints in nature and the recognition that theistic arguments are little more than intuitive and speculative hypotheses, defending natural theology has become more difficult. Most participants in the debate rather take the side of a theology of nature in various versions to accommodate a critical mutual interaction with science (Kärkkäinen 2015:28). This theology starts with the decision of faith and reads nature from that perspective. It is acknowledged that it is not possible to see God in nature. At the same time, it accepts that one's decision to believe in God does lead one to engage in scientific endeavours distinctively. For instance, one would ask different questions and pose different problems. It also emphasises that theological perspectives found in the Bible illumine aspects of the world that otherwise would have remained hidden. It realises that to be a complete Christian theology, it should include a reflection on the nature of reality as informed by science in addition to its own perspectives. Theology of nature has exchanged an interest in theistic proofs in service of apologetics dedicated to finding creative ways of engaging with scientific discoveries. It realises with Galileo that the purpose of Scripture was 'to teach us how to go to heaven, not how the heavens go' (Barrett 2000:33).

Theology of nature is concerned with the age-old protology developed in the doctrinal history of the church. The theological concept of 'creation' assumes a creator. While theologians of nature utilise scientific methods and descriptions from a perspective of faith, traditionally theologians of

50. While 'natural theology' concerns itself with studying the world in order to gain knowledge about God, it only permits one to view God from afar, out of range of God's voice, by way of speaking, too distant to recognise more that God's broad outline. It excludes God's self-disclosure (Houghton 1995:46–47). It was revived and revised by Ian Barbour in the USA and Arthur Peacocke in England during the 1960s and 1970s (Barrett 2003:196–197).

creation utilised biblical-theological frameworks. A theology of nature or creation, however, causes a challenge in terms of the diversity within the Christian tradition. In reading the Bible, the question is whose hermeneutic is going to be accepted? And in using dogmatic traditions, which traditions are to be privileged? It is suggested that each tradition should engage in the discussion between science and faith in terms of its own particular ethos. In developing a Pentecostal-charismatic perspective on the dialogue, a tradition-specific mode of enquiry is used, although it is acknowledged that the Pentecostal movement as such also contains much diversity. However, a generic 'Christian' approach is too broad and generalised to provide any sensible dialogue partner representative of the 'church'. More productive is an engagement in the dialogue from within the established theological traditions.[51]

In this section, it was argued that Pentecostalism should engage with science for several reasons, and that it can and does have a distinct contribution to make to the ongoing dialogue between theology and science in terms of its tradition-specific mode of inquiry. Finally, we look at the essence of Pentecostal theology, its identity, as a means to contribute distinct Pentecostal elements to the discourse.

A distinct Pentecostal contribution to the debate

It is argued that Pentecostal-charismatic scientists should freely engage in the dialogue from within their faith identities because their distinctive Christian theological tradition has something unique to offer to the dialogue. It is required of Pentecostals to cultivate a distinctive Pneumatological imagination, different from Reformed theologians' imagination. Some of these unique features are now discussed.

Christology and trinitarianism

Within a new emphasis on tradition-specific modes of dialogue within the broader science-theology discourse, an important contribution during the

51. For instance, the Russian Orthodox scientist-theologian Alexei Nesteruk brings patristic perspectives, an important source in the Orthodox spiritual tradition, to the dialogue. He discusses contemporary physics, ontology, protology and cosmology within the tradition of the Logos Christology. For him, scientific endeavours are a cosmic eucharistic work and liturgy (Nesteruk 2000:2). And Lodahl (2003) develops a theology of nature from a Wesleyan perspective, stating that Wesleyan creaturely freedom can be used to describe the essence of God who creates and sanctifies all creation, shedding new light on the concept of evolutionary creation in which the world responds 'freely' to the gracious initiative of God, and the necessity to reconsider our approach to the environment to enable us to conserve the environment in a manner consistent with God's prevenient grace.

past decade or two was a creative Christological perspective on modern science. Insights from contemporary physics, evolutionary biology and the socio-cognitive sciences were used to shed more light on the incarnation of God in Christ (Knight 2007; Shults 2008). What does Christ's incarnation, ministry, death and resurrection reveal about the way the world is and how God acts in the world? And what is the interface of a Christologically charged vision with contemporary science? In this way, faith and science inform each other, putting new questions to both science and theology. A Christological perspective necessarily led to trinitarian considerations. Once the doctrine of Christ's incarnation and the meaning of his death were factored in the dialogue between theology and science, it was natural that a trinitarian dimension should be added. It proved to be a resourceful perspective to approach the intersection between religion and science, requiring a reconsideration of the nature of time and temporality in terms of the understanding of the history of human beings and salvation history. The discussion involved specialists in astrophysical cosmology, quantum physics and the physics of thermodynamic processes, as well as ecological sciences and creation care (Yong 2011:22).

However, it seems that the interaction up to date suffers from a Pneumatological deficiency. In contributions to the discourse, for instance, Polkinghorne's (2004) remarks about the Spirit is limited to a few observations, while McGrath (2009) refers only in passing to the Holy Spirit and limits it to the Spirit's sanctifying of creation (cosmos) on its way to fulfilment. The current dialogue thus seems to be characterised by a thick trinitarian theology within which the Spirit is presumably neglected. If the whole world is permeated by the Spirit of God, it is impossible to neglect the role and influence of the Spirit in any theological considerations of creation. Although God is more than the universe, with every part of the universe filled with the divine Spirit the Pneumatological aspect needs to be emphasised.

The same cannot be said about theological discussions as such which are not aimed at the theology-science discourse, which has seen an acceleration of Pneumatological interest during the past few decades in terms of theologies of creation and life, and the environment in the form of eco-theologies of creation care. The new interest reflects the growth of Pentecostalism worldwide, especially in the majority world or the global south.

Pneumatology

What is needed in the science-theology discourse is an axiom or axioms that would allow a scientific world picture to be linked to the Pentecostal

understanding of God as a trinity, in the tradition of Ellis (1993).[52] The two natures of Jesus, as divine and human, describe God's simultaneous transcendence and immanence and in scientific terms serve as a model, which helps one to think of God's relation to space (Houghton 1995:133, 149).

In the current science-theology discourse, theological thought is engaged with successively higher levels of the complexity hierarchy, including physics and cosmology, biology and its complex systems, studies of consciousness and other aspects of human beings and artificial intelligence, offsetting the development of complexity in nature, the realm of quantum phenomena, mind, consciousness and free will, genes and the evolution of culture and ethics as part of the investigation into a multi-layered universe (Barrett 2000:167). It will require theologians to rethink certain central Christian doctrines, the non-religious interpretation of biblical concepts and a theology of beauty, in which the Holy Spirit serves as the one who maintains particularity and inspires beauty (in art and nature), a perspective that would be relevant to the tasks of the discourse but also in establishing interfaith understanding and trust.

For Pentecostals, it is conditional to experience God's presence and activity before one can formulate a valid theology of the Holy Spirit. At the same time, it enables one to experience God's presence and involvement in other ways, including encounters with science's discoveries (Yong 2000:174). The resultant Pneumatology is then also based on the findings of the natural sciences. Apart from such robust Pneumatology, coherent theological response to the questions raised by the religion-science discourse would be inconceivable.

Pentecostals' spirituality is Christocentrically configured, in terms of their acceptance of the 'full gospel' message of the four- (or five-fold) Christ. However, in the process, their focus is necessarily Pneumatocentric because the Spirit (of Christ) is viewed as the facilitator for Christ's ongoing work on Earth. Their Pentecostal sensibilities are supported by a Pneumatological imagination that determines their lifestyle, worldview and spirituality (Yong 2000):

> [*O*]ur Pneumatological imagination is being constantly challenged, enlarged, transformed, or exposed through our faithful attention to the Scriptures, participation in rituals of the Spirit, engagement in dialogue with the 'other', and obedience to the presence and agency of the divine Spirit in the world. (p. 185)[53]

52. Gelpi (1984:241) describes the objectives of such a Pneumatology. It synthesises one's experience of the Spirit with what the Bible reveals about the work of the Spirit in the apostolic church and investigates the implications of the current charismatic work of the Spirit. It prophetically challenges individuals, churches and society, and it connects affectivity and cognitivity in the daily life of Christian faith.

53. 'Pneumatological imagination' is the result of a charismatic experience of God through the Spirit that results in a specific way of seeing God, self and the world, in contrast to other imaginations, such as sacramental, apocalyptic and prophetic.

Van der Laan (2008) acknowledges that early Pentecostal systematic theologies consisted of the typical evangelical theology with a few themes added that Pentecostals emphasised:

> [*T*]hese theologies did not utilise a distinct methodology that was derived from their ethos. However, a proper Pentecostal theology requires a paradigm shift because it starts from another place than in traditional theology and it ends differently as well. (p. 3)

Pentecostals encountered divine power in their charismatic experiences with the Spirit, and they emphasised their charismatic experiences of God's presence and activity. Their encounters with the divinity are their point of departure in their participation in the discourse with science and scientists. Yong (2000:175) adds that Pentecostals view the Spirit of God as 'a symbol of the presence and agency of God' that works in Christians and the natural world.

Experience, however, does not close the process of theological deliberation; it serves as a starting point out of which theology is developed.[54] Because of its emphasis on experience as the point of departure, Pentecostal theology will always be biographical (that is why testimonies have always played a prominent role in its liturgy) while presented truth will always be directly relevant in the life of the author, as embodied spirituality. However, to defend it against the many risks of subjectivism, it also needs the objective source of the Bible to come to a balanced theological conclusion (Van der Laan 2008:9). The subjective interaction with the Spirit needs to be balanced with the profound exegesis of the biblical text.[55] However, the study of the Bible may not be limited to a mere academic grammatical-historical exegesis of the text. Its purpose is to discover ('receive' or 'hear') a divine revelation or insight from the Spirit to understand what God wants to say to the people within the current situation. Conclusions go beyond cognitive research as a result of 'faithful' and 'prayer-ful' reading (Keener 2016:164). For that reason, Pentecostals emphasise prayer and worship as the conditions in which

54. Van der Laan (2008:7) compares the Wesleyan quadrilateral, of Scripture – tradition – reason – experience, to a possible Pentecostal quadrilateral, of experiential – Scriptural – prophetic – intercultural, showing how the hermeneutic process is turned on its head.

55. In its history, Pentecostalism studied the Bible through the prism of restorationism, primitivism and dispensationalism in the tradition of its predecessors, the holiness movement, before it turned to fundamentalism in its new alliance with evangelicalism. In time their exegesis was determined by evangelical hermeneutics. The second generation of charismatic renewal within established churches (since the 1960s) studied the Bible in terms of some charismatic themes such as Spirit baptism and *charismata* but within the framework of the established theological traditions that these mainline churches represent. A new Pentecostal hermeneutics has developed since the 1970s, in line with certain aspects of early Pentecostal hermeneutics, and is characterised by an emphasis on the interrelationship 'between the *Holy Spirit* as the One animating *Scriptures* and empowering the *believing community*' (Archer 2009:213). The critical element is one's experience of an encounter with God through the Spirit. Then one interprets the Bible in terms of one's praxis of such encounters (Nel 2019:154).

exegesis is undertaken. This leads them to dare to speak with divine authority ('in the name of God'), which is what is appealing to many people in Africa thirsting for an encounter with God.

Pentecostal exegetical practice does not concur with the historical-critical method that interprets the Bible in critical and analytical terms and that is used widely in the Western world. Pentecostals observed that many believers, especially prospective candidates for the ministry, who had become involved in academic theological endeavours eventually became confused and lost their faith. This explains their prevailing anti-intellectualist approach that has at times resulted in suspicion of and even animosity towards science as such. It is more important for them to hear the word of God with their 'hearts'; the aim of biblical exegetical work is a spiritual one (Fee 2001:276, 289). The process and results of their exegetical endeavours should reflect their distinctive spirituality (Land 1993:218). It is important for Pentecostals that word and Spirit do not contradict each other but also that the Spirit's involvement in exegesis results in the prophetic interpretation and application of biblical truths within the context of the faith community of the practice of distinction (1 Cor 12:10; 14:29; Van der Laan 2008:11).

Pentecostal Pneumatology views the Spirit revealing God in nature and corrects a scientific perception that may exist of an image of nature as a 'passive woman to be subdued' rather than as a 'nurturing mother to be revered' (Gelpi 1984). In much of Christian theology and thinking before the scientific revolution, the former view prevailed of nature as enlivened in some sense by the creator spirit. The onset of the age of science and commercial capitalism saw the death of and a relational symbiosis with nature. The current environmental challenges such as global warming can directly be ascribed to the objectification of nature, which led to its abuse. The need to draw upon the reserves of the Earth, through mining, deforestation and other counter-natural activities steadily increased over time until the Earth's resources became exhausted and the 'woman's rape' destroyed her essence (Barrett 2000:38–39). What is critically needed by postmodern humankind is that it regains the image of nature as a living organism that nurtures life but who avenges herself on those who do not revere her. In the discussion with science, an embodied Pneumatology will represent nature as en-spirited and en-Spirited.

As science studies the natural world while theology views the natural world as the creation of God, it can be argued that the information that science generates about the natural world serves as complementary to the information found in the sources of the revelation of the Christian tradition. If there are contradictions between science and theology, a problem might exist with the way the source of revelation or the findings of scientists are interpreted.

At the same time, it should be kept in mind that it is necessary to distinguish between what is distinctive to theology and science.[56]

Pentecostals are popularly associated with their practice of *glossolalia*, which they believe to be in line with the experience that is described as the miraculous visitation upon the early disciples on the day of Pentecost of the Spirit, found in Acts 2. Some Pentecostal scholars opine that the charismatic gift of *glossolalia* has historical and linguistic as well as missiological significance, in that it signifies the outreach to people of all nations and tongues, the diversity of Christian communions and the democratisation of the *charismata*. It can also be argued that *glossolalia* represents the interfaith dialogue, a public theology of various political, social, civil and economic postures (as Yong 2008, 2010 demonstrates) and Pentecostal engagement with science. This is the reason why the title of the chapter refers to Pentecostal scientists and scholars exercising the freedom to speak in tongues in the context of the laboratory.

Finally, Pentecostals' Pneumatological theologies of nature and creation need to counter a trend within some scientific endeavours that represent a scientistic-positivistic reductionism of the world that ignores the realm of spirit in favour of a materialistic-naturalistic misrepresentation of reality. It emphasises the necessity of scientific enterprise in combination with a metaphysics of spirit. On the contrary, while modernity at times treated the material and spiritual in dichotomic terms, ignoring in practice the spiritual, postmodernity's obsession with a re-enchanted world is prejudiced towards an over-evaluation of the spiritual at the cost of an interest in the material. It is suggested that Pentecostals can provide a balance between an en-spirited world with its world of spirits, angels and demons that populate the Pentecostal and charismatic imagination and spiritual scientific enterprises. In terms of their worldwide growth, especially in the majority world, Pentecostals' influence in the science-theology discourse has become essential, and they can restore a balanced theological ethic that may inform the discourse and the ongoing scientific enterprise.

Conclusion

In this chapter, I have argued that certain aspects of a Pentecostal worldview are based on a 'pre-modern' supernaturalistic enchanted world that shows affinities with the world as perceived in New Testament times by early believers.

56. Polkinghorne (2011:1) describes one such distinctive: scientific endeavours approach the subject in the style of 'bottom-up thinking', natural to a science that motivates scientific findings through consideration of the evidence offered by science, while theology traditionally approaches its subject in more of a 'top-down thinking' approach, motivating belief in terms of the revelation of God and using the consideration of evidence as proof. 'Natural science deals with the *causa materialis, causa formalis* and *causa efficiens,* but never with *causa finalis',* while theology is mainly concerned with the teleological idea of purposefulness (Du Toit 2003:3).

The question is posed: can there be any agreement between such a worldview and that of the naturalistic and rationalistic world of modern science? In answering the question, I sketched a short history of the relationship between Pentecostalism and science in terms of Pentecostal sectarianism, conservatism and progressivism. I then argued that Pentecostalism can and does have a distinct contribution to make to the ongoing dialogue between theology and science. It is done in terms of, on the one hand, more tradition-specific modes of enquiry that provide models for how the theology and science discussion can proceed and, on the other hand, the essence of Pentecostal theology, as defined by its identity, as a means to enter into the debate. These distinctives, related to its 'Full Gospel' theology, are Christological and Pneumatological emphases that may contribute to the development of a theology of science supplementing the emphasis in trinitarian theology that was developed in the past two decades and that correlates with recent scientific advances.

Chapter 5

‘In technology, we trust’:

How did the Fourth Industrial Revolution influence theology?

Jaco Beyers
Department of Religion Studies,
Faculty of Theology and Religion, University of Pretoria,
Pretoria, South Africa

Introduction

The words chosen for the title of this contribution, ‘In Technology, we trust’, is an allusion to the words ‘In God, we trust’, which since the 1950s had appeared on the printed money and coins of the USA. In 1956, the Congress of the USA approved a proposal signed into law by the then-president Dwight Eisenhower, determining that the words ‘In God, we trust’ replace the official logo of the USA in use since 1776. ‘*E pluribus unum*’ [out of many, one] was replaced by the words ‘In God, we trust’.

Whether the logo ‘In God, we trust’ reflects a collective faith and a commitment to Christianity among all inhabitants of the USA is questionable, but the words do indicate how religion was, at least at some stage in history

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in at least one particular context, considered central to public life. The word 'God' replaced with the word 'Technology' indicates the loss of the central position of religion in a society. Technology has become the central driving force in a society. It is no longer God but the technology that has become the highest and most powerful concept central to human existence or to formulate it differently, as the 'ultimate concern' (cf. Tillich 1957:4–5). The object of the religious attitude of ultimate concern is perceived as holy and indescribable; it is real and its value overshadows all others, so everything else in comparison appears to be worthless. Technology appears to have attained the status of ultimate concern in human existence. The Fourth Industrial Revolution (4IR) has driven the centrality of technology in the human decision-making processes.

Since Klaus Schwab (2016) has made the world aware of the new label to describe the times we live in, several publications reflecting on the presence, influence and responses to the 4IR have seen the light. Compare in this regard publications by Xing and Marwala (2017), Mohapi (2017) and Brynjolfsson and McAfee (2014) were compared. Furthermore, theologians have joined in presenting their perspectives on how 4IR affects their field of study. In this regard the contributions to the theological debate made by South African theologians, such as Oliver (2020), Veldsman (2019), Baron (2020), Mdingi (2020), and the comprehensive edited work by Van den Berg (2020) were compared. Outside of South Africa, many joined in discussing the effect of technology on theology (cf. Edmiston 2014; Padgett 2005; Peters 2018; Stahl, Timmermans & Flick 2017; Stückelberger 2018; Waters 2015).

These contributions mentioned present reflections on how theology and science relate, and the effect of 4IR on theology. The contribution I want to make is to identify ways in which the technology-driven 4IR has influenced theological reflection and how this challenges theology. To go about this endeavour, we first venture into the definition of the 4IR and why it matters to know this. Reflections on theology as science then follow before the effects of 4IR on theology are discussed with references to how the church can respond. The corrective to the impact of 4IR on a society is provided by Society 5.0 and hence discussed.

What is the Fourth Industrial Revolution?

To understand what we are talking about, it is necessary to define what is meant by the Fourth Industrial Revolution, known as 4IR. We, however, need to remember that we might have already, since the outbreak of the COVID-19 pandemic, seen a new 5IR paradigm emerging. The further discussion on Society 5.0 in this regard is compared. Does the concept 4IR refer to a period in time describing a particular industrial dominance, or does it describe a phase in

human cognitive evolution with a particular dominant perspective on technology, or does it refer to a universal framework determining the interpretation of reality? Perhaps, it does represent something of all of these possibilities.

When the German-born engineer and economist, Klaus Schwab, coined the expression Fourth Industrial Revolution in 2016, he tried to describe a phase in human development labelled as a technological time as perceived from an economic perspective.[57] Since then, 4IR has become a paradigm determining the interpretation of reality and a descriptor of human cognitive processes. Schwab is the founding director of the World Economic Forum, as well as a member of the Bilderberg Group, about which little is known (cf. Rossouw 2020:86). The expression Industrial Revolution was used for the first time by Arnold Toynbee in 1984 to describe scientific advancements in a society (see Oliver 2020:2). With 4IR, Schwab (2016:1) refers to a next phase in industrial development with universal implications. Schwab refers to an emerging technological revolution with unforeseen consequences affecting our lives, work and relationships. According to Schwab (2016:11), this fourth revolution commenced at the turn of this century and elaborated on the digital revolution marked as the Third Industrial Revolution of the 1960s.

Preceding the Fourth was the First Industrial Revolution based on the use of water and steam. The Second Industrial Revolution appeared with the discovery of electricity. The Third Industrial Revolution used electronics and information technology (Schwab 2016:1) and was marked by developing 'semiconductors, mainframe computing, personal computing and the Internet' (Schwab 2016:11). The immanent 4IR builds on the achievements of the Third Industrial Revolution, expanding the digital revolution and leading to 'blurring of lines between physical, digital and biological lines' (Schwab 2016:1–2). The 4IR emphasises the generating of information and the interconnectivity resulting from technological advances (Schwab 2016:2). The 4IR is characterised by a 'more ubiquitous and mobile Internet, by smaller and more powerful sensors that have become cheaper and by artificial intelligence (AI) and machine learning' (Schwab 2016:11). Mohapi (2017) indicates that the 4IR can roughly be defined as the 'digital revolution'. The 4IR is sometimes referred to as Industry 4.0 (McGinnis 2020), emphasising the advances or upgrading of the industry.

The 4IR can be described as the confluence of technologies, resulting in the 'blurring of boundaries between the physical, digital and biological worlds' (McGinnis 2020). The technologies driving the 4IR are the following:

57. There are other categories than economics that can be used as structures to describe human history. Compare the descriptor of Society 1.0; 2.0, 3.0, 4.0 and 5.0, addressing human history from a more anthropological perspective.

AI, blockchain, faster computer processing, virtual and augmented reality, biotechnology, robotics, the Internet of things, 3D printing and more (McGinnis 2020). This fusion of technologies exhibits the following characteristics (cf. Veldsman 2019:2):

- *Digitalisation:* Access to information is made available through technology.
- *Interconnectivity:* Information is not only created in large volumes at an incredible pace but also shared and made available on an international scale.
- *Virtualisation:* Interconnectivity enables people to connect to anyone anywhere while remaining static at one location.
- *Automation:* The performances of activities and completion of processes are no longer dependent on human intervention.
- *Smart:* Data are constantly generated, enabling quicker processes of decision-making.

Schwab (2016:3) identifies the challenges and opportunities 4IR presents to a society. The 4IR will bring about a financial upswing and improve living conditions; however, it will also contribute to social stratification and inequality. Knowledge of technology will result in a 'high skill/high pay and low skill/low pay' division of society. The impact of 4IR will be felt in business and government (Schwab 2016:4). As to the impact on people, Schwab (2016:7) emphasises on how the 4IR will affect our identity, our sense of ownership and privacy, our consumption patterns, how we relate to work and leisure, how we meet people and interact socially. Schwab (2016:7) identifies the diminishing effect of our compassion and cooperation. Technology affects how we engage in meaningful conversation or the increasing lack of it.

There are, however, those who are critical of the term 4IR and the lack of identifying the implications. According to Rossouw (2020:87), the term 4IR is not widely used globally, and there are indicators it is not regarded by all as a useful or meaningful descriptor (Rossouw 2020:80). However, those who promote the term must be scrutinised for their motivation. Rossouw (2020:89) indicates that Schwab uses the term 4IR to refer to technology-based developments in economic terms. The 'industrialisation of human consciousness and memory', as Rossouw (2020:88) refers to it, is not accounted for in any discussion of 4IR by Schwab. The impact of the 'revolution' is also not well-discussed. At most, Rossouw (2020:89) concedes, the 4IR is at least an attempt by Schwab to 'invite people to think about technology, economy and society'.

It is clear society is changing because of the impact of 4IR. It is, however, not only the economic basis that is changing but how society functions that is changing. The concept of Society 5.0 used for the first time by Japanese scientists to describe the nature of the current society should be seen as a tandem descriptor of the changing and challenging times we are living in.

Why does it matter

Now that we know what the 4IR refers to, it might be necessary to ask why does it matter to know all this? This is especially true if we think in terms of a stark delineation between theology and technology, or simplified, a delineation of material and spiritual. Why is it important for theologians to take note of the 4IR and its impact?

The impact of the 4IR on theology should be understood against the backdrop of the debate on the relationship between religion (theology) and science. Technology can be perceived to be part of the prolongation of the activities and results of science. Physical and biological sciences stand in opposition to so-called 'quasi-sciences', such as spirituality and religion, easily equated with superstition and unsubstantiated opinion. This, however, reflects an outdated definition of what constitutes science created during the Enlightenment, where the senses are defined as the access points to real science. It is, however, impossible to indicate the empirical objects of study for some disciplines such as mathematics, philosophy, ethics and logic. Theology can be added to this category of science where the human behaviour in response to the transcendental is studied.

In the discussion of the influence of technology on theology, the relation of science (of which technology forms part) and theology is important. Technology, for example, is perceived to function as religion vying to replace religion altogether (cf. Peters 2018; Waters 2015). Technology also influences the very nature of theological statements. It becomes necessary to understand the nature of theology to discuss the impact of 4IR on theology.

It has been established that theology is science holding its place alongside all other sciences. A brief excursion into the debate on theology as science provides the context for understanding the complexity of the impact of 4IR on theology.

Theology as science

The conversation on technology and theology should be seen against the backdrop of a much larger and older debate on the relation between science and religion. This debate has been raging in severity since Galileo Galilei in 1633 was forced by the church to renounce his scientific conclusions as they did not correlate with church doctrine. A conversation on the relation between technology and theology has been going on for much longer, but theology had the dominant position. The historical overview of the debate presented by Noble (1997) is compared. Currently, in the debate on the relationship between technology and theology, the impetus has shifted with technology now in a prominent position. The relation of technology (and science) and theology is an unresolved matter.

The debate on the scientific nature of theology is also an old debate. Pannenberg (1973:12, 226) indicates how theology was for the first time considered a science during the 13th century under the influence of the church father Augustine. Pannenberg identifies the different definitions of science applied to theology over time: speculative and theoretical science, practical science (1973:230) and positivistic science (1973:240). Science, according to the Merriam-Webster Dictionary, is defined as the 'state of knowing: knowledge that is opposed to ignorance'. Such knowledge can relate to a system of knowledge relating to the physical world and its phenomena. If science is concerned with understanding reality, McGrath (2003:135) reminds us that natural sciences and theology offer explanations of reality to explain the way things attain understanding.

Interpreting and creating an understanding of reality are not 'the monopoly of one but the privilege of all' (Cassirer [1909] 1974:10). Therefore, natural sciences and theology have access to reality to interpret it and create an understanding of human relation to it. Animosity may be experienced when natural sciences claim to have superior knowledge of reality in opposition to human sciences, perceived as subjective and inferior – both natural sciences and theology attempt to interpret the nature or reality in a rational way. Christians interpret reality and nature as created by God (McGrath 2001:193). Reflecting on creation implies reflecting on the One who created everything. 'Theology is the human attempt to grasp something of the rationality of the created order' (McGrath 2001:193, 2002:248).

Although both reflect on their own unique encounters with reality, theology and natural sciences are not to be equated as identical (McGrath 2002:245). It is important for McGrath (2002:245) to note that engagement with reality implies that each stratum of reality is engaged 'according to its distinct nature'. The sciences then need to follow the rules of engagement relevant to the nature of reality being scrutinised. As reality is stratified, it requires different modes of interrogation (McGrath 2003:82). Based on this, theology requires a unique method of investigating reality. Theology is scientific in content and utilises scientific methods to function.

Theology is concerned with God as the 'ultimate concern'. According to Bultmann (1984:50), God is the object of the scientific activity of theology. Pannenberg (1973:266, 299) states that the object of theology is the reality of God in His revelation. God as the object of faith cannot be comprehended through scientific endeavours unless the nature of faith as the activity of focusing on God is also clarified (Bultmann 1984:54). Faith must be distinguished between *fides qua creditor* [the act of believing] and *fides quae creditor* [what is believed in]. The result is that the object of that which is believed in must be understood as being part of what faith is. Faith is concerned with the revelation of God in Jesus Christ. God reveals himself to humans in his incarnation as Jesus Christ. Humans react to this revelation with faith, believing

that God has revealed himself. Theology is the scientific activity of interpreting the content of this meeting between God and humans (Van Niekerk 2011:6).

When humans meet God, it results in dogmatic statements about God. According to Pannenberg (1973:301), these dogmatic statements are to be captured in subjective faith. Faith, however, does not become the engagement with lifeless doctrines. God is perceived as reality, and therefore, faith is directed at God as being. Access to God's revelation in Jesus Christ is through the Holy Scriptures accessed through faith. Humans gain knowledge through hermeneutical understanding, which is a constant process of interpretation mediated by faith, to understand and comprehend God. This very process causes theology to 'differ from other sciences' (Van Niekerk 2011:3).

Theology is concerned with God, the message about God and humans as interpreters of the divine message (Van Niekerk 2011:7). This does not make God an object. God is never just an object, but He is part of the metaphysical reality humans endeavour to comprehend (Bultmann 1984:53). The human attempt to understand God results in subjective faith, which is impossible to estimate as being true or untrue. Faith is constantly compared with the believed traditions transmitted through history. This makes faith subjective and objective as it is tested against transmitted beliefs in the community of believers. Ritschl (1996:39) suggests that the function of theology is to create 'a language for the implicit obscured concepts hidden from the view of ordinary believers'. Theology as a scientific activity 'assists and contributes to the faith experiences of believers' (Beyers 2016:7 of 9). Theology is science but a science different in nature from other sciences.

The main principle in terms of the relation between theology and technology is parallel to the debate on science and religion. Dixon (2008:4) indicates that the main concern with the relation between religion and science is the possibility of 'intellectual compatibility'. With this, Dixon wants to indicate the different angles and approaches unique to theology and technology and the possibility of reconciling these different and often opposing views. Can religious ideas be compatible with scientific ideas? For example, can miracles be reconciled with the laws of natural sciences (Dixon 2008:4)?

As agents in theology and technology, humans may direct their attention and devotion to reality and refer to the engagement with reality from either a theological or technological framed understanding. The impact of 4IR on theology can be summarised in the dictum of 'In God, we trust', as opposed to 'In Technology we trust'.

Effects of the Fourth Industrial Revolution on theology

To determine the effect of the 4IR on theology, the warning, as stated by Oliver (2020:2), is important. Oliver reminds us of the time lapse that occurs

after the emergence of technology until the full effect on the immediate environment becomes clear. This lapse of time is referred to by Mohapi (2017) as the 'lag period'. During this period, it is only possible to predict and guess the total impact of 4IR on the society. The total effect 4IR will have on the society is not yet clear. This applies to our investigation into the effect of the 4IR on theology. At this stage, it is still only a prediction, suspicion, guessing and anticipation based on the characteristics of the 4IR and how that will impact theology that guides us in creating the possible conclusions.

Scholars have been investigating the effect of the 4IR on theology for some time.[58] The contribution made here is not an attempt at repeating or summarising the existing material but rather an attempt at categorisation of topics[59] already addressed, presented here as examples of the impact of 4IR on theology.

Reconfiguring metaphysics

The Greek philosopher, Plato, argued in his treatise entitled *Timaeus* that God created everything, including humans. After creating the soul, God created a body in which a soul was placed (Russell 2010:143). Humans are, according to this depiction, of dual nature: body and spirit. The Greek philosopher Socrates suggested in his treatise *Phaedo* that the body is of lesser value. The soul is of more value and importance (Russell 2010:134). The dualistic understanding of reality, for long-held as a viable way of thinking about metaphysics, is now challenged by adding virtual reality to the spiritual and material reality. With the emergence of virtual reality, the constitution of metaphysics is put into question as to how to describe reality. Are there three or even more unknown realms, consisting of the spiritual, material and virtual, or has the virtual being replaced with the spiritual realm? The technologically created virtual reality can contribute to the alienation of humans from nature (material reality), other humans and being alienated from God (Edmiston 2014).

Ontologically, the understanding of reality is also challenged in terms of the relationship between entities. Estrangement from reality can take place at different levels. Virtual reality increasingly replaces deep face-to-face connections (Fourie 2020:30). The increase in the amount of Zoom, Google Meet and Microsoft Teams meetings during the COVID-19 pandemic serves as an example of the decrease in face-to-face engagements. 'Virtual reality increasingly replaces real human beings with objects, thus alienating humans from the real world and fellow humans' (Fourie 2020:30). The increase in time

58. Compare the reference in the Introduction to scholars who published on the topic of technology and theology.

59. Compare in this regard efforts by Venter (2020:71–72) to list some categories.

spent on social media contributes to the alienation taking place. Rossouw (2020:82) alludes to the estrangement within ourselves, a disconnection within human consciousness and memory.

The question arises whether technology has replaced religion altogether and focused on an 'ultimate concern'. Waters (2015) suggests that technology has become the new religion. Noble (1997) argues that technology should not be viewed as a new religion. All technological endeavours had been embedded in religious ideas, and therefore, the two (religion and technology) should not be viewed as opposites or identical. Noble (1997) indicates that religion and technology evolved together, with the consequence that technology 'remains suffused with religious ideas'. Technology is still embedded in religious myths and ideas.

There are, however, other opinions regarding this. Padgett (2005) argues that technology displaced religious beliefs, leading to theology emerging from a techno-culture. Roy (2002) outright states that technology has become the most powerful religion globally because of human trust in it. Trust in God has been replaced by trust in technology to be the provider of what humans need. Edmiston (2014) agrees with this statement that humans are becoming more dependent on technology than on God. Noble (1997) indicates how technology has become identified with transcendence. The shift in trust led to the choice of the title of this contribution: 'In Technology we trust'.

Anthropology and dehumanisation

One of the important fields impacted by technology is the consideration of what constitutes being human. The impact of genetic engineering, robotics, AI and nanotechnologies will alter human nature (cf. Fourie 2020:18). People will no longer be regarded as created by God but can be viewed as products defined by AI algorithm' (Fourie 2020:19), contributing to the dehumanising effect on a society.

Fourie (2020:25) addresses the matter of human beings created in the image of God [*imago Dei*]. Through technological augmentation, the boundaries of what it means to be human become blurred. The debate on post- and transhumanism emphasises the new thinking about what it means to be human. Using technology to enhance human mental or physical abilities gave rise to the term transhumanism as an interim phase leading to a post-human phase in a future where humans might live eternally because of technological advances (cf. Edmiston 2014). Humans are evolving away from the original version as the creator designed and created humans.

According to Schwab (2016:7), 4IR will have an immense impact on human existence and society. The 4IR will influence our identity, our experience of private ownership. It will change the way we think of privacy and how we

spend, and on what we spend our money. Our ideas about careers and labour will change (i.e. the place of work and working hours). It will change the way we socialise and interact with others. There will be less meaningful conversations. Schwab (2016:7) emphasises the decreased feeling of empathy and willingness to care for and support others. Society at large is impacted.

According to Schwab (2016), technology will contribute to the dehumanising effect on society. With dehumanisation, Schwab refers to the anti-anthropocentric sentiment of technology-driven societies. Humans and their needs are no longer at the centre or a priority of considerations in a society. We no longer live in an anthropocentric society. Society becomes faceless and cold as technological processes replace true physical human interaction. In this regard, the banking sector's development is a good example of how contact between humans has become less as technology replaced the human face.

Technological advances have long been anticipated, but the process of digitalisation was fast-tracked by the COVID-19 pandemic. The need for social distancing increased because of digitalisation and limiting the risk of spreading disease. Technology became the saving factor, enabling many institutions to continue to exist. In this regard, the adjustments that had to be implemented in the education sector are compared. Besides the positive effect of being enabled to communicate *en masse* and at leisure with others, technology also alienated humans by presenting a technological device as an interface between humans. Technology does distort our relations with others (cf. Waters 2015:144).

Advances in technology brought the issue of the human agency under the microscope. To what extent are humans still necessary to be acting agents in society? Technology can replace many functions performed by humans. This leads to the question of the ethical relation between humans and machines. By combining technology and biology, the ethical question about the status of machines is brought to the fore. May a machine (robot) be a legal entity and what are the implications for society? May a robot be named the legal beneficiary in a will? May a robot be held legally accountable for errors leading to injury or death? Humans are no longer the only members of society. Robots and AI create ethical challenges to humanity. The challenges reveal the trap of anthropocentrism to which humans subscribe (Fourie 2020:27).[60]

Technology resulted in a dislocation from ourselves. Our identity will change. But the dislocation is not only within ourselves or between humans. Fourie (2020:20) indicates the isolation humans might experience from nature. Emphasis on the virtual world will create a distance between humans and nature. Because of technology, humans become more prone to engage

60. Consider how some manufactured robots are still reflecting anthropomorphic features.

with ideas and images of reality than with reality itself. This results in a distance arising between humans and the creation.

Technology changes the very nature of being human. It reconfigures relations: humans in relation to themselves, humans in relation to others, humans in relation to nature and God.

Soteriology

For some, technology has become the evil that heralds the end times. For others, technology has become the saving element bringing relief from all human suffering.

Those who perceive technology as being evil present the following arguments:

- Technology causes humans to be replaced by machines in the labour market.
- Technology leads to the stratification of society, exacerbating the separation of rich and poor (Fourie 2020:24; Schwab 2016).
- Technology wants to turn humans as useless in the larger machinery of society, abusing the individual's skills to benefit the larger whole.
- Technology claims to reproduce humans through cloning, and therefore, commodifies being human.
- Technology is artificial because it preys on human intelligence and intellect.

However, there are also those who think of technology in a positive way:

- Technology improves living conditions by alleviating suffering (i.e. genetically manipulated seeds result in feeding the masses; progress in the health industry causes people to live longer).
- Technology improves living conditions by utilising natural resources like solar power and water filtration.
- Technology assists in protecting endangered wildlife species through implanted tracking devices.
- Technology investigates and enables humans to colonise other planets.

Some find in technology the elements of soteriology when translating these views of technology into religious terms. Fourie (2020:31) indicates how the technological utopia replaces the Christian understanding of God's saving grace. Through technology, an improved environment and living conditions can be created, leading people to no longer rely on God for sustenance and care. Trust in technology will lead to an improved life without suffering. An obsession with technology exists because it is perceived to be the quick fix and magic bullet that can solve all problems (Stahl 1999:20). All the world needs is a 'technology fix' (Stahl 1999:25).

Noble (1997) emphasises how technology came to be perceived as the means to salvation, because 'technology had become to be identified with transcendence, implicated as never before in the Christian idea of redemption'. However, it is not as simple as equating technology with religion, as argued by Waters (2015:143). Goede (2020:115) appears to agree with Waters by indicating 'Science has become a religion in a way, especially in the West'. What, however, can be stated unequivocally is that humans 'place an unwarranted trust and confidence in technology that is effectively, albeit unknowingly, idolatrous' (Waters 2015:144). Humans believe that they can control life through science and become God or equal to God (Goede 2020:115). This trust in science and technology, Waters (2015:144) concedes, distorts our devotion to God and our love for the neighbour.

Rossouw (2020:92–93) refers to techno-messianism, indicating how technology becomes the saving factor in human existence. Salvation and grace are no longer a matter of forgiveness of sin but rather a horizontalised salvation of improved living conditions in this world where suffering and worries are minimised. The 4IR brings the promise of alleviating debt and increasing wealth and development. Technology appears in the guise of a messianic figure, bringing all solutions to all evil. Rossouw (2020:92) warns against such illusions.

The matter of salvation is closely bound to the understanding of an end-time judgement where God will judge all humankind and bring eternal deliverance for those who persevere in faith. Through technological advances, salvation is no longer something to achieve one day somewhere in the future. Technologically induced salvation can be experienced in the present.

Eschatology

Eschatology is the theological discipline dealing with the end-time judgement of God, the expectation of a future day of reckoning where God will bring eternal life to all faithful believers. Then all suffering will end, and all will share the grace of God, providing all human needs.

Through technology, there is no longer a need for salvific action through Christ. Eternal life has become possible through means other than faith and perseverance in the belief in Christ. The possibility of creating a post-human condition through technological augmentation makes the redemptive suffering of Christ on the cross redundant (see Fourie 2020:29). Eternal life can be achieved through technology (cf. Peters 2018). The result is that salvation is now perceived to 'rest in the hands of technology' and no longer only in the hand of God (Fourie 2020:30). The imperfect current world will be replaced by a new, improved and enhanced world

governed by machine intelligence (Fourie 2020:32). Eternal life for humans is not because of Christ's resurrection from the dead but is achieved through technological advances in genetic editing, nanotechnology and the post-human condition.

Fourie (2020:31) makes us aware of the 'dual Eschatology'. The poor and those deprived of access to technology will still need to rely on and trust God for healing, care and salvation. Only in an Eschatological event will deliverance come for them. Simultaneously the rich people who have access to all the advantages of the technology believe that technology will provide and deliver them from evil, suffering and bring about eternal life.

Ecclesiology, Koinonia and Diaconia

The COVID-19 pandemic forced churches to find new and innovative ways of being church. Technology proved to be a successful alternative to traditional ways of being church. Through technology, churches still communicated with congregants and spread the gospel through electronic means, reaching a greater number of people than regularly attending a Sunday worship service. Other church activities were also presented in an online format, with great success. The result was that technology proved to be a good alternative to real-life congregating. Technology has always been at the disposal of the church and has successfully been used by the church to communicate and spread the gospel (cf. Waters 2015:144).

In recent technological advances, technology changed the form, the church's structure and how people participated in church. This revised format of being church challenges faith communities to reconsider the way they think about being church. A new ecclesiology is emerging.

The understanding of the church as the body of Christ has to be reconsidered. Is the church still the body of Christ if no bodies are congregating in the building dedicated to worshipping God? Can the body of Christ be spiritual and virtual? Are there different ways to express the community of believers (koinonia)? Is there still an underlying bond between believers, and if so, how strong is it still? Technology has dissipated the perception of the community of believers (Waters 2015:145). Technology made it possible for individual believers to experience their belonging and express their faith from the comfort of their homes. Belief can easily become a pure individualised matter as congregants rarely experience belonging in a physical environment. The community of believers has been shifted to a virtual reality where Christians can meet with other Christians. Koinonia needs to be redefined as the underlying connection believers have, whether face-to-face or in a virtual capacity.

The digitalised church may experience a change in the way diaconia is experienced. Dehumanising because of technology and alienation because of physical distancing create challenges in caring for and serving those in need (diaconia). In virtual reality, Christians are not exposed to the reality of poverty, hunger and despair. Participation in virtual reality is only for those who can afford Internet-enabled devices and sufficient data. On the Internet, there are no traces of poverty. It does not mean it does not exist. As indicated by Schwab (2016) and Fourie (2020:24), technology will exacerbate the stratification of society into the poor and rich. The process of digitalisation will contribute to the severe stratification of society by dividing the society into the haves and the have nots, and according to Veldsman (2019:4), the 'never will haves'. The church's task to care for those in need dissipates because of the ignorance and unawareness of poverty. In this regard, the church will need to create awareness and establish modes of assistance directed at those in need in a society.

Should the church decide on adopting a complete digital presence, communities and sectors of society will not benefit from it. The poor and even the elderly who are accustomed to a different form of the church might be excluded from the church. The stratification of society is a reality which the church must acknowledge and adapt to reach all people in society. The impact of 4IR on the society will cause concern in terms of fairness and equity (Fourie 2020:24). This warning by Fourie needs to be addressed by the church. No one should be excluded from participating in the body of Christ because of being technologically disadvantaged.

Society 5.0 mitigating the threats of the Fourth Industrial Revolution

The 4IR impacted heavily on the society. Goede (2020:119) reminds of the effect brought about by an overly optimistic reliance on capitalism driven by technology. This combination of economic and technological factors resulted in alienation, market failures, inequalities and social unrest (Goede 2020:119). The belief that capitalism and the unity of world economic markets will result in global solidarity, progress and wealth for all turned out to be a deceiving illusion (cf. Goede 2020:120). Capitalism driven by technology resulted in a dehumanising world and the exploitation of nature.

The threat of dehumanising and alienation already identified by Schwab as a real debilitating effect of 4IR is not an incurable disease. There are already efforts to restore the human face to a dehumanised world. It is important to note the emergence of Society 5.0 to present an alternative to the effects of 4IR. Interestingly, the impetus towards restoring human dignity does not originate from theology or even religious contexts but comes from an economic context.

The Japanese government, through its cabinet office, submitted the Science and Technology Basic Plan in which reference is made to several stages of development labelled as Society 1.0 (early hunter-gatherer societies), Society 2.0 (settled agricultural communities), Society 3.0 (industrialised society) and Society 4.0 (information society) (cf. Van der Merwe 2020). The latest development refers to Society 5.0, defined by the Japanese Cabinet Office as, 'A human-centred society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space' (cf. Van der Merwe 2020). The Japanese formulation considers the fact that economic factors need to be accounted for in a plan to place humans at the centre of society. Society 5.0 attempts to move beyond 4IR and resolve the problems of 4IR (Goede 2020:123). 'The vision is to become a truly human-centred society' (Goede 2020:123). Society 5.0 attempts to reposition humans at the centre of a digital environment and not technology.

Society 5.0 emphasises certain values enabling the human face to be restored to society. Society 5.0 is (Goede 2020):

> [*A*] society where value is created; where anyone can exercise diverse abilities; where anyone can get opportunities anytime, anywhere; where people can live and pursue challenges in security; where humankind lives in harmony with nature. (p. 124)

A value-driven society emphasising human harmony with the environment and human well-being is envisioned as the ideal society.

Society 5.0 does not make space for religion or theology but it does not exclude it from society. By emphasising values that will benefit human well-being, Christianity can associate itself with this endeavour.

Conclusion

Even though Society 5.0 does not consider theology as one of the change agents in the plan, theology may contribute to the outcome envisioned by the architects of Society 5.0. Theology can consider the following contributions to counter the debilitating effect of 4IR:

- humanise society by creating awareness of humaneness
- remind society of the metaphysical and spiritual dimension as essential to human existence and well-being
- become the voice to the voiceless, namely those in a society deprived of technological connectedness.

In this way, theology contributes to restore human dignity to society while still embracing technology as a helpful medium to mitigate the spread of the gospel and improve the lives of many in the world.

Venter (2020:73–74) suggests that theology has a three-part responsibility in dealing with the challenges of technology:

- Theology should accommodate and embrace technology in as far as it can assist in spreading the gospel.
- Theology should absorb and integrate new ideas, thus responding in creative new ways in viewing, reinterpreting and utilising technology.
- Theology should refuse and resist the negative aspects about technology, that is dehumanisation (Venter 2020:75).

In this way, a form of peaceful coexistence between science or technology and theology is possible. Theology then does not replace the devotion to God with adherence to technology. Theology can then still proclaim, 'In God, we trust'.

Chapter 6

Transhumanism and faith responses to science in the public sphere

Manitza Kotzé
The Unit for Reformational Theology and the Development of the South African Society, Faculty of Theology, North-West University, Potchefstroom, South Africa

Introduction

Modernity, Nürnberger remarks, can be described by referring to four essential characteristics; in the first instance, science, which is measured by evidence. In the second place, modernity is categorised by technology, which is calculated by its effectiveness. Thirdly, commerce is another aspect of modernity and is measured by profit. In the last case, modernity is illustrated by consumer culture, which is calculated by utility and pleasure. That which falls outside of these characteristics, Nürnberger (2010) indicates, is side-lined in all of the really meaningful dimensions of life:

> Religion is tolerated as a private pastime as long as it does not interfere in the mechanisms of modern society. At best it is embraced where it offers emotional security, spiritual highs, or a lucrative source of income. (p. 130)

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This dismissal of religion to the private sphere and disregard for religion in the public sphere is especially evident in scientific discussions. Gill (2013:9) indicates that sociologists, for example, rarely treat theology 'as anything other than epiphenomenal and the symbols and concepts generated by theology are typically ignored in sociological accounts of religion'. The significance of theological discourse to social capital is disregarded even by Robert Putnam, a social scientist who has particularly emphasised the societal meaning of religious belonging (Gill 2013:9).

This is especially the case when it comes to statements by theologians and Christian ethicists on scientific matters such as transhumanism. Some perspectives are even more extreme and not only disregard the contribution of theology and religious ethics on these matters but actively call for ethicists to 'get out of the way' (Pinker 2015). Pinker 'reproaches those concerned with the ethical implications of biotechnological research of slowing progress down' (Kotzé 2020:2). Ethicists, Pinker (2015) asserts, stand in the way of research and progress with their 'red tape, moratoria, or threat of prosecution based on nebulous but sweeping principles such as "dignity," "sacredness" or "social justice"'.

Interestingly, it is not only from the perspective of science that this call is raised for theologians and theological ethicists to keep quiet, but sometimes the same appeal is offered from within the theological and ethical sphere itself. Van de Beek, for example, notes that seeing that the relationship between God and humanity is not a relationship that is centred in ethics, we should not limit theology merely to human activity. In his view, ethicists often make themselves guilty of exactly that (Van de Beek 1996:35). Christian ethics, Van de Beek indicates, too frequently get caught up in contemporary issues and the agenda ends up being determined by culture, the times and the social order. He postulates that ethics is contrary to the diversity of choices offered by Scripture and, accordingly, alleges that those who busy themselves with ethical decisions and deliberations are attempting to be 'godlike', indicating that there are greater taboos in the church than anywhere else and that God, knowing what is happening, knows no taboos (Van de Beek 1996:38).

Even though Van de Beek (1996:38) does not argue that no ethical direction or understanding can be offered, it does appear to be a fairly Manichean outlook, where theologians ought to remain occupied only with the 'spiritual' dimensions of life and not human activity. Shuman (2012:1010) also offers this critical evaluation, arguing that theologians, struggling to remain morally relevant, often engage with bioethical matters in such a way that they, rather than make the moral implications for the Christian clearer, often have the opposite effect and make things more incomprehensible. According to these views, theology and theological ethics have no voice in the public sphere and contemporary issues such as transhumanism and its implications should be left to the scientists.

Theology and Christian ethics, however, cannot remain silent, and as I argue in this contribution, should also not remain silent (Moltmann 1999):

> As the theology of God's kingdom, theology *has* to be public theology: public, critical and prophetic complaint to God – public, critical and prophetic hope in God. Its public character is constitutive for theology, for the kingdom of God's sake. (p. 5; [*emphasis in original*])

There is also a valuable precedent for the relationship between theology and science. The leading drive of science, Polkinghorne (2000:5) remarks, 'lies in the desire to understand the physical world'. Accordingly, he states that theology has an inherent function in the age of science, 'because it shares with modern science this quest for intelligibility' (Polkinghorne 2000:5). Nürnberger (2010:128) also indicates that theology contends with concepts of the divine and transcendent, concepts that are inherently part of reality. However, conversation and exchange of ideas between the two fields, theology and science, are dependent on a shared method that enables it to show (Nürnberger 2010):

> (a) how far science and faith deal with the same reality, (b) where current insights of science question traditional theological assumptions, and (c) where theological assumptions go beyond the mandate and method of science. (p. 128)

Similar to scientists, theologians 'are concerned with trying to discern and to understand the nature of reality' (Polkinghorne 2000:29). In the following section, one aspect of the nature of reality, technology will be discussed as part of the conversation and science and theology, with a particular emphasis on transhumanism.

Science, technology and transhumanism

When it comes to theories on technology, as with many other things in life, two extremes and a variety of positions within these two exist. One the one hand, some oppose technological progress as either a required evil or avoid it completely, while on the other hand, other theories support all technology as part of the profound human achievement. Reflection on technology, however, requires that we also remember that technology not only refers to the contemporary surges in technological development in the fields of communication or science, for example. Technology refers to all human abilities and knowledge that are either the result of or the improvement of tools and gear. Inventing the wheel was a technological achievement just as much as the development of the modern computer.

The dilemma of technology is viewed by the leading conversation of technological assessment as the quest to know enough to suitably direct technology, while a different approach stresses the setting up of legislation that impedes the misuse of technology. A further discourse frames the problem as human uncertainty regarding the utilisation of technology. Both of

these directions are dead ends; however, in the view of Heidegger both exacerbate the technological quandary in further establishing the assumptions that we feed it (Brock 2010:31–32).

'Technology is many things to many people, but is external to none of us because it is a constitutive aspect of modern humanity' (Brock 2010:10). Given that technology shares the setting and situation of our modern lives, it follows that it has an influence on the way in which our thoughts and views, and accordingly, our ethical judgements are also shaped. Human beings, Callahan (2012b:228) indicates, are technological creatures and as such, it would be unwise for us to take up an antagonistic perspective towards technology without further nuance. Accordingly, how we utilise technology is the more important conversation. The utilisation of technology that I am interested in, in this contribution, are the biotechnological and nanotechnological endeavours to 'improve' what it means to be human, broadly construed as transhumanism.[61]

Burdett indicates that transhumanism depends on what he calls 'the myth of progress', noting that this untruth is deeply entrenched in the claims made by science and technology. Transhumanism depends on the myth of progress and extends it even further, to the extent that 'its enthusiasts subsequently derive religious value from it' (Burdett 2015:132). The 'myth of progress' is that humanity is advancing and will continue to do so; we are not simply changing, but moving towards a specific goal. According to such a view, the present reality is just a reduced form of the future, which we are moving towards. Consequently, it signifies the incongruity between the flawed present and the flawless future (Burdett 2015:132).

The Enlightenment is usually pinpointed as the beginning of the myth of progress (Burdett 2015:134). Burdett also indicates its relation to Christianity, mentioning for example, Christian mystic Joachim de Fiore who anticipated that history would rise in three stages corresponding to the Trinity, with the final stage, the Age of the Spirit, 'when human beings would be liberated from their physical-animal desires and would know a contemplative serenity and happiness of mind scarcely even describable' (cited in Burdett 2015:135). At present, the utopian ideology is still touted by science in the public sphere. It is particularly seen in the ideals of transhumanism, which 'inspire the hope that human beings will live longer, healthier and happier lives because technologies will remove biological imperfections and the social ills they cause' (Tirosh-Samuelson 2012:711). Tirosh-Samuelson (2012:718) notes that while there are different ways in which to engage transhumanism, an often-neglected element is its religiosity, stating that while the majority of

61. Very briefly put and simply stated, transhumanism can be defined as the attempt to transcend current human biological limitations through technology. For a fuller discussion, see for example Kotzé (2020) and Burdett (2015).

self-proclaimed transhumanists treat religion with contempt and proclaim to be atheists, there are a number of religious themes in the core convictions of transhumanism. These include the search for perfection, the emphasis on human development and a concern for the betterment of society, the progressive understanding of history and the focus on transcendence (Tirosh-Samuelson 2012:721).

In this contribution, I am interested in the faith responses to science in the public sphere, with bioethical discourse being especially relevant to the issue of transhumanism. In the following section, these responses are examined by tracing the shift in how insights from theology and Christian ethics were received in this regard.

Shift in faith responses to scientific advances in the public sphere

The origins of medical ethics can be traced to the Greek physician Hippocrates, with the well-known Hippocratic Oath calling for beneficence and non-maleficence. In some ancient cultures, including the ancient Near East and Greek cultures, because of their intermediary roles with the divine, religious leaders were viewed as healers (Jonsen 1998:27–35). During the Middle Ages and the systematisation of moral theology in Scholasticism, the Christianisation of Hippocratic ethics was severely influenced by Aquinas and his *Summa Theologiae*, especially the sections on moral life and theological virtues. The appeal was to grant human reason an independent sphere 'in all human enterprises favo[u]red an autonomous moral philosophy' (Jonsen 1998:66) during the Enlightenment period. Even though theology and medicine became more separated during the Enlightenment and after, with universities and medical schools adopting codes of medical ethics, there was no seeming conflict between medical ethics and theology and Christian ethics (Jonsen 2000:63–79).

Polkinghorne (2000:196) indicates that in the 1600s in English thinking, a general and widespread idea was 'that of the "two books" that God had written: the book of nature and the book of scripture'. This theme is found in the writings of scholars like Francis Bacon, Sir Thomas Browne and Robert Boyle, 'relating the insights of a nascent science to the traditional insights of theology' (Polkinghorne 2000:196).

The field of medicine after World War II, as noted by Tham (2008), offered a host of new treatment options that previously were not available or even conceivable:

> For the first time in history, medicine gave humanity the possibility of controlling and manipulating its nature and destiny in the areas of procreation, prolongation of life, genetic enhancement, and creation of clones, hybrids, and the like. (p. 447)

With the advent of the 1900s, 'medical ethics' was still recognised as 'the moral theological investigation of the ethical issues connected with the professional practice of medical personnel' (Kelly 1979:228). Moreover, Kelly indicates that almost all sources were Christian (1979:2). These contributions were mostly from Catholic theologians, and apart from Fletcher, prior to the 1960s 'no Protestant work attempted any real medical ethical study' (Kelly 1979:2). In 1954, Fletcher (1954:224) himself recognised that to the best of his knowledge, 'nothing of this kind has been undertaken by non-Catholic as yet' and that with the exception of Catholic moral theology, 'there is a strange blind spot about the ethics of health and medicine in almost all ethical literature'.

Whereas medical and bioethical issues have been the topic of public discussion and debate since ancient times, it is really only after the biomedical experiments used during World War II were exposed that public attention was brought to this matter. After Nuremberg, concern began to be raised over the grade of scrutiny of scientists and doctors by society and the public insisted on a greater say in how scientific and biomedical experiments were conducted and findings used. This heightened public concern can also be understood as part of the broader decline in paternalism and the egalitarian shift in the Western society. It is also marked by a widespread suspicion of scientists Bryant, Baggot la Velle & Searle 2005:24–25). Jonsen (1998:11) also indicates that part of this shift was a result of the advances in medical science and medical interpositions becoming progressively specialised and technical.

Hanford (2002:5–6) refers to the secularisation[62] of bioethics, and ethics as a whole, and the elimination of theology from the field, and reiterates that the only source of bioethical enquiry in the mid-1960s was theology, particularly Catholic theology and the tradition of medicine itself, which was deeply influenced by religion, as indicated earlier. At the time, the Catholic Church's public articulations on a variety of discussion points in medical ethics resulted in many distancing themselves from the pronunciations and the discussion, in general, and the field of bioethics was taken over by secular disciplines like law and policy, to such an extent that Hanford (2002:4–5) states theology has all but completely disappeared from bioethical debates. Ethical issues in

62. It is beyond the scope of this contribution to enter into the various debates on the definition of secularisation. As used today, the term 'secularisation' stems from the work of sociologists such as Weber, who made use of it to argue for the decline of religion. For the purposes of this contribution, a broad definition of secularisation will suffice, referring to the diminishing of religious authority at various levels, including societal and individual. Hollenbach, however, notes that secularisation is often the opposite of the truth; religion is in reality not on the decline as is frequently reported, but that that is merely the modern Western European experience. Secularisation defined as the privatisation of religion is also a debatable explanation, given the prominence of religious factions also in the political domain. Another way that secularisation can be understood is as the distinction of religion from other areas of life. Considering the notion of secularisation in such a manner upholds an appreciation for personal and religious liberty, while also assuming that religious communities and institutions should avoid attempts to achieve hegemonic control of other spheres of life, such as the social and political, by the religious.

medicine were known as 'medical ethics' up and until the 1970s, and Cameron (1995:3) indicates that the shift towards 'bioethics' also contained symbolic meaning, concurring with the advent of new values in medical practice and the start of a new community.

While the voices of theologians and Christian ethicists were becoming more and more side-lined in public discussions on issues of bioethics, it does not mean that they were stopped completely. Francis Collins, the director of the US Human Genome Project from 1992 to 2008, for example, stated that the project is founded in Jesus' ministry of healing, calling it a 'matter of discipleship, a natural extension of our commitment to heal the sick' (Verhey 2003:159). Other elements remain widespread in the public sphere, even after the secularisation of bioethics and bioethical debates. Phrases such as 'playing God' are still widely used in secular discourse in the public sphere, particularly when transhumanism is discussed (Kotzé 2020:4).

Since the Enlightenment, Tham (2008:445) notes, 'secularism has encroached upon the hegemony of religion in different public spheres of society'. One after the other, the fields of 'politics, culture, science, economy, judicial activism, philosophy, and education', as well as medical ethics, started to shift from one where religion was in control to a context where (Tham 2008):

> [*M*]ost modern democracies have taken to heart the dictum of 'separation of State and Church' or the Rousseauian proposal of a secular state of laicite, where laws, government programs, and education must strictly be founded on nonsectarian principles. (p. 445)

The secularisation of bioethics is also identified by Callahan as one of the most prominent adjustments since the 1970s. The field of bioethics, he indicates, 'has moved from one dominated by religious and medical traditions to one now increasingly shaped by philosophical and legal concepts' (1990). This has resulted in an approach to public discourse where secular leitmotifs such as self-direction are stressed, as well as 'a systematic denial of either a common good or a transcendent individual good' (Callahan 1990).

Where earlier theology and Christian ethics were prominent voices in bioethical discussion, also in the public sphere, these perspectives gradually became less welcome. In the present, as noted earlier, there are strong opinions that ethicists and particularly those with religious points of departure should distance themselves from such debates, as well as similar attitudes from within Christian ethics.

Theologians, Tham (2008:443) indicates, 'had opened up the field of bioethics' but now 'found themselves slighted in academic and public discussion'. In the following section, I examine the type of theological ethical reflection offered in order to determine whether this can have ties to the side-lining of theological ethics in the public sphere on matters of bioethics, transhumanism in particular.

The type of theological ethical reflection

In the previous section, it was indicated how theologians and Christian ethicists were at the front of reflection on medical ethics and bioethics from its inception, but that this has gradually changed to a field where these voices are no longer welcome and, in many circles, actively unwanted. In this section, I examine the type of ethical reflection offered against this shift. As noted earlier, moral and ethical reflection on medicine in the 1960s and prior was almost entirely Christian, which is a very different situation than the present reality.

The early theological bioethics, Cahill indicates, involved their 'publics', be it the church, the academy or society, in a variety of overlapping manners that very often became reduced to one, policy making. From almost the very beginning, she (Cahill 2017:376) states, 'theological bioethics had to contend with the assumption that the primary forum of their public contribution would be policy, and that "secular" and "neutral" language should prevail'.

It has also been remarked by Kaveny that the theologians who are elected to serve on federal and legislative committees are usually elected based on the perspective of the chair of said committee. This can be seen clearly in, for example, the National Bioethics Advisory Commission, established by President Clinton for 1996–2001, which deliberated on issues such as, among others, cloning and embryonic stem cell research. Only one perspective on the role of law was featured, which sought to maximise individual liberty and rights. Research utilising human embryos was provided the green light to be continued without restrictions. However, the President's Council on Bioethics, established by President George W. Bush for 2001–2009, 'included only 'neoconservative' religious thinkers, who were set up against the secular liberal members in culture-war fashion' (Cahill 2017:377). While in both councils, contributions from theological perspectives were given the space to do so and some views were referenced with biblical and theological language, the absence of nuance and complexity in the viewpoints offered, Cahill (2017:378) notes, 'led to an inability to ponder the "big questions," and theology did little to influence the outcome'. Callahan (2012a:68) also notes that within one generation, the professional role played by theologians in bioethical debates, in particular in the public sphere, was overcome and subjugated to the entrance of philosophers and lawyers, educated in the logical tradition, into the field of bioethics; they were able to express their perspectives with a 'cool, impersonal and putatively "rigorous" style'.

In order to compete, it is very often the case that theologians who do serve legislative councils and public forums on bioethical matters 'operate in practice

more as philosophers' (Cahill 2017:383). Cahill (2017:383) notes that such theologians serving on bioethics bodies utilise language and concepts that are commonly agreeable and rather than overt theological terms, would speak of 'human dignity' and 'the precautionary principle'.

In a 1983 report of the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioural Research, *Splicing Life*, which focused on genetic engineering, and the direct and social implications it could have, the perspectives of theologians and religious institutions were considered. In the final report, however, the concerns raised were dismissed as too vague, avoiding profound questions raised by theologians and theological ethicists on the limitations of forethought and humility and the exclusion of the needs of the poor. Cahill (2017:377) states in this regard that the '"thick" traditions of faith communities have been marginalised [...] and replaced by a "thin" secular language that elevates autonomy and refrains from putting any serious limits on scientific innovations'. In the following section, the designation of responses as 'thick' and 'thin' will be returned to when reflecting on faith responses and the public sphere.

Faith responses and the public sphere

On the role of the church, or of theology, in the public spheres of life, Smit (2009) indicates that:

> The Reformed intuition is not merely that the church itself should be continuously reformed in obedience to God's revealed word and will, but in fact the whole of life, the political and social order, history and the world. (p. 424)

Koopman's public theology is rooted in the confirmation that 'God so loved the world', or on '"thick descriptions" of the content of the Christian faith traditions' (Smit 2009:526). There are three components to this confessional conviction; the 'inherent public nature of God's love', the 'rationality of God's love for the world', and the 'meaning and implications of God's love for every facet of life' (Smit 2009:526). Similar to the three aspects, for Koopman, this manner of explaining the Christian faith should also be in accordance with a trinitarian approach. Furthermore, a theological, 'in fact Trinitarian and confessional', outlook, consistently and consciously marks his approach to ethical issues (Smit 2009:526). The theological tradition provides the moral vision, frameworks, motivation and inspiration and 'guides the formulation of parameters for the formation of moral character and public virtues'. In addition, it can 'provide the values and norms that can be a factor in the making of decisions on public policy' (Smit 2009:526).

There is also a strong link between bioethics and public theology. Cahill (2017:370) remarks that in the years directly before Martin Marty first used the

term 'public theology' in 1974, '[b]ioethics was one of the main arenas of public theology'. From the 1960s to the 1980s, theologians 'took on a public role in bioethics debates' (Cahill 2017:370) and several served on legislative and government commissions, took part in institutes with an interdisciplinary approach and published analyses that received attention in the popular media also. Eventually, public engagement in this regard influenced especially by liberation theology, 'shifted from medical, research, and policy decisions of elites to the needs of the poor locally and globally' (Cahill 2017:370), and the connection between theological scrutiny and action was more emphasised. The shift in faith responses in the public sphere discussed earlier can also be seen in this regard, however.

A proposal: How theological ethics could respond to issues raised in the public sphere by transhumanism in a productive manner

Before turning to the notion of theological ethics in the public sphere, it is necessary to briefly touch upon the contested term of public theology, one that is also defined and utilised in diverse ways. For this contribution, I merely use it in the manner articulated by Koopman (2012:1), who refers to his usage in an article as 'simply [...] to refer to the quest of South Africans churches and theologians to redefine and contextualise the calling and role of Christian faith and churches in public life'.

It was indicated in the earlier sections of this contribution that while theologians and Christian ethicists were involved from the beginning in public discussion on bioethical matters, this is no longer the case. The type of faith responses in the public sphere has also shifted to a more neutral language, or 'thin' rather than 'thick' contributions. I wish to make the proposal that a way for theological ethics to respond to issues raised in the public sphere in a productive manner, also on issues such as transhumanism, could be a reclaiming of 'thicker' contributions, utilising the Christian doctrine.

Concerning the connection between ethics and doctrine, Moltmann indicates that 'everything done and suffered must conform to what is believed, loved and hoped for' (Moltmann 2012:xiii). What we believe and confess must influence how we live, think and act, and accordingly, also our ethical response. For this reason, I propose that Christian doctrine is the ideal entry point in ethical discussions on transhumanism. While Douma emphasises that ethics and dogmatics are two different disciplines, he also refers to Calvin's *Institutes* as an example of a work that cannot be considered either a dogmatics or an ethics in the modern sense of the word. As he notes, in the *Institutes* (Douma 2003; cf. Kotzé 2013:2):

> [*D*]octrine and life are treated together from the first page to the last [...] Calvin knew what every dogmatician and ethicist must know, namely, that every doctrine (in dogmatics) has an ethical side, and every ethical question roots deep in the soil of doctrine. (pp. 39–40)

Smit also discusses Calvin's preference for the terms 'Source', 'Wisdom' and 'Power' and argues accordingly that the first attribute of Reformed trinitarian thought can be expressed by stating 'that the doctrine is seen as providing the necessary "grammar" to speak about the message of the scriptures' (Smit 2009:61).

Science, Polkinghorne (2000:33) remarks, is never completely certain or its method completely clear cut. Similarly, he indicates that the (Polkinghorne 2000):

> Christian creeds are not non-negotiable formulae presented for us to sign with hesitation or questions. Instead, they are concise summaries of the Church's beliefs, arising from its intense reflection on the foundational events recorded in scripture and the continuing experiences of worship and obedience present in the lives of its members, who are seeking to live in the faith of the risen Christ. (p. 38)

The *Nicene Creed*, for example, is the same today as it was in the fourth century, he notes. The character of Christian doctrine, or credal statement, makes it possible for an unchanging text to be reconciled with ongoing enquiry and the claim that every generation should make the *Creed* their own. Doctrine is succinct, exactly because it is not attempting to be thoroughly specific and define a zenith of orthodoxy. Rather, a territory is staked out, 'within which a faithful theology is free to roam' (Polkinghorne 2000:40). In this manner, the openness within limits of Christian doctrine makes it ideal to engage scientific issues, including questions raised by transhumanism.

Responding to transhumanism from Christian theology

I have argued in this chapter that Christian theology and ethics have a contribution to make to discussions on scientific advances, and that a 'thicker' form of engaging, informed by Christian doctrine, could form the basis for such engagement. In the final section of this chapter, I lay out some specific features of transhumanism, briefly indicating how Christian theology can respond in a more substantive manner. The intention here is not to provide a full theological treatise on every aspect; however, the aspects that follow serve as an illustration of the valuable response that Christian theology and ethics can offer, also in the public sphere.

Seeing as transhumanism seeks to 'transcend' humanity, in particular the limitations and shortcomings that it perceives, one of the most important fields of discussion could be on *anthropology*. The question of whether the so-called 'enhancements' proposed or envisaged by transhumanism could

result in the creation of a new species rather than merely enhanced human beings is one of the questions posed by ethicists reflecting on this matter (Dumsday 2017:602–603). This would hold implications for how we define human nature and as a result, anthropology itself. Accordingly, theological anthropology, as a field that also reflects on what we believe and confess about humanity and human nature, has much to contribute to these types of discussions. Some similarities exist between the Christian view of human beings as fallen and in need of redemption and the transhumanist view of human beings as flawed and in need of improvement, although the manner in which redemption or improvement is reached differs wildly. Christian doctrine, creeds and confessions can, therefore, add to the conversation also by clearly articulating these differences. One such example could be the differing 'new creatures' that transhumanism has in mind and the 'new creatures' that is confessed by Article 24 of the *Belgic Confession*, where reference is made to human beings being made new through sanctification.

In reference to the intersection between biological concepts of what constitutes a species and conversation of human genetic enhancements, Dumsday (2017:603) also observes that 'theological discussions of transhumanism have seen relatively little detailed engagement with these accounts'. As such, engagement from the side of theology and theological ethics with transhumanism that is grounded on thicker responses steeped in Christian doctrine, as has been argued in this chapter, could make a valuable and novel contribution to such debates on anthropology.

Already alluded to in the previous paragraphs and related to anthropology, other Christian doctrines that could be of particular relevance in the theological response to transhumanism could also include *hamartiology* or the doctrine of sin. The Augustinian notion of original sin whereby all human beings become heirs to the original sin through Adam, providing them the inherent inclination towards sin and estrangement from God, raises a number of questions when considering the possibility of future transhuman individuals. Would a new transhuman species, free from the lineage of Adam, be free from original sin?

Elsewhere, I have also examined the response to transhumanism from the perspective of hamartiology, in particular the sin of pride. Two conflicting arguments can be made by appealing to the Christian doctrine of sin, on the one hand, by referring to the sin of human pride and the inability to recognise our own limits as human beings, the Promethean concern (Kotzé 2020:4). Within such an understanding, the Christian doctrine of hamartiology could add to discussions on transhumanism in the public sphere to caution against overstepping our boundaries and 'play God'. On the other hand, it would also be possible to appeal to the sin of sloth to argue in favour of transcending our human limitations through transhumanist endeavours, claiming that to shirk

our responsibility to better ourselves as a species and not step up when we have the technological abilities to do so, would be slothful and sinful. These two perspectives can be fleshed up in much more detail but serve to again illustrate the valuable contribution that theology and theological ethics can make to the conversation in different directions when offering such a thicker response informed by Christian doctrine.

As a final example of Christian doctrine offering a response to transhumanism in the public sphere, the doctrine of salvation, or *soteriology*, also offers an obvious and related point of concern. In Christian thought, salvation for humanity 'or, in the Reformed tradition, all the *elect* among humanity' (Dumsday 2017:616; [*emphasis in original*]) has been given by the sacrificial death of Jesus Christ on the cross. If transhumanism results in a new species of transhuman beings, questions can be raised whether these creatures would be included in the ambit of this sacrifice? If, as indicated earlier, such human beings, not of the lineage of Adam, are born without original sin, a further question would be whether they are in need of salvation at all and whether it would be possible for them to experience their own Fall? (Dumsday 2017:616). These are all questions that deserve much deeper theological deliberation; however, that serve as an illustration of the stronger engagement that would be possible for theological engagement with transhumanism.

Conclusion

With new technology and new developments in medicine, new challenges arise for bioethics. Transhumanism poses unique questions to theologians and Christian ethicists; yet, the contributions from these fields are often unwelcome in the public sphere. In this contribution, I have traced the shift in faith responses to scientific advances in the public sphere. I then examine the type of theological ethical reflection offered, and how it went hand-in-hand with a shift from thicker to thinner theological reactions in the public sphere. Lastly, in the final part of this chapter, I offered a suggestion for how theological ethics could respond to issues raised in the public sphere by transhumanism in a productive manner, by utilising Christian doctrine as a thicker theological reflection (Polkinghorne 2000):

> If the religious aspect of personhood has the significance that I believe is rightly attributed to it, then theological study is an indispensable component of the search for understanding, in a scientific age as much as in any other. (p. 19)

In this contribution, I have contended that a 'thicker' form of engaging in the public sphere, in particular, one that is informed by Christian doctrine, could be a way forward for theology and Christian ethicists in the context of often being dismissed from the very discipline they founded.

Chapter 7

Respect for quality traditional medicine as a global bioethical principle

Riaan Rheeder
The Unit for Reformational Theology and the Development of the South African Society,
Faculty of Theology, North-West University,
Potchefstroom, South Africa

Introduction

The Universal Declaration of Bioethics and Human Rights (hereafter UDBHR) as adopted in 2005 by all the member states of the United Nations Educational, Scientific and Cultural Organization (UNESCO) is a unique and extremely important bioethical (political) text. It is the only human rights declaration that has been accepted unanimously by all the governments of the world and is considered the greatest impetus for the rise of global bioethics (Ten Have & Jean 2009:17; Ten Have & Patrão Neves 2021e:55). In this research study, I focus on Article 17 of the UDBHR, which is formulated as follows (UNESCO 2006):

> Due regard is to be given to the interconnection between human beings and other forms of life, to the importance of appropriate access and utilization of biological and genetic resources, to respect for traditional knowledge and to the role of human beings in the protection of the environment, the biosphere and biodiversity. (n.p.)

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Article 17 clearly states that the state and all communities must value respect for traditional knowledge as a matter of principle (Art. 1.2; UNESCO 2006). In light of the objectives of the UDBHR, this means that traditional knowledge must be actively promoted (Art. 2g; UNESCO 2006). The UDBHR offers no definition for traditional knowledge; however, most commentators are of the opinion that the term traditional knowledge as used in the UDBHR should be understood and applied in two ways. The first use of the term can be defined as environmentally oriented traditional knowledge (Ten Have & Patrão Neves 2021c:627). This is inferred from the fact that the term traditional knowledge is used within the context of Article 17, which focuses on the protection of the environment, biosphere and biodiversity. Because indigenous peoples are directly dependent on the environment, biosphere and biodiversity for their food, water, shelter and medicine, they have acquired thousands of years of experience and (traditional) knowledge in caring for and preserving the environment, biosphere and biodiversity (International Bioethics Committee [IBC] 2013:11). In Ghana, for example, some animals are considered sacrosanct, and according to traditional guidelines, fishing is forbidden on certain days. The second use can be described as referring to medically oriented traditional knowledge, known as TM (Macer 2014:1380). It is important to take into account the fact that the focus of the UDHBR is on global bioethics (medical ethics) (IBC 2013:1; Ten Have & Patrão Neves 2021d:1007). Article 1 of the UDBHR describes the scope of the instrument as follows: '[t]his Declaration addresses ethical issues related to medicine, life sciences and associated technologies as applied to human beings [...]' (UNESCO 2006). It follows the fact that the UDBHR not only focuses on traditional knowledge in a broader sense but particularly on traditional medical knowledge (Ten Have 2019:112).

This article focuses exclusively on the medical aspect of traditional knowledge, namely TM. In the UDBHR, however, TM is associated with the concepts of respect for cultural diversity (Art. 12) and quality health care (Art. 14). This ethics connection raises the issue of faith (culture and tradition) and science (quality health care) *ipso facto* (Ten Have 2019:119). The purpose of the research was to present a Protestant theological-ethical foundation for respect for quality TM. Why is it necessary to design a Protestant theological-ethical foundation for this human rights principle? Human rights are essentially a moral issue, which means that human rights must first be ethically grounded or assessed before they can be acceptable or formalised in legislation (Vorster 2017:33–34). Interestingly, UNESCO commentators also acknowledge this premise when they argue that an exclusive appeal to the authority of human rights is not enough to accept bioethical rights from a religious perspective, and therefore, 'a deeper layer of convergence between the political/ethical/legal communities must be sought' (Garcia et al. 2017:72).

From a Protestant perspective, the Christian scriptures serve as the normative starting point in a discussion on human rights and serve as the primary and authoritative means by which 'convergence' can be proven or rejected. Vorster (2015) writes in this regard:

> The essence of the second commandment therefore lies in the statement that God wants to teach his children through the living proclamation of the Word [...] Eventually, the written Word provides the principles for ethics and that is the acid test for all ethical codes and acts. (p. 109; author's own translation)

A Christian–ethical approach to human rights must start with the fundamental question: is there any theological ethical foundation for a particular global human right? The research problem is that the idea that quality TM should be respected has not yet been assessed from a Protestant theological-ethical perspective. During the development of the UDBHR, there were intense deliberations with Islam, Confucianism, Buddhism, Hinduism, Roman Catholic and Jewish faith traditions, but not with the Protestant faith tradition (Ten Have & Jean 2009:31), from there the subheading, namely 'Protestant ethics from the outside in dialogue with UNESCO'. The central theoretical argument of the study is that respect for quality TM can be grounded in the Trinity and goodness of God, but not without a corrective addition. The UDBHR does not bring culture (faith) and science into conflict with each other with its use of the concept of respect for quality but suggests a responsible coexistence and interconnection.

The theological ethical basis of the global bioethical principle of respect for quality TM is discussed as follows: under the first heading (Global principles) two issues are addressed. In the first place, the meaning of TM in Article 17 is analysed and described (TM). In the second place, the discussion pays attention to two global bioethical principles, namely respect for cultural diversity (Art. 12) and the principle of quality health care (Art. 14; Ethical guidelines). Under the second heading (Theological foundation), a Protestant ethical foundation for respect for quality TM is developed.

Respect for quality traditional medicine

Introduction

This section, firstly, pays attention to what the UDBHR broadly understands by TM; secondly, what TM health systems can be expected from the world community; and thirdly, what the world community can expect from TM. This information is essential for the development of a Protestant ethical foundation for the notion of respect for quality TM.

Traditional medicine

What is meant by the term 'traditional medicine' (TM)? It is important to point out that TM is a collective name for a wide variety of health systems and practices (plants, animals and mineral products, as well as spiritual systems), each with their own unique history, anthropology and development. It is impossible to discuss each system in depth and practice in the available space, and any attempt to discuss TM at length will detract from its complexity and cultural dignity. What is more, it is not necessary to discuss TM comprehensively, because the global bioethical perspectives are the main focus of the article (cf. Tangwa 2016:2810). The UDBHR does not offer a definition for TM, but in the introduction into the UDBHR, readers are advised to use, among other things, the information provided by the World Health Organization (hereafter WHO) regarding the interpretation of the UDBHR (par. 6, UNESCO 2006). In light of this, I use the WHO's definition for TM here (cf. IBC 2013:2). In his discussion of TM and the UDBHR, Tangwa (2016:2810) considers the WHO definition as the best available definition to work with. The WHO defines TM as follows (WHO 2019):

> It is the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness. (p. 8)

Traditional medicine as referred to in the UDBHR is briefly described based on the WHO definition. It has five characteristics. However, although these characteristics are distinguished from each other in the discussion, they cannot be separated from each other.

The *first characteristic* is that TM can be *explicable or inexplicable*. In general, there is a distinction between allopathic (modern) medicine and TM. Allopathic medicine is rational, scientifically and technologically based medicine. Modern medicines are strictly regulated, which means that all medical interventions must be scientifically verified as safe and effective (by randomised controlled trials) before they can be made available to the public. There are also strict quality control mechanisms to ensure that the patient can be sure of the quality of the medicine (Chatfield 2016:102). Along with this, intensive training is combined with professional and ethical standards (Chatfield 2016:106; Ten Have 2019:125). Allopathic medicine is generally considered to be explicable because of the comprehensive knowledge about the functioning of the body and psyche, as well as the exact functioning of the medical intervention.

At the other end of the spectrum, we find TM with its variety of forms as old as mankind itself (Ten Have 2019:114). In general, especially from the dominant Western perspective of allopathic medicine and health care, TM is not taken seriously and is considered unscientific and second-hand health care that cannot be trusted. The functioning of TM may be either explicable or unexplained. In modern times, some TM may be explicable in the sense that

the active ingredient of a particular herb has been scientifically researched in another context, and its safety and effectiveness are known to some extent. For example, *Rhodiola rosea,* used to relieve depression, has been clinically studied and is frequently used in TM. However, in most cases, the functioning of TM is still unexplained and is based on the knowledge of plants, animals and the spiritual that has been gathered over a very long period of time by trial and error, observation and experience (Tangwa 2016:2815; Ten Have 2019:112; Ten Have & Patrão Neves 2021a:109). TM is defined by some people as historical case-based empirical knowledge (Chatfield 2016:102).

It should also be mentioned here that some TM show some effectiveness and safety. It appears that Chinese and Indian TM has shown encouraging outcomes in the treatment of chronic disorders, such as rheumatism and certain metabolic, neurological and behavioural disorders (IBC 2013). In India, Africa and Latin America, there are also examples where TM offers successful treatment for the relief of symptoms such as stomach pain, diarrhoea and jaundice. Along with this, TM has also reduced the incidence of malaria through preventative herbal medicine (IBC 2013). Often, sceptics mention the placebo effect as a reason where TM is claimed to be effective (O'Mathúna & Larimore 2009:loc. 775).

The *second characteristic* claims that TM is strongly *culture bound*. It is projected that there are approximately 370 million native people living in nearly 70 countries (Ten Have 2019:124; Ten Have & Patrão Neves 2021c:627). These indigenous peoples are found in various cultures in the Arab world, Africa, Asia, the Pacific Islands, Latin America, the Caribbean, Europe and North America, and they each use their own unique TM. Culture is characterised by genealogy and environment, and is the result of the adaptation of a moderately homogeneous population over a long period of time to a specific environment. This group of people face the same challenges in the environment, develop the same life and worldview, which results in the same behavioural patterns, attitudes, expectations, ideas, beliefs, thoughts and practices. The need to promote health and to diagnose, prevent and treat disease develops spontaneously in the culture, and people use (discover) the available resources in the environment where the population resides (Tangwa 2016:2812; Ten Have & Patrão Neves 2021c:627). Traditional Medicine is closely linked to culture and the environment (Ten Have & Patrão Neves 2021d:1007). It is accepted that there are as many forms of TM as there are cultures (IBC 2013:2). Ten Have (2019:117) remarks that biological diversity (environment) is linked to cultural diversity (see the discussion on cultural diversity of TM further). The value of TM lies in the fact that it not only holds medical benefits but also is particularly of cultural (and spiritual) value (Ten Have 2019:126). Practitioners of TM share the same culture as their patients and have the same view on health and disease, and also a similar understanding of the human organism in relation to the wider community (IBC 2013:10). In China, Korea, Japan and

Asia, TM has existed for thousands of years and is accepted as an inherent part of the culture, and therefore, highly valued and respected (Chatfield 2016:99; Ten Have & Patrão Neves 2021d:1007).

The discourse on TM and culture frequently also refers to alternative medicine (AM) (Ten Have & Patrão Neves 2021d:1007). This medicine is also known as complementary, natural, non-conventional or holistic medicine. Alternative medicine is generally accepted as TM and is defined as medical interventions practised outside their cultural origin and environment (IBC 2013:3; Ten Have 2019:118; Ten Have & Patrão Neves 2021d:1007). The use of AM (and TM) is growing globally (IBC 2013:1; Ten Have & Patrão Neves 2021a:109, 2021d:1007) and is no longer limited to developing countries (Ten Have & Patrão Neves 2021d:1007). More and more citizens of industrialised countries are using TM, despite access to modern medicine (Chatfield 2016:99). Herbal medicine, yoga and acupuncture are among the most popular practices (Ten Have 2019:118). In Germany, about 90% of the population have used some form of TM at least once (Ten Have & Patrão Neves 2021d:1007). About 40% of adults in the USA use some form of AM (Chatfield 2016:99; Ten Have & Patrão Neves 2021a:109). There are three reasons: (1) some citizens are disillusioned with modern medicine and have lost confidence in it, (2) other people are convinced that TM is more 'natural' and therefore risk free, and finally, (3) many consider TM as good additional treatment for chronic, debilitating conditions and incurable diseases (Chatfield 2016:99; IBC 2013:3–4).

The *third characteristic* avers that TM is *based on unique theories*, *beliefs* and *experiences*. Traditional medicine is not only closely related to a particular culture but also closely connected to the unique theories, beliefs (religions, worldviews) and experiences of a specific culture (Tangwa 2016:2812; Ten Have & Patrão Neves 2021a:109). Ten Have (2019:121) confirms, '[a] traditional healing system explains and treats suffering, illness, disability and dysfunction within a particular worldview'. In most TM health systems, health is understood and approached holistically (IBC 2013:10; Tangwa 2016:2812; Ten Have & Patrão Neves 2021c:627, 2021e:55). In many global cultural systems where TM is used, there is the broad philosophical belief that health is a harmony or balance (state of equilibrium) between a variety of factors. A person lives interconnected with other people, the environment and the spiritual aspects (Ten Have & Patrão Neves 2021b:589). Health (equilibrium) or disease (imbalance) is determined by the character of the interdependence between a person and his social, natural and supernatural environment. TM as a medical system and intervention offers health or equilibrium (IBC 2013:9).

In Africa, TM is based on the traditional African religion and spirituality that views man as an inseparable part of the social, natural, spiritual and cosmic environment (IBC 2013:9; Mokgobi 2014:24). In *Zimbabwe*, for example, certain herbs are considered having supernatural powers. However, the magical

properties of the herbs are only effective when combined with a belief system that combines rituals (slaughter of animals), divination (making contact with the spiritual or supernatural world for obtaining information) and the use of symbols. The Mijikenda tribe in *Kenya* has a similar view, with the belief that if herbs are not combined with the belief system (rituals, divination and symbols), the patients will be punished or made sick by the spiritual forces (ancestors) (Abbott 2014:6, 30–31). In *South Africa*, traditional healers also use divination through the interpretation of bones. The traditional healer is controlled by an ancestral spirit. The healer throws the bones in front of him, after which the ancestors influence the pattern into which the bones fall on the ground. The pattern is interpreted to determine the diagnosis and treatment (Mothibe & Sibanda 2019:12–13).

In the Arab world, TM is largely related to the Islamic religion and other indigenous popular cultural beliefs (IBC 2013:5). TM in China is based on various interconnected philosophical concepts such as yin/yang; the five elements of wood, fire, earth, metal and water; treasures of the body such as essence, qi energy and mind or soul; zang/fu solid organs and meridians or channels in the body. In India, Ayurveda is the country's most recognised and used TM health system. Ayurveda means knowledge of life and is based on the view that life and health are maintained by a non-physical life-giving energy called *prana*. Good health is facilitated when the healthy flow of *prana* is improved by TM (IBC 2013:6; O'Mathúna & Larimore 2009:loc. 3338). In the southern Pacific Islands (e.g. Fiji; UNESCO 2013), TM is connected with two fundamental Polynesian ideas, namely *tapu* (ritual prohibition and restrictions) and *mana* (an depersonalised force or quality that resides in humans, animals and immobile objects), and these concepts stand in a relationship with the spiritual world (IBC 2013:6–7). In Latin America and the Caribbean (e.g. Cuba), health is dependent on the uninterrupted availability of precise sources in the environment, such as plants, animals and animal products and ritual objects, as well as seasonal scents, colours and scenery (IBC 2013:7). In North America and Canada, TM is practised by American Indians, First Nations, the Inuit and the Metis indigenous peoples. An important feature of the TM of the First Nations, Inuit and the Metis population groups is the idea that each individual is occupied by a specific spirit that has its own name and colour. The only way to determine the reason of disease and cure it is to communicate with the spirit (IBC 2013:8).

The fourth characteristic asserts that TM consists of *knowledge, skills and practices*. From a particular culture and its related theories, beliefs and experiences flow knowledge, skills and practices. Because knowledge systems (theories, beliefs and experiences) vary, a great variety of knowledge, skills and practices exist (Ten Have & Patrão Neves 2021c:627). Medical interventions through TM can be divided into three categories, namely medical, non-medical and spiritual therapies (IBC 2013:4; Ten Have & Patrão Neves 2021d:1007).

The *first category of medical therapies* involves medicines made from plants (herbs), animals and minerals (Ten Have & Patrão Neves 2021d:1007). To restore harmony and balance, healers use a combination of community flora and minerals selected for their therapeutic properties and their symbolic and religious significance (IBC 2013:5, 7). In Latin America, cocoa and tobacco leaves are used during ritual healing. Herbs are also sometimes burned (IBC 2013:7–8). Homeopathy can also be mentioned here.

The *second category of non-medical therapies* is diverse in nature. Hand therapy (massage) is very popular in the Caribbean and South Pacific Islands (IBC 2013:6). Interventions that are more physical in nature include Chinese body exercises (e.g. *qigong, t'ai chi ch'uan*), rituals, acupuncture, moxibustion (burning plant material on the body) and cupping (glass containers that suck to the skin). Bleeding as an intervention includes the practice of making a small incision in a vein during the Islamic lunar calendar (IBC 2013:5). Some cultures (e.g. African, Latin American and Caribbean islands) use midwives and bone healers. Both practitioners have no formal (modern) training. The first helps with childbirth, while the second helps with dislocations, bone fractures and cracks (IBC 2013:6). In India, health (balance, harmony) is achieved through cleansing treatments (medical oil, laxatives, enemas or bloodletting) or sedatives (herbal therapy to strengthen immunity and rejuvenation therapy). This therapy is supported by yoga, meditation, prayer and singing (IBC 2013). Yoga is an important therapy in Hindu TM. Chiropractic treatment, osteopathy, biofeedback and energy therapy (*Reiki*) are also popular in the West (Ten Have & Patrão Neves 2021a:109). Practices that are psychic in nature include interventions such as meditation, hypnosis and chanting (IBC 2013:5, 8). The *third category* includes interventions that are more spiritual or religious in nature. Of these, faith healing and Christian prayer are the best known (Arnason 2014:1151). Sometimes herbal preparations are combined with specific rituals for the purpose of appeasing the gods or expelling those issues responsible for the disease (IBC 2013:5, 7).

The *fifth characteristic* indicates that TM is aimed at (1) maintaining existing health, as well as (2) the prevention, diagnosis, improvement or treatment of physical and mental illness conditions. About 60%–90% of the populations in developing countries are dependent on TM for primary health care (Chatfield 2016:99; IBC 2013:7; Tangwa 2016:2814; Ten Have 2019:118). In Kenya, about 80% of the community uses TM for primary health (Ten Have & Patrão Neves 2021d:1007). For many people, TM is the only form of medical care (Chatfield 2016:99). In China, Korea, Japan and Asia, between 30% and 80% of the populations use some form of TM (Chatfield 2016:99; Ten Have & Patrão Neves 2021d:1007). In most developing countries, there are many more traditional practitioners as compared to modern physicians. The modern physicians practice mainly in cities and are sparse (Tangwa 2016:2815; Ten Have 2019:118). In Africa there is about one traditional practitioner for 500 citizens, while

there is only one modern physician for 40 000 citizens (Chatfield 2016; IBC 2013; Ten Have & Patrão Neves, 2021d). Along with this, TM is often the only form of low-cost medical treatment available, especially for the neediest in a society for whom modern medicine is completely out of reach for economic and geographical reasons (Chatfield 2016:99; IBC 2013:10; Ten Have 2019:122).

The next section examines the ethical aspects of TM from the perspective of the UDBHR.

Ethics guidelines

Introduction

In discussing the moral aspects of TM, two ethical principles of the UDBHR are of particular importance. The International Bioethics Committee of UNESCO (hereafter IBC) in a thorough report on TM makes the following observation (IBC 2013):

> Two principles from the Universal Declaration on Bioethics and Human Rights [...] are essentially at stake here: on the one hand, the right of every human being to enjoy 'the highest attainable standard of health' (Article 14); on the other, the explicit need to respect 'cultural diversity and pluralism' (Article 12), which includes 'respect for traditional knowledge' (Article 17). (p. 1)

Also, according to the *Bioethics Core Curriculum* of UNESCO (2008:51), there is a deep-seated connection between Articles 12, 14 and 17. This point of departure is also supported by Rodríguez (2015:76), who calls these principles the cornerstone of the conversation on TM.

Respect for cultural diversity

What can TM health systems expect from the world community? In the *first place,* Article 12 of the UDBHR sets out the principle of respect for cultural diversity and pluralism. This bioethical (medical) principle is formulated as follows: '[t]he importance of cultural diversity and pluralism should be given due regard' (UNESCO 2006). Article 12 does not itself provide a definition of culture, but the UNESCO (2008:51) *Bioethics Core Curriculum 1* recommends that the definition of the *Universal Declaration on Cultural Diversity* by UNESCO (UDCD) can be used in this regard. The following definition of culture is found in the *preface* to the latter declaration (UNESCO 2002):

> [*C*]ulture should be regarded as the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs. (n.p.)

Important in this regard is the reference to traditions (and beliefs) that include traditional knowledge and medicine. In this sense, Article 12 forms the basis for the call in Article 17 that traditional knowledge must be respected.

The preceding discussion already pointed out that TM is essentially a cultural phenomenon.

According to this principle, respect for cultural diversity means that individuals and populations have the right to practise their culture, of which TM is a particular expression (Ten Have 2019:130). The right to cultural expression is also related to the right to autonomy. As a cultural person you have the right to decide whether to use TM (Chatfield 2016:100; IBC 2013:11). Chatfield (2016:103) argues that the huge global demand for and reliance on TM should not be ignored and the autonomy of the patients around the world should be respected. Many patients around the world choose to use TM with or without modern medicine. Respect for cultural diversity and TM, according to the UDBHR, also gives expression to human dignity (Art. 3), the equality of all cultures (art. 10) and the fact that no culture or religion may be discriminated against (Art. 11, 14; Chuwa 2014:166, 174; IBC 2013:13; Revel 2009:200; Rivard 2009:188–189). The same argument applies to AM where it is used outside of its geographical and cultural origin. In this regard, UNESCO (2002) in the UDCD makes the following important statement, namely (art. 5): '[...] all persons have the right to participate in the cultural life of their choice and conduct their own cultural practices, subject to respect for human rights and fundamental freedoms'. UNESCO and the UDBHR do not endorse the concept of cultural appropriation and recognise every person's right to use TM that is not part of that country's culture.

It is worth stating that the UDBHR does not view the right to cultural life and practices as an absolute right. Article 12 also makes it clear that although cultural diversity must be respected, cultural practices may not disregard human dignity, human rights and fundamental freedoms either (IBC 2013:13, 17). The second part of Article 12 of the UDBHR states the premise as follows (UNESCO 2006):

> However, such [*cultural*] considerations are not to be invoked to infringe upon human dignity, human rights and fundamental freedoms, nor upon the principles set out in this Declaration, nor to limit their scope. (n.p.)

Human rights are prioritised in Article 12 over the principle of global cultural diversity and pluralism. In other words, the norm of respect for cultural diversity is limited or subordinated to universally accepted principles of human dignity, human rights and fundamental freedoms (Revel 2009:207). Loyalty to culture and tradition does not give traditional and modern practitioners the license to apply medical interventions that are detrimental to humans (IBC 2013:12; Ten Have 2016:106).

In summary, TM health systems can expect recognition and acceptance from the world community. Therefore, the call by the WHO that states should consider integrating TM as far as possible with existing health systems can also be acknowledged (Ten Have 2019:120). It is also clear that the UDBHR is not distant or hostile to culture and belief systems.

Quality health care

What can the world community expect from TM health systems? In the *second place,* Article 14 of the UDBHR states the principle of social responsibility and health. Article 14 sets out the principle as follows (UNESCO 2006):

> The promotion of health and social development for their people is a central purpose of governments [...] Taking into account that the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being [...] progress in science and technology should advance [...] access to quality health care and essential medicines [...]. (n.p.)

From the principle, it is clear that the highest standard of health is a fundamental right and must therefore be pursued diligently. It is further clear that Article 14 carefully indicates that the best possible health is only possible through access to quality health care and essential medicines ('quality health care and essential medicines'). The concept of quality implies that the best possible health is possible only through medical interventions of the highest standard or quality (IBC 2010:39; UNESCO 2008:57).

Two core global bioethical requirements or norms must be met for a medical intervention to be of the highest standard. The UDBHR states in Article 26 that '[e]ach principle is to be considered in the context of the other principles' (UNESCO 2006). An in-depth discussion of TM by the IBC (2013) relates Articles 4 and 14 to each other:

> Fair assessment of benefit and harm [...] are all instrumental in promoting the right of every human being to enjoy the highest attainable standard of health. They are the cornerstone of any practice that professes to be medicine. (p. 11)

This premise is also supported by Evans (2014:70–71) in her discussion of Article 4 of the UDBHR. The IBC (2013:11) is convinced that TM must comply with the principles of Articles 4 and 14 (cf. IBC 2010:40; UNESCO 2008:52).

The *first norm* is that medical intervention must be effective. This condition is in line with Article 4 of the UDBHR, which states that 'In applying medical practice [...] direct or indirect benefits to patients [...] should be maximi[s]ed' (Chatfield 2016:100). Beauchamp and Childress (2013:209) also relate the effectiveness of medicine to the principle of maximum benefit. Ten Have and Patrão Neves (2021b:589) explain the meaning of maximum benefit as follows: 'Since the ethical principle of benefit is also consequentialist it requires that the good is effectively accomplished'. This means that before any medical intervention for human consumption can be considered, there must be scientifically proven certainty that it holds maximum benefit or is effective. The Declaration of Helsinki of the World Medical Association (WMA) considers the effectiveness of medical intervention to be so important that article 6 recommends that already approved and effective medicines should be researched constantly with the aim of ensuring effectiveness or

maximum benefit (WMA 2013). This maximum benefit calls on the health community to promote best practices and quality care, which include the most effective medical interventions (IBC 2010:39). However, this does not mean that a proven effective intervention for all people will always be equally effective. What is clear, is that medical intervention must actively promote the good. Ten Have and Patrão Neves define the effectiveness of medicine as a form of goodness to fellow human beings. Pellegrino (2009:101) in his discussion of Article 4 considers maximum benefit as a good deed to fellow human beings.

Despite the strong argument that TM is based on a long historical case-based (informal) empirical knowledge (IBC 2013:13), the premise of the UDHBR is the great value of research to determine maximum benefit or effectiveness (IBC 2010:39; Ten Have & Patrão Neves 2021a:109). The UDBHR in article 2d makes the following statement (UNESCO 2006):

> The aims of this Declaration are [...] 'to recognize the importance of freedom of scientific research and the benefits derived from scientific and technological developments' (see also Preface of UDBHR, par 17). (n.p.)

Along with this, Hamdan (2009:255) points out that article 18.1 of the UDBHR cannot be detached from Section 4. Article 18.1 states the principle that all medical knowledge or interventions presented to patients must be based on honesty or truth, and the best way to determine the truth about any medical intervention is to use the best possible scientific knowledge and methodology (Hamdan 2009:259; UNESCO 2006). The truth in this context means that all the accurate information about a particular medical intervention must be shared with the potential user. Providers should be particularly honest about whether the effectiveness of the medicine has been determined by research.

The *second norm* states that medical intervention should be safe. This also links with Article 4 of the UDBHR, which states that '[i]n applying medical practice [...] and any possible harm to such individuals should be minimi[s]ed' (Chatfield 2016:100; IBC 2013:11). Beauchamp and Childress (2013:209) also relate the safety of medicines to the principle that patients may not be harmed. Medical intervention may not harm or injure patients [*primum non nocere*]. The minimisation of the potential harm to the patient is so important that the Declaration of Helsinki argues that the safety of already approved medications should be reaffirmed through ongoing research (WMA 2013:Art. 6). However, it should be noted that most medications can have adverse effects on the patient. The pros and cons must be weighed against each other, and the effectiveness (advantage) must be so great and the disadvantage so minimal that the advantages outweigh the disadvantage by a huge factor (Ten Have & Patrão Neves 2021b:589). A good example is the COVID-19 vaccine where the minimal disadvantage is a painful arm, while the maximum benefit is the prevention of death.

Traditional medicine raises two challenges, namely unsafe interventions and incompetent healers. Some herbs are dangerous, while others can be misused and then become dangerous as well (Addissie & Tesfaye 2014:1132; IBC 2013:12). There is also the misconception that natural products are in themselves 'naturally' safe and will not result in side effects. In reality, the use of some products can lead to poisoning or acute health problems. This misapprehension also occurs in highly developed countries where the public turns to natural medicine without any sufficient product information (IBC 2013:12). Take *kava kava* (*Piper methysticum*) as an example. For over 3000 years, the populations of the South Pacific Islands have been using the plant for medicinal, religious and social purposes. Clinical tests have shown that the herb has a calming effect on the user. However, it has come to the attention of the UK government that this plant has caused severe liver damage in some patients (Chatfield 2016:105).

Another danger to the safety of patients, physically and mentally, is the reality of incompetent healers abusing TM in the absence of regulation and training (IBC 2013:12; Mathooko & Kipkemboi 2014:257). Misdiagnosis, delayed diagnosis and failure to prescribe effective and safe medication can be greatly detrimental to the patient. Incorrect advice, misleading information, exceeding professional boundaries and poor care standards can also harm people (Chatfield 2016:105–106; IBC 2013:12). Chatfield (2016:106) discusses an example in Australia (in 2010) where several children died because of the use of TM. Among other things, an 8-month-old baby died of malnutrition and septic shock after the child was treated for constipation with a diet of rice milk as a form of naturopathy. In another example, O'Mathúna and Larimore (2009:loc. 379) refer to an example of an African American male who had been diagnosed with prostate cancer several years ago and was convinced that TM would cure the cancer. When he later went to a modern doctor, nothing more could be done for him, and he died. Undoubtedly, malpractice and incompetence are also present among allopathic doctors. However, in the absence of formal training and legal obligations in the world of TM, vulnerable people can be exploited. People want to earn a living without serious reflection on the benefits or disadvantages for their patients (Ten Have & Patrão Neves 2021a:109).

The IBC report notes in their discussion on the safety and effectiveness of TM that a distinction must be made between general medical intervention (e.g. herbal products) and cultural or spiritual therapies and techniques. Although the UDBHR emphasises efficiency, safety and quality through research, there is an argument that randomised controlled trials cannot be considered a satisfactory test because of the complex and holistic nature of TM (Chatfield 2016:102). The major challenge with spiritual therapies is methodology and epistemology, because it is very difficult to subject cultural

and spiritual phenomena to scientific enquiry (IBC 2013:13; Ten Have & Patrão Neves 2021a:109).

In summary, it is clear that the world community can expect TM to be effective and safe. The UDBHR recognises the importance of science in determining the effectiveness and safety of medical interventions. The discussion subsequently turns to the development of a theological foundation for quality TM.

Theological basis

Introduction

Before proceeding with the development of a Protestant theological ethical foundation, the hermeneutical point of departure of the study should be explained briefly. It is important to acknowledge that there are a variety of moral positions within Protestantism and it will therefore be difficult to find a universally acceptable Protestant position with regard to any bioethical challenge. Consequently, Childress (2002:190–191) recommends that Bible commentators select one or more 'Protestant' themes with which to investigate a bioethical problem. These themes start from a revelation-historical point of departure that takes into account the Bible as a whole and does not focus only on a few proof texts (Vorster 2017:125). In testing the global principle of respect for quality TM, I make use of a specific view of God, namely the Trinity, and the theme that God is good.

In the discussion of the UDBHR, it was evident that from a global bioethical perspective, two issues are of particular importance in the assessment of TM. The first is respect for TM as a distinct form of cultural diversity and the second is the call for TM to meet the conditions of quality health care.

Biblical perspectives

Respect for cultural diversity

How does Scripture judge, *in the first place*, the global ethics premise that TM should be respected as a unique form of cultural diversity within health care? Are culture, cultural diversity and pluralism outdated concepts that have no value in a modern and scientific world and that do not really deserve respect and acceptance? How should the Protestant religious tradition think about and act towards cultural diversity or TM (Sheffield 2001:39, 50)?

The principle of respect for cultural diversity is grounded in the Trinity (Gibson 2012:439). Unity and diversity are found in God: there is one being who exists distinctly in three persons. These three Persons, namely Father,

Son and Holy Spirit, exist multifariously from eternity, and each possesses qualities they do not share with the others: the Father is not the Son or the Spirit, the Son is not the Father or the Spirit, and the Spirit is not the Father or the Son. This diversity of Persons is not one superior to the others, they are equal (Volm 1996:25). The Trinity serves as an ontological model of existence from which we can deduce the duty of man (Bridger 1995:352–353; Plantinga, Thompson & Lundberg 2010:115). Mankind was created in the image of the triune God [*imago Trinitatis*]. From the confession of the Trinity flows an anthropology of unity and diversity. As there is only one God, so there is only one humanity, and as there are three Persons, so humanity exists in diversity (Ac 17:24, 26). The diverse being of God suggests the prospect of cultural diversity (DomNwachukwu & Lee 2014:loc. 1463). For this reason, God commands mankind to spread over the Earth (Gn 1:28; 9:1–7). The cultural diversity (tribes, nations) we read about in Genesis 10 is therefore the result of carrying out this command (Maggay 2017:loc. 849). Movement creates diversity. Cultural diversity is not the result of the Fall (Gn 3), but the result of carrying out the command of God. In Genesis 11, mankind tries to disregard the command to cultural diversity by returning to only one mankind (Gn 11:4–6), but God again brings about cultural diversity by having mankind spread all over the world (Gn 11:8; Maggay 2017:loc. 941; Sheffield 2001:47). The principle of cultural diversity is also reaffirmed in the New Testament. The Spirit of Pentecost is poured out over all people and over a great variety of cultures (GNU 2:10, 17). Along with this, different languages are blessed by the Spirit, which means that the New Testament recognises cultural diversity and a culture's particular socio-cultural existence (Congdon 2016:loc. 1459, 4913). Scripture indicates that cultural diversity on Earth is not merely an ignorable coincidence but is a present reality that will continue with God in the future life. Cultural existence belongs to the essence of being human (Rv 7:9; Gibson 2012:439; DomNwachukwu & Lee 2014:loc. 2121). Cultural diversity is so positively valued that Scripture indicates that the New Jerusalem will be enriched by what the various nations will bring with them (Rv 21:26; Sheffield 2001:50).

Without a doubt, medicine and TM form part of cultural diversity (Rugwiji 2019:3). God commanded man to use nature to their advantage (Gn 1:28, 2:15). Cain formed a town, made tents and farmed with animals. Others built musical instruments and produced copper and iron technology (Gn 4:20–22). Every culture uses nature and transforms natural things into medicines. In the Bible, plant materials are used as medicine (Ez 47:11–12; Rv 22:2). Love apples were used for infertility (Gn 30:14–16). Nature is transformed into medicinal preparations (fig cake, olive oil and mud) for various conditions (Is 38:21; Lk 10:33–34; Jn 9:6). There are indications of technological developments such as medical bandages (Is 1:6; Lk 10:33–34). Anaesthesia and relief for physical and mental pain (Pr 31:6; Jr 51:8), as well as specific diets are recommended

(Jg 13:3–4; Lk 1:24; Rugwiji 2019:3). Mulemfo (1995) comments on these scriptural references as follows:

> But from the passages cited above, one understands that plants were created for the purpose of saving the lives of human beings. That is why plants are part of human history, in the sense that they served and still serve us within that context. No nation in this world is excluded from the use of plants as food and medicine. (p. 352)

Holistic healing is part of cultural diversity as people pray and trust in God for healing and health (Ps 41:4–5; Ja 5:14–15). Along with this, the spiritual expulsion of illnesses (Mk 6:13), holy water (2 Ki 5:10; Jn 9:7) and rituals (Jn 9:6–7) are used to effect healing (Mulemfo 1995:353; Rugwiji 2019:3). There is also a connection between religious obedience and health (Pr 3:7–8; Berends 1993:281).

In light of the fact that Scripture recognises cultural diversity and establishes it as a principle, it follows that Scripture places much emphasis on respect for cultural diversity and practices, which includes TM. Examples include foreigners in Israel who were not obliged to follow Jewish cultural eating habits (Dt 14:21) and who had cultural rights (Dt 24:17; Maggay 2017:loc. 1615). Respect for cultural diversity finds its deepest point in Jesus Christ when he recognises and follows human cultural practices (Mt 3:15–17; Fensham 2004:898). Frame (2008:866) also points to Paul, who confesses his respect for the habits and customs of different cultures and therefore adheres without hesitation when necessary (1 Cor 9:20). Because of Paul's respect and sensitivity for cultural diversity, he sees to it that the Greek deacons are chosen to care for Greek widows (Ac 6:5).

As for the UDBHR, Scripture recognises cultural diversity, which includes faith, as a very important aspect of being human. It can be cautiously concluded that a broad Protestant ethic can accept and promote respect for TM as a particular form of cultural diversity.

Quality health care

In the *second place*, the discussion turns briefly to the call for the highest quality health from a biblical perspective. The discussion of articles 4 and 14 shows that the promotion of the highest quality health means that medical intervention must be effective (maximum benefit) and safe (minimal harm). The concept of 'highest quality health' as such is not found in Scripture, but rather the concepts of goodness or benefit and the idea that people may not be harmed. These two concepts are subsequently explored.

The UDBHR relates maximum benefit to good or goodness. The concept of effective medicine is grounded in the biblical concepts of goodness, calling and truth. God is good (Mk 10:18), does and promotes good (Ps 31:20; 145:7, 9;

Gl 5:22), and is therefore praised for his goodness (Ps 106, 107:412–413). And one of the specific ways in which God has shown his goodness is by promoting health (Ps 107:1, 20). This goodness of God is most clearly revealed in the person and work of Christ. Death and resurrection are examples of Christ's goodness to mankind (Ross 2011:334). According to Holmes (1995), the goodness of God and Christ can be described as 'God in benevolence'. The fact that God is good has implications for human goodness. God is the norm that man must follow. As the image of God, man must imagine God's goodness with his good deeds (Gn 1:28). According to Paul, this means that every one of us should think of his or her neighbour and what is good for him or her (Rm 15:2). Holmes (1995:413) sums up goodness in the Bible as follows: '[t]o do good we direct our actions to beneficial ends. Beneficence and benevolence are teleological concepts; beneficence is a teleological principle for making ethical decisions'. Frame (1988:14) also found the principle of maximum benefit in the directive of actively pursuing the good in the health environment. Along with this, the idea of doing good to others or the promotion of maximum benefit can also be supported by the sixth commandment (De Bruyn 1993:139–140), the narrative of the Good Samaritan (Beauchamp & Childress 2013:198) and Christian love (Douma 1997:53–54).

There is also an inseparable link between goodness and effectiveness. From the preceding discussion, it is clear that God and people's goodness are not an abstract concept but brings effective benefit in people's lives. The truth is reaffirmed with the confession of effective calling. Peter relates the concept of goodness (1 Pt 2:3) with calling (1 Pt 2:9). Calling is understood as an act of power from God in which a positive reaction or change towards God is cultivated in the human heart. It is an act that guarantees positive change of the human heart (Rm 8:30). Goodness is not a powerless reality but brings the desired outcome. Grudem (2020) sums up this truth as follows:

> [*T*]he effective calling of God that actually brings about a willing response from the person who hear it is sometimes called internal calling [...] the effective call is particular, internal and always effective. (pp. 843–844)

In light of the foregoing discussion, the claim can be made that there is always certainty about the effectiveness of God's goodness. The Bible does not maintain powerless or ineffective goodness but does maintain effective benefit or goodness. The best way to determine effectiveness in the health environment is through research. Research is a concept that is not found in the Bible in its modern form. Yet, the responsibility of research can be broadly grounded in Scripture. Because research is the best methodology to determine the benefit of medical intervention, it can be based on the biblical idea of goodness. Douma (1997:49) is certain that the healing stories of Christ point to the duty to heal responsibly, and according to Frame (1988:58), there is a close connection between the duty to heal and medical research. He argues, '[i]n Biblical terms, medical research should be regarded as part of the process

of healing people. As such, it has the same biblical mandate as medical treatment itself'. Heyns (1986:290) also relates research to a search for the truth. Finally, there is also a special connection between goodness and truth (Eph 5:8–9). The good God is also the God of truth (Is 65:16; Jn 17:3). God is a speaking God who provides the necessary information to people (Jr 36:2; Jn 1:14), which is always the truth (Jn 17:17). Like God, people must share the necessary information with one another, which means that it may not be false information (Col 3:9) but the truth (Eph 5:25). Traditional healers and other health providers should share the full truth about their medical intervention. They must indicate whether medicines are supported by research.

According to the UDBHR, medical intervention must be safe and may not harm the patient. It is accepted that sin is part of human existence, which means that there is always the possibility that people will harm each other (Gn 3, 4; 1 Cor 15:25, 28). The Bible is open about the fact that people can harm each other physically (Am 1:3; Mt 27:30; Mk 5:5) and psychologically (Am 1; 13; 1 Cor 8:12), and even kill each other (1 Jn 3:12; Sentamu 1995:853–854). The health environment is not exempt from evil endeavours (McGrath 1995:32). God is good, which means that God protects people from evil (Ps 14:7, 20, 31:20–21) and condemns the harm people do to each other (Jr 22:3; Rm 12:9), and therefore, harm is categorically forbidden (Ex 20:13; Rm 13:9; Douma 1997:53). Even the slightest physical (Ex 21:26–20) and psychological harm (Mt 5:22) must be prevented (De Bruyn 1993:136; Kaiser 1983:101–105). In Christ, God fought evil and began the victory over the evil of men (Col 2:15; Hb 2:14–15). During his earthly wandering, Christ fought against that which harms people's health (power of the devil; Ac 10:38; Blocher 1995:362–363). Man as the image of God is called to be like God and Christ in condemning evil and struggling against harm (Eph 6:10–20; 1 Pt 5:8–9). Like Christ, people should remove that which could harm other people's health (unclean spirits; Ac 5:16). Your neighbour's life must not be endangered (Lv 19:16), which means that the necessary precautions must be taken to prevent harm to the neighbour (Ex 21:28–30; Dt 22:8; De Bruyn 1993:134–135; Frame 2008:687–689, 724). Within the context of health, research would be the best way to prevent possible harm.

According to the UDBHR, the principle of promoting the highest quality health should be considered a priority over cultural rights. Could this premise be founded on Scripture? Karl Barth (1976:311) indicates that the first directive in the Bible is worldwide in nature (Gn 9:6) and as a universal directive exists before any other cultural directives (Gn 12). It can therefore be considered a priority.

From the former discussion, it can be concluded that a broad Protestant ethics can accept the principle of quality health care as found in the UDBHR and promote it as a priority. For the UDBHR and the Scriptures, culture, religion and science do not stand in antithesis but in a relationship of cooperation.

A restriction

Although the right to quality TM is recognised and must be respected from a Christian perspective, this principle cannot be accepted unconditionally.

The *first condition* is that not all practices of TM are acceptable as a medical intervention. In this regard consider King Ahaziah who fell and seriously injured himself. In this narrative, the king tried to get a diagnosis and prognosis in an unacceptable way in approaching the god Baal-Zebub, the god of Ekron by way of divination (2 Ki 1:2–4). The practice of divination as part of various forms of TM is prohibited in the Bible (Lv 19:26; 2 Ki 21:6; Jr 14:14; O'Mathúna & Larimore 2009:loc. 1502). The believer is also expected to practise spiritual discernment when considering TM (1 Jn 4:1; Anderson & Jacobson 2012:24). O'Mathúna and Larimore (2009:loc. 1575) summarise the provision as follows: '[b]iblical examples show the need for discernment regarding where we turn for healing'.

This *second condition* has already been raised by the IBC that it is undesirable and impossible to subject certain cultural healing practices to scientific research. Here, we can consider Christian prayer. From a biblical perspective, prayer is considered an important medical intervention (Jn 5:13–16). O'Mathúna and Larimore (2009) write in this regard:

> Clinical research on the effectiveness of prayer is designed to control the impact of human factors on the results. It cannot take into account God's decision – whether or not to answer a particular prayer – or even to delay an answer. (loc. 12225)

The point is that God of the Bible cannot be subjected to research, and this makes scientific research inapplicable. It would be unfair to expect believers to subject certain beliefs and cultural practices to scientific research. The same is true of spiritual beliefs and the practices of other religions and cultural groups.

Conclusion

This chapter presented a Protestant theological ethical foundation for the global bioethical principle of respect for quality TM as declared in the UDBHR of UNESCO (Art. 17). The Protestant faith tradition was excluded from any discourse during the development and acceptance of the UDBHR (accepted in 2005). This means that the principle of respect for quality TM has not yet been assessed and tested from a Protestant perspective. The existence and practice of TM also raise the issue of science and culture (faith). Two global bioethical principles can be inferred from the UDBHR: on the one hand, TM health systems can expect recognition and acceptance from the world community (Art. 12); on the other hand, the world community can expect TM to be effective and safe (Art. 14). It is further clear that the UDBHR is open and inclusive with respect to medical culture and belief systems, although the

declaration recognises the importance of science and research in determining the effectiveness and safety of medical interventions. From the perspective of the Trinity, Scripture recognises cultural diversity, which includes faith as a very important aspect of being human. It can be cautiously concluded that a broad Protestant ethic can accept and promote respect for TM as a particular form of cultural diversity. The principle of quality health care can be founded on goodness of God. From the view of the UDBHR and Scripture, culture, religion and science do not stand in antithesis but in a close relationship of cooperation.

Chapter 8

The rational plausibility of faith as buffer against existential anxiety

Nico Vorster
The Unit for Reformational Theology and the Development of the South African Society, Faculty of Theology, North-West University, Potchefstroom, South Africa

Introduction

We all know that shrinking feeling of dread that persistently gnaws at the core of our consciousness. Most of us, either deliberately or instinctively, devise strategies to avoid or silence the mysterious intruder who disturbs our inner peace. We develop fixed routines, try to organise our environment, engage in frantic activities, storm, run-away and so forth. Now and again, we experience temporary relief from the inner struggle when we resolve a difficult problem, achieve something praiseworthy or find a special person in our lives. However, the gnawing intruder at the core of our conscious keeps coming back: we cannot escape existential anxiety.

This chapter deals with the question: how should Christian theologians and scientists respond to the challenge of providing appropriate and meaningful buffers against existential anxiety, especially in light of new existential threats

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and against the background of questions about the validity and plausibility of religious worldviews? Is faith merely a death-denying strategy, as secular philosophers such as Marx, Nietzsche and Freud contended, or can faith present rationally plausible answers to the phenomenon of existential anxiety? The question of rational plausibility inevitably brings science into the debate. Even though science cannot provide final answers to important questions, it might assist faith in gaining a better understanding of reality and formulating answers on ultimate questions that are at least plausible in light of existing scientific evidence.

Our concern in this chapter is with existential anxiety as a universally experienced feeling of dread, and not with genetically transmitted pathological manifestations of anxiety, which are the objects of study in psychology and psychiatry. The discussion draws on the existential Christian analysis of anxiety presented by Seren Kierkegaard (1813–1855), which was developed further by Reinhold Niebuhr (1892–1971) and Paul Tillich (1886–1965). Niebuhr and Tillich share Kierkegaard's views on the origins of anxiety. Niebuhr extends Kierkegaard's theory on anxiety as a prelude to sin with an analysis of the relation between anxiety and pride, while Tillich's distinction between the three types of anxiety (ontic, spiritual and moral) is closely related to Niebuhr's analysis of three forms of pride (pride of power, pride of knowledge, pride of morality) (Kralik 2015:179–188; White 2016:89).

The line of argument unfolds in four parts. The first section defines existential anxiety and discusses the origins and dynamics of existential anxiety, as well as the challenges that it poses to theology. The second section narrows in on the relation between self-actualisation and anxiety and the fears that finitude, emptiness, guilt and condemnation generate in human beings. The subsequent part considers the relation between anxiety and sin. It posits that faith in a loving God is an inescapable precondition for human well-being, because the threat that non-being poses cannot be 'humanly' resolved. The last section enquires about the rational plausibility of faith. It argues that faith rests on a trust in God's love. Love by nature expresses and reveals itself. If a loving God exists, and if he is a creator, we should be able to find traces of his revealed love both in history and in his created order. It asks whether the natural sciences provide 'hints' of loving creativity in the natural order that supports the Christian thesis of a loving God.

The nature of existential anxiety

Existential anxiety is closely linked to our natural desire for ontological security. Despite being a basic drive, ontological security remains an elusive human desire as our being is continuously threatened by non-being. Existential anxiety inevitably sets in when our sense of ontological security is threatened. It is an emotion that all human beings experience from time to time. Even as

anxiety might result in pathological behaviour, it cannot be typified per se as a pathological phenomenon; while some forms of severe anxiety are caused by genetic deficiencies, existential anxiety remains a universal and fundamental feature of human life.

Theologians, philosophers and psychologists alike distinguish between anxiety and fear, although the two phenomena are closely related (see Kierkegaard [1844] 2014:23; May 1977:34; Tillich 1952:36,). Fear has a definite object. We are afraid of something or someone, but can find ways to face the threat and make the fear go away. From childhood to adulthood, we repeatedly encounter challenges that fill us with trepidation; however, when the challenge has been confronted successfully, our capacity for resilience and bravery is strengthened. After having overcome our fears, we usually experience a sense of pride and achievement and feel better equipped to address future challenges.

Unlike fear, anxiety has no clear object to confront and no clear solution to draw upon. We experience anxiety precisely because we cannot resolve a threat to something we consider as essential to our security and well-being. This reality makes us feel helpless and desperate. Anxiety could, of course, turn into fear when we learn how to cope with a threat, just as fear might turn into anxiety when we cannot find ways to cope with a challenge (May 1977:49). Still, certain forms of anxiety, such as existential anxiety, cannot transform into fear, because the struggle does not have clearly identifiable objects but resides in the human condition itself. In the words of Rollo May (1977:142), existential anxiety 'attacks the foundation (core, essence) of the personality; the individual cannot stand outside the threat and objectify it'.

The basic human dilemma is that every person faces the attack of existential anxiety at the core of his or her personality. We all have to come to terms with the threat of the powers of 'non-being'. Simply put, non-being refers to those powers that negate *being*, such as death, finitude, nothingness, emptiness and meaninglessness. Drawing on Heidegger, Paul Tillich (1886–1965) made a distinction between three types of existential anxiety that are 'directed' by three ways in which 'non-being threatens being', namely fate and death which threaten our 'ontic self-affirmation', emptiness and meaninglessness, which threaten our 'spiritual affirmation' and guilt and condemnation which affect our 'moral affirmation'. (Tillich 1952:41)

Existential anxiety not only is limited to individual experiences but can evolve into a collective phenomenon when groups of people face a common existential threat. Tillich (1952:57–64) argues that different ages were dominated by different forms of existential anxiety. The Greek-Roman culture was, for example, obsessed with the problem of fate and tragedy, while late-medieval Europeans exhibited a pre-occupation with the problem of guilt. These historically conditioned forms of anxieties erupted, according to Tillich,

at stages in history when societies were in transition and flux and people experienced a collective feeling of insecurity. Modern people, I would argue, are no less prone to collective anxieties. Materialist and naturalist scientific ontologies bring the meaning of existence into question. Climate change and the COVID-19 crisis aroused a sense of dread among us about ontic discontinuity. The existential threats of yesteryear, such as the possibility of a cold war nuclear catastrophe, were frightening but depended largely on the exercise of human agency. These possible threats continue to exist today, but have been overtaken by threats beyond the reach of human agency. Climate change brings about probable, regular and almost inevitable calamities, cataclysmic in size and in many cases beyond any human control. New generations of people are born into an environment of enduring existential threat that will not disappear and probably cannot be resolved. This has severe implications for human well-being at individual and collective levels.

Anxiety has no clear object but it demands a response. We inevitably have to devise buffers against realities that create anxiety. If we do not, the intruder will not only keep gnawing at the core of our consciousness but colonise and debilitate the whole of our existence. In fact, clinical psychiatric studies indicate that depression, physical anxiety symptoms and heightened forms of aggression are in many cases the result of uncontrolled levels of anxiety that have breached the security provided by our psychological defences (see Carter et al. 2013:351).

Anxiety's demand for a response leads to yet another challenge, namely how to deal with the erosion of traditional buffers against existential anxiety. Cultural safeguards against anxiety such as our sense of being part of a community, tradition, value system and a larger symbolic whole that extends beyond the limited lifespan of individual existence have to a large extent been upended in the past century by colonisation, individualism, social stratification and heightened levels of pluralism. It is not only Western societies that are affected by these trends but also ethnic minorities and indigenous groups in places such as Africa are extremely vulnerable to the shattering of their cultural heritages.

Religion and the belief in a god or gods who provide purpose and structure to life have for centuries served as a means to quell anxiety. However, religious worldviews have come under increasing scrutiny since the rise of modernism. Highly influential intellectuals, such as Marx, Freud and Nietzsche, have portrayed religion as irrational and delusionary attempts to quell existential anxiety and escape hurt. Marx ([1843] 1970) described religion as the opium of the people, a flawed attempt to escape the harsh realities of material existence by resorting to a supra-natural reality. Nietzsche (1896:IV, 73) was of the opinion that modern humanity must have the courage to accept the fact that Enlightenment has caused the death of God and that the supernatural can bring us no solace, while Freud (1927) described religion as a form of

neurosis, a desperate illusionary attempt to control the external environment. In modern psychology, terror management theory (TMT) – a social and evolutionary psychological theory on anxiety – has continued the line of attack by claiming that religion, specifically the belief in a personal saviour, is a death-denying strategy and escape from reality (see Solomon; Greenberg & Pyszczynski 2014).

The magnitude of the existential threats we experience, combined with the erosion of traditional anxiety buffers, is creating a potentially dangerous situation of reduced human well-being. If not appropriately addressed, these conditions may result in new kinds of social and political evil. Extreme existential insecurity, as seen in the past, tends to feed toxic phobias, such as xenophobia, racism, fascism and totalitarianism.

Anxiety and self-actualisation

The human beings are a synthesis of nature and spirit. On the one hand, we are free, self-aware, self-determining and rationally reflective agents who have a sense of the past, present and future. We are also creative beings who seek meaning and purpose in life and possess a rare ability to comprehend the vast range of possibilities that life presents and to deliberate on the best options available.

On the other hand, we are contingent beings subject to the demands of a transient, material existence (Niebuhr 1945:161). We are living organisms who possess instinctual impulses, consume energy and disintegrate as the time goes by. To survive, we need to adapt to our biological and social environments, find employment and sell our skills.

Kierkegaard and Niebuhr consider the synthesis between nature and spirit, the tension between possibility and necessity, as the major cause of existential anxiety (Kierkegaard [1849] 1980:5; Niebuhr 1945:161). This tension is especially evident in the process of self-actualisation, which goes hand-in-hand with intra-psychical and interpersonal conflicts. The conflictual nature of self-actualisation follows a general pattern: to find meaning and purpose in life, we must unlock our inner potentialities, situate ourselves, affirm ourselves, make choices and take decisions. While this process is marked by a sense of exhilaration, it is also fraught with doubts, inner conflicts and fears. Decision-making processes inevitably coincide with the calculation of risks and awards. We are perfectly aware that their outcomes may place us on a collision course with the interests of others. In fact, it is almost impossible to avoid the hostilities that clashes of interest bring about. Kierkegaard ([1844] 2014:23) speaks of the 'dizziness of freedom'. We are never in a position to predict the future, to avoid uncomfortable conflicts or to be sure of the outcomes we strive after. This generates anxiety, especially when vital values of personality are at stake or when threats are 'juxtaposed' so that one cannot 'avoid one

threat without being confronted by another' (May 1977:240). Thus, the future attracts us but, as Kierkegaard ([1844] 2014:37) rightly notes, also repulses us. Rollo May (1977) summarises it succinctly:

> When all is said and done, all anxiety arises from conflicts, with its origin the conflict between being and non-being, between one's existence and that which threatens it. (p. 241)

How do we silence the anxiety that self-actualisation brings? We construct identities as buffers against anxiety. When we speak about identity, we are not reflecting on qualitative attributes but on our self-understanding, something that may fluctuate over time as our environments, experiences and outlooks on life change. Spaemann (2018:346) rightly observes that '*who* we are is not simply interchangeable with *what* we are'.

Identity formation consists of two basic dimensions, namely exploration and commitment (Berman, Weems & Stickle 2006:305, 309). Exploration refers to the process of seeking a resolution to the existential issues that a person faces, while commitment presents the positive outcome of the exploratory process. Empirical studies have shown that a firm commitment to a specific identity lessens the anxieties that a person experiences, while confusion about identity enhances existential anxiety and aggression (Carter et al. 2013:350, 353).

Identity structures serve as frames of reference for our self-understanding. They direct us in the way we relate the self to the self and the self to the external world, and they embed us in particular communities. They offer worldviews that articulate ultimate meaning, and they contain moral codes that define desirable and non-desirable outcomes in everyday life. Stated in Tillichian terms, identity structures provide us with ontic, spiritual and moral centres.

The ontic centre of our identity frameworks manages our sense of biological and psychological continuity. We experience ontic security by belonging to a family, cultural group, network of friends or a community, for instance, in a church where members consider us as one of their own, recognises our worth and are willing to go the extra mile to ensure our physical and psychological well-being. Our spiritual centres pertain to meaning. To make sense of the world, we require a worldview. The scope of our worldviews and our conscious affirmation thereof may well differ; however, we cannot escape making a choice in this regard, because life demands that we take a stand, that we choose a point of entry and that we construct a path to find meaning and purpose. Even those who reject coherent narratives about the ultimate meaning of life and despise religion as a consequence, have some kind of worldview. Our moral centres provide us with guidance principles for desirable conduct and outcomes. Again, we cannot escape the need for some kind of moral code. We need to live by a rule. Ironically, a conscious decision not to live according to rules is in itself a rule.

The construction of identity is a necessary, inescapable and ongoing process in life. That said, it remains a highly ambiguous activity, fraught with difficulties, especially in increasingly connected, plural and diverse societies characterised by a wide range of worldviews. The authenticity, plausibility and functionality of our identity formations are consistently tested and can easily be shattered when challenged by unforeseen events or threats. Most of the time, we are able to adapt our identity structures according to evolving contexts by revising certain identity elements and integrating new elements into our worldview. Yet, it often happens that an identity framework simply cannot carry the burden of threats posed and that it becomes extremely unstable. When our ontic, spiritual and moral centres implode and our identity constructions collapse, we face the stark possibility of a dissolution of personality.

As noted earlier, Tillich (1952:43–67) perceptively identifies the anxieties caused by fate and death, meaninglessness and emptiness and guilt and condemnation as the most basic threats to our ontic, spiritual and moral centres. These threats are part and parcel of human existence, they are givens and hence serve as the deepest sources of anxiety.

Fate and death pose a challenge to our ontic self-affirmation. Human beings are acutely aware of the threat that non-existence poses to their *being* and the inevitability of their biological destruction (May 1977:17; Pyszczynski, Greenberg & Arndt 2012:378). We are also aware of the unpredictability and contingencies of life, the possibility that we may fall victim to evil and the reality that our own existence, viewed from the perspective of the ultimate scheme of things, may be fleeting and unimportant (Tillich 1952:43, 44). According to Tillich (1952:45), fate would not generate existential anxiety had death not stood in its background. Fateful happenings remind us of the ultimate fate of death, which is 'omnipresent and produces anxiety even where an immediate threat of death is absent'. We experience the threat of biological non-being throughout our lives, but especially in our latter years when our bodies start disintegrating. Health setbacks and ageing create ontic despair. We are aware of our physical disintegration; however, we are unable to affirm ourselves against the power of biological non-being.

Whereas fate and death threaten our ontic affirmation, emptiness and meaninglessness threaten our spiritual affirmation, that is, our sense of meaning and purpose (Tillich 1952:47). As noted earlier, human beings are by nature creative agents. We seek to participate meaningfully in the world surrounding us and we desire recognition from others as a participant: we crave a sense of being valued. When our creative participation in life is impaired, or not valued, life loses its sense of purpose, and we experience the anxiety that emptiness brings. However, emptiness is only a relative threat. At the background of emptiness lurks the absolute threat of meaninglessness,

which denotes the loss of ultimate meaning, that is, 'the meaning that gives meanings to all meanings' (Tillich 1952:47). When our sense of ultimate meaning is destroyed, we lose our spiritual centre and we find ourselves staring into the abyss of despair, which is a spiritual form of non-being.

Guilt and condemnation threaten, according to Tillich (1952:51), our moral affirmation. Morality concerns the art of using our freedom appropriately within the 'contingencies of finitude' to unlock our potential, participate meaningfully in reality and fulfil our 'destiny' (Tillich 1952:52). It is, therefore, part and parcel of the process of self-actualisation. Anxiety of guilt arises when our moral awareness is compromised by our acts. This results in feelings of moral despair about the loss of what we potentially ought to be and could be. Moral non-being results when the guilt we experience leads to 'self-rejection, to the feeling of being condemned – not to an external punishment but to the despair of having lost our destiny' (Tillich 1952:53).

The anxiety that ontic, spiritual and moral threats generate demands a response from the self; it does not go away or recede without some sort of reaction. Neurotic habits attest to this reality. Although seemingly odd, they are typical and very common human attempts to lessen anxiety by doing at least 'something'.

Anxiety and sin

If self-actualisation is a process characterised by contradiction and if anxiety emanates from inner psychological conflicts in the self about its self-actualisation, it follows that an intricate relationship exists between anxiety and distorted human conduct. The Christian faith describes this reality as sin. Kierkegaard ([1849] 1980:110, [1844] 2014:4) rightly notes that the concept of sin belongs to 'the sermon', not science, because when we speak about sin, we are speaking about the 'human before God'. Sin is human conduct rejected by God as a transgression of his will. The term presupposes the existence of God, as it considers him the norm of righteousness (Jenson 1999:103). The last section discusses the reality of God. In this section, our focus remains on the relation between anxiety and sin.

Kierkegaard ([1844] 2014:28, 58) and Niebuhr (1945:190) posit that anxiety is the psychological condition that precedes sin and makes sin possible. Anxiety is not sin in itself, as it is not an 'actuality', nor does it necessitate sin, because it can always be 'purged by faith'; however, it does create an avenue or entry point for sin (Niebuhr 1945:195). Anxiety asks the questions and creates the mood that sin exploits.

Sin itself is, of course, neither a necessity nor an accident (Kierkegaard [1844] 2014:62). We can always respond to anxiety by trusting in God and by following a lifestyle that obeys his will. Anxiety does not have to be a

destructive force in our lives. Our relation to the future remains one of freedom, as no 'future possibility is a necessity' (Beabout 1996:48). Yet, both Kierkegaard and Niebuhr contend that although sin is not necessary, it is inevitable (Niebuhr 1945:256). We can explain the paradox as follows: human beings are bound to commit sin, to opt for self-love and self-centredness, and do so in a predictable and foreseeable pattern, while, paradoxically, sin remains a choice, a free act. We are not forced or coerced into sinning.

Niebuhr (1945:256) ascribes sin to human distrust in God. At the heart of our 'distrust' in God lies a sinful pride driven by an inordinate self-love that attempts to replace God as the centre of existence (Niebuhr 1945:268). The human is unwilling 'to acknowledge his dependence, to accept his finiteness and to admit his insecurity' (Niebuhr 1945:161). Hence, he abuses his freedom by moving away from God and overreaching his creaturely limits. This pride, however, only 'accentuates' the insecurity from which the human person seeks to escape (Niebuhr 1945:205). Intimidated by the fundamental insecurity of the human condition, we try to make ourselves 'doubly secure' and, tempted by the knowledge of our own insignificance, we make vain attempts to 'prove' our significance (Niebuhr 1945:205).

When we sin, we make a 'qualitative leap' into guiltiness, which brings about the possibilities of rejection and condemnation (Kierkegaard [1844] 2014:20). Sinning creates the impression that it makes anxiety go away; however, it actually increases anxiety by incurring guilt. Once the leap is made from innocence to guilt, there is no way back because innocence, by its very nature, cannot be regained (Kierkegaard [1844] 2014:20). Nevertheless, as Kierkegaard rightly indicates, even after sinning we are faced with the possibility of sinning again and sinking even further, or seeking redemption (Beabout 1996:52). Thus, anxiety maintains its basic structure of attraction and repulsion, but with the caveat that sinful acts reduce the future possibilities that are open to the human being (Beabout 1996:52).

The 'possibility-reducing' nature of sin is most clearly illustrated in the systemic effects of human wrongdoing. Sin enters the life of an individual through a qualitative leap; however, sinfulness moves in quantitative terms (Kierkegaard [1844] 2014:26). In fact, as soon as we enter the world, our future possibilities are already, to a large degree, limited by the accumulation of the sins of previous generations. We arrive in a world ravaged by the after-effects of ecological sins, we participate in social structures distorted by sin and are part of societies with histories of injustice that limit the future possibilities open to historically disadvantaged groups. This increases our ultimate apprehensions even more. As its effects accumulate, sin increases anxiety. Yet, we remain responsible, free agents who do not have to participate in the sins of our surroundings.

Besides increasing anxiety, sin creates despair because it leads to estrangement from God and fellow human beings, and disharmony within

the self. When we respond to anxiety through wrong uses of freedom, our self-actualisation loses direction and becomes unstable. In extreme cases, we might even fall prey to the power of total self-dissolution. Despair is therefore an early sign of the looming danger of self-dissolution. We may describe despair as an advanced state of anxiety (Kierkegaard [1844] 2014:44) that leads to what Luther called a life curved inward on itself [*incurvatus in se*]. By rejecting God, the human being opts to be on his or her own, to be a lone self. This entails inner contradiction, because he or she declares him or herself to be independent of God, while he or she, in truth, is dependent on God. In other words, the human being is actually striving to be something that he or she is not (Beabout 1996:132). Various *incurvatus in se* responses are given to the anxieties that future possibilities and the powers of non-being generate, but they usually amount either to an adverse 'shrinking of the self' or to an overly idealistic 'expansion of the self' (see Cooper 2003:78, 126).

Self-shrinking signifies a refusal to exercise freedom, to make choices and take responsibility, to grow as a person and to participate fully in reality. It is characterised by the attempt to escape realities that cause anxiety by moving away from others, by avoiding demanding situations or by indulging ourselves excessively in sensuous things.

The *move-away* shrinking reaction occurs when an individual has reached a point of self-conflict so paralysing that his or her self-awareness is severely impaired. Self-actualisation becomes a frightening prospect, an unassailable obstacle, so much so, that the exploring of possibilities makes way for detachment and evasion. The individual despairs to such a degree that he or she can no longer act creatively and enthusiastically. *Moving away* may relieve immediate and extreme anxiety; however, the personal costs of the approach are high, because it brings about a loss of autonomy and impairs the capacity for meaningful relationships with others.

Sensuous self-shrinking manages anxiety by creating a tunnel vision that focuses on the immediate and the sensate. In doing so, it attempts to shut out the powers of non-being through a 'pre-occupation with the details of life' (Cooper 2003:155). Niebuhr (1945:247) aptly describes sensuality as 'the inordinate love for all creaturely and mutable values which results from the primal love of self, rather than love of God'. Materialism, hedonism or excessive moves towards other people to find love and approval are perhaps the most representative exponents of sensuous self-shrinking. At the core of the response lies the attempt to escape the anxious self by finding an alternative centre of existence, a visible god that provides immediate gratification. Kierkegaard ([1844] 2014:59) aptly typifies this attitude as 'spiritlessness'. Despite being 'earthly' in expression, sensual self-shrinking remains a form of evasion, a cover-up of inner conflict and a refusal to achieve selfhood.

Self-expansion is marked by the creation of an idealised image of the self. A person who experiences anxiety and lack of self-esteem often compensates

for these feelings by constructing a 'superiority complex' (Cooper 2003:10). The idealised self is a form of self-deception that rests in self-love. It manifests itself in self-exaltation and obsessive efforts to control the external environment, conquer opposition, attract admiration and secure resources. However, underlying the ambition, will-to-power and grandiose outward appearance of the idealised self, is a deep sense of insecurity that attempts to quell anxiety by securing the interests of the self or the group at all costs.

If the self chooses to be on its own without standing in relation to God, an inner contradiction in the self is bound to occur, because the human being is not meant to be a closed-off organism. The inner contradiction resulting from wrongful use of freedom leads to confusion, disharmony and a growing sense of despair. This despair may reach the point of what Kierkegaard ([1849] 1980:44) states as 'the sickness unto death' – a situation of absolute hopelessness. Conversely, the despair that anxiety and sin create may serve as a reminder that we can only find rest outside ourselves. In fact, when we acknowledge our despair, we may find ourselves at the point where a new kind of existence is possible.

Anxiety and the rational plausibility of faith

So far, we have established a link between anxiety and sin. We have stated that anxiety creates a breeding ground for sin. However, anxiety can also serve as a bridge towards faith. In a sense we can only have a mature faith after having experienced the despair that anxiety brings (see Kierkegaard [1849] 1980:57; Niebuhr 1945:276). Faith flows from an awareness that the human self is a 'product of a relation that it did not establish itself' (Beabout 1996:92). To find solace, the human being must relate himself or herself to the transcendent source that created him or her, because God alone can negate the powers of non-being. Kierkegaard ([1844] 2014:107) contends that through anxiety we are formed to faith, and when faith is formed, anxiety 'eradicates' what it produces. His intent was not to claim that faith totally obliterates anxiety, but to argue that faith reduces anxiety to a level where the human person can move ahead in life despite experiencing anxieties (May 1977:25–26).

But is faith in a transcendent God rationally plausible? As noted earlier, Marx, Freud, Nietzsche and, more recently, TMT claim that faith in a transcendent source is an irrational and delusional form of conduct. TMT theorists, in particular, view religion as a tool used by the evolutionary process to ensure that the human is not so incapacitated by anxiety that he or she loses the urge to survive. According to these theorists, courage entails that we accept the reality of non-being and unlock intrinsic sources of meaning that expand and liberate the self (Solomon, Greenberg & Pyszczynski 2015:73–80). Life has no 'ultimate or inherent meaning' – instead, the patient should be 'encouraged to focus on what matters for him in life' (Pyszczynski et al. 2012:399; Solomon et al. 2015:213).

My response is twofold: firstly, attempts to address anxiety by expanding the self and building self-esteem through inner sources of meaning are destined to unravel because of the reality of sin and the overwhelming power of non-being. We experience anxiety precisely because we cannot cope with a threat. Secondly, the solution offered by TMT advances both self-shrinking and self-expansive responses to anxiety. On the one hand it suggests that we must accept our mortality and focus on those matters that are important to us (shrinking into the self), but conversely it proposes a focus on self-esteem, intrinsic motivation and growth (self-expansion) (Pyszczynski et al. 2012:399).

In my view, ultimate existential meaning can only be found when our spirit finds peace in a transcendental God capable of negating the powers of non-being. I base the rational plausibility of faith as a response to existential anxiety on the nature of love. The main feature of love is that it reveals, expresses and relates itself to the beloved through actions that serve the well-being of the beloved. If God exists, and if he is indeed love as Scripture contends (1 Jn 3:8), then we could expect him to reveal his love through word and actions to his beloved.

The *Belgic Confession* speaks of the two modes of God's revelation. The book of nature contains a general revelation of God. It intimates that God exists and that his love is expressed through his providential actions, his governance of all things and the aesthetic beauty of creation. Scripture, on the other hand, contains the specific revelation of God. It reveals in human words who God is, how he expresses and enacts his love through Christ to and in the world and how we can enter into a relationship with him through the spirit.

With regard to the first mode of revelation, we need to ask: is love a fundamental feature of natural reality? Moreover, can we speak of hints of divine love that 'underlies all that is good in reality?' (Oord 2005:992). If we understand love as the driving force behind relatedness and reciprocity, we could, indeed, say that love is a fundamental part of natural existence. Oord (2004) articulates it as follows:

> If love requires relations, if humans inevitably relate in cause-and-effect interaction, and if non-human organisms down to the smallest of entities apparently also express interactive relations, one seems justified in claiming that relatedness is a natural expression of what it means to be. (p. 294)

Kagan (2002:55), in a similar vein, describes love as a force akin to gravity that pulls individuals together as does gravity between planets. According to Burunat (2014:104, 108), love is not merely an emotion but a 'physiological motivation' like hunger, thirst and sleep that acts as the main driver in the communication system between a mother and a baby, and as a major source for the creation of language. While the natural sciences widely accept the fact that organisms act selfishly in order to survive, increasing evidence has emerged that love – which attunes the self to the other – acts in the case of

humans as an important epi-genetic factor for 'brain and human mind development' (Burunat 2014:108). Drawing on recent studies, Burunat (2014:108) states that sexual attraction, cooperation, attachment, empathy and altruism are important factors responsible for human ontogeny and phylogeny, and a major reason for the success of human population's fitness.

Of course, one could argue that human love is a form of self-interested behaviour aimed at protecting genetic lineage, which is undoubtedly true. Yet, the most puzzling feature of human and non-human love is the phenomenon of genuine altruistic love that sacrifices the self without expecting any benefit or return. As far as humans are concerned, multiple evidence of such behaviour exist (see Oord 2004:289). Historical examples of these include behaviours such as 'voluntary poverty, celibate orders of benevolence', martyrdom and Holocaust rescue acts (Schloss 2002:221). Humans seem to possess the rare capability of empathy, that is, the ability to anticipate, understand, feel and experience the hurt of others and to act on it in order to reverse a situation of ill-being. The feelings of shame and guilt are also unique human capacities (see Kagan 2002:41). That said, love that activates relatedness and reciprocity usually contain both egoistic and altruistic impulses. If natural organisms were not wired to give, they would self-destruct. If organisms were purely altruistically wired, they would also self-destruct. In short, a balance between self-regard and other-regard seems to be essential for survival and flourishing.

Having stated that love is a fundamental feature of natural reality that makes relatedness and survival possible, we need to ask whether we find 'hints' of divine love in natural reality? Note that I am not asking whether natural science can 'proof' the existence of a cosmic source of love. By its very nature, natural science cannot generate definite knowledge about the supra-natural. At best, it can only provide 'hints' of divine love at work in creation. 'Hints', though, might be enough to affirm the rational plausibility of faith. If they exist what would these hints be? Stephen Post (2002:59) finds one such hint in the human capacity for an altruistic love, which extends beyond kinship bonds and survival interests. He asks whether this higher key altruistic love does not have its 'origins in the deepest foundations of the universe' and whether the 'building blocks for this leap in human love' does not 'suggest a telos'? Other possible hints of divine love are the anthropic nature of the cosmos, which points to a fine-tuning of constants that makes the evolution of intelligible life forms on Earth possible; the ability of the phylogenetic process to generate organisms with greater freedom, capabilities and powers, and the evolution of human morality as a means to foster the expansion and flourishing of human and non-human life (cf. Hurlbut 2002:320–321).

Empirical knowledge is, however, not the only valid source of knowledge. Inductive logic, intuition, phenomenological knowledge and aesthetic awareness are also valuable resources of knowledge capable of building on

the 'hints' provided by the natural sciences. For many Christians, the proposition of faith as a plausible and legitimate defence against anxiety is based on a consciousness and awareness of God's power in their lives and a sense of greater force at work in the universe. Calvin called this natural awareness of the divine the *sensus divinitatis*. It stems from the fact that human beings are a synthesis of nature and spirit. The human being is designed to be a transcendent creature able to reach beyond himself or herself, while reality points to more than so-called material reality. As we feel the rays of the sun and its invigorating power, we experience the power of God's presence in our lives. Our ethical intuitions and aesthetic awareness are thus not merely the outcome of bio-chemical processes or cultural constructs, but are (Polkinghorne & Welker 2001):

> [*W*]indows through which we truly look into a rich realm of created reality, within which the creator has set us up and which extends far beyond the world of human generated thoughts and attitudes. (p. 16)

Humans have the capacity to love and seek love, because God, who is Love, created us to seek after him. Our yearning for wholeness and spirituality is thus not an 'evolutionary trick', but part of an inborn desire for God that flows from the 'essence of human spirit' (Cooper 2003:68).

While Calvin affirmed the existence of the *sensus divinitatis*, Welker is right in pointing out that he considered it to be 'vain and fleeting'. Awareness of the transcendent source, in itself, cannot lead to a 'clear recognition of God' (Polkinghorne & Welker 2001:24). It is also not capable of quelling anxiety, because it does not coincide with the trust that you are accepted. Faith is only able to root our ontic, spiritual and moral existence in God when it affirms God's love. To alleviate anxiety and despair, we need to progress from awareness of a loving ultimate being to rooting our existence in a relationship with the loving God. Only a loving transcendent source can liberate us from the grip of anxiety.

Besides the general revelation of nature, the Christian faith holds that God expresses his love to us through Scripture and the historical person of Jesus Christ. In Scripture, we hear human testimonies about God's love and in the historical person of Jesus Christ we find a concrete historical example of love in action.

These windows into God's love testify that his grace heals, restores and strengthens our ontic, spiritual and moral centres. The rooting of our ontic existence in God does not require questionable Platonic doctrines on the immortality of the soul but finds its impetus instead in the nature of God as a loving and life-giving power. God's love, that is, his desire to have communion with his children, and his creative power, that is, the ability to create and sustain life, serve as the ground for the Christian belief that he will not surrender us to ontic non-being. We do not know how God will overcome our ontic disintegration, but we trust that for God everything is possible, because he is, after all, Being in Itself.

Rooting our moral centres in God entails that we show the courage of confidence in being accepted by him in spite of being 'unacceptable' (Tillich 1952:164). This confidence in justification, forgiveness and grace is again rooted in God's love, but coincides with the knowledge that God's loving grace demands a response of gratitude that takes into account the qualitative difference between God and human beings. Love denied creates offense. Kierkegaard ([1844] 1980) articulates it as follows:

> If the single individual is to feel kinship with God, and this is what Christianity teaches, then he also senses the full weight of it, in fear and trembling, and he must discover – as if it were not an ancient discovery – the possibility of offense. (p. 158)

Rooting our spiritual centres in God requires that we become aware of what Tillich (1952:177) calls 'a hidden meaning behind the destruction of meaning'. Rational, immanent and even religious constructions of meaning can become sources of pride and are destined to unravel when they are not properly rooted in God's love. Intriguingly in this context, and despite his mechanistic and materialistic worldview. Rational knowledge is never final or absolute. It is always a process, a journey that encounters dead ends and new possibilities, and therefore, must be undertaken in a spirit of humility.

Conclusion

Anxiety emanates from the inner psychological and intra-personal conflicts that self-actualisation and individuation generate in the face of the powers of non-being that threaten our ontic, spiritual and moral centres. Sin is a wrongful human response to anxiety characterised by a prideful attempt to resolve anxiety from within. The negative effects of anxiety can only be overcome by the more powerful constructive effect of faith, which finds rest in the ultimate being of God (see May 1977:260). Faith is not an irrational or delusional response to anxiety, nor does faith require 'belief in something unbelievable' (Tillich 1952:171), but rather constitutes cognitive awareness and human intuition [*sensus divinitatis*] that the conflicts we experience in the self are, in essence, the result of our *being* not being properly grounded in the ground and power of Being. However, our natural awareness of an ultimate being cannot dispel anxiety. Only a loving transcendent source can alleviate it. The Christian faith holds that we can enter into a relationship with God because God is love. God's love expresses and reveals itself, while faith confirms and responds to it. In the face of a loving God who sustains our ontic, moral and spiritual centres, anxiety can be managed and constructively employed. Kierkegaard ([1844] 2014:105) rightly describes anxiety as an 'adventure' that every human being needs to go through if he or she wishes not to fall in perdition. However, when we have learned to deal with anxiety in an appropriate way, we have learned the most important skill required to survive.

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Chapter 1

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Chapter 8

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Index

Faith seeking understanding makes a valuable contribution to the religion-science conversation. The opening chapters address the familiar issue of the apparent conflict between science and the early chapters of the biblical book Genesis. They clarify the issues and add some helpful new insights to that study. Subsequent chapters deal with other vital matters where religion and science come into contact. These include possible Pentecostal contributions to the conversation, the impact of recent technologies on theology, transhumanism, the question of how to regard traditional medicine, and an issue fundamental to human existence – existential anxiety. Each paper is distinct and offers a thoughtful and helpful perspective on the aspect of the religion-science debate.

Prof. Dr James Bradley, Department of Mathematics (Emeritus), Calvin University, Grand Rapids, Michigan, United States of America

How did it all begin? How do we even start to engage the differences between creation narratives in the Christian Bible and modern scientific theory? The authors of this book explore hermeneutic approaches and developments in biblical studies to set the scene for a religious approach. This approach is open to the possibility that a literalist approach to Scripture is, in fact, the most unjustifiable reading of the Bible. This may profoundly affect how we view God, the cosmos, and even ourselves. To be able to read the Bible from the perspective of an open present and future paves the way for suppressed uncertainties to be liberated. This paves the way for humankind to freely question all things without being enslaved by imposed religious dogma. This is not to say that religion has served its purpose, but it is far from it. With the rise of technological advancements come other social and anthropological problems, not to mention the challenge we face on a global scale with climate change, et cetera. Just as we dare to peek over the edge of a future without religion, the authors bring us back to the fundamental teachings of faith traditions, Christianity in particular. They remind us that the solutions to these challenges are to be found in us becoming 'better humans'. Becoming 'better humans' brings us back into the arena of faith traditions. When technology may lead to social disconnection and narcissism, religion calls for love of self and neighbour. Where greed-inspired advancements threaten the future of our planet, religion teaches us to be in relationship with our environment and to be custodians of it.

Prof. Dr Wessel Bentley, Research Institute for Theology and Religion, University of South Africa, Pretoria, South Africa

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