Interpreting the Bible for Children in Coherence with Evolution[1]

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ABSTRACT

Children need both science and religion, but to avoid cognitive dissonance, the propositions of religion and science, if they are true in general, should "fit together" – they must cohere. The traditional understanding of God's activity in the world must now be reconsidered because the scientifically established mechanisms of evolutionary change have been shown to be determined by random mutation and natural selection. Christians have to accept the challenge of troublesome reorientations of understanding. Either some of the basic source material of Christianity must be reinterpreted, or scientific advances are to be rejected. Fundamentalists choose to follow the latter course, but the premise of this article is that the relation between science and religion should be one that establishes the compatibility (but not the reducibility) of one to the other. We urgently need to find new ways to convey our bible-based faith to young children. In approaching the interdisciplinary challenge, epistemological differences between science and religion are considered. Re-thinking Christianity is not a betrayal of unchanging truth. Christians need not identify with Creationism or Intelligent Design in order to see the magnificent achievements of modern science as a manifestation of the glory of creation rather than as a threat to faith.

A INTRODUCTION

> For all religions, there remains the unremitting question of … the credibility of their account of existence and of human nature. Fundamentally, this is a question of truth, but it is posed, in practice, as a question of coherence … the exploration of the principle of coherence is perhaps the most urgent task before us in the attempt to understand the relationship … between religious and secular accounts of existence.[2]

Despite the challenge posed by this statement made almost fifty years ago, and the overwhelming scientific confirmation of evolution as a normative cultural concept, Christian educators are still interpreting the Bible for children in "the

[1] This material is based upon work partially supported financially by the National Research Foundation.

[2] John Bowker, *Problems of Suffering in Religions of the World* (London/NewYork: Cambridge University Press, 1970), 290.

temporal framework that has largely shaped Christian theology."[3] Christians have now to either reinterpret some of their basic source material, or to reject scientific advances. Christian fundamentalists[4] choose to follow the latter course, but the premise of this paper is that the relation between science and religion should be one that establishes the compatibility (but not the reducibility) of one to the other. The challenge for Christians is that the propositions of religion and science should "fit together" – they must cohere.[5] The Bible takes it for granted that God is the creator of the world,[6] but the point of departure of this paper is that in the evangelising of children, children must be helped to bring concepts of the evolutionary processes that gave rise to our world into coherence with Christianity because that is an extension of our God-given capacity for intellectual freedom. Children need to be helped to achieve coherence between biblical values and the dramatic increase in scientific and technological knowledge, and they need a loving and accepting environment in order to be encouraged to think critically.[7] The argument of this article is based on a pilot study using an illustrated booklet read by parents to their own five to eight-year old children.[8] The results were followed up using the same methodology, applying the findings of recent research in children's religious development, for instance Alison Gopnik has shown that children strive to form

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3 Arthur Peacocke "Biology and Theology of Evolution," in *Religion and the Challenges of Science* (ed. William Sweet and Richard Feist; Aldershot, Hampshire/Burlington, U.S.A.: Ashgate, 2007), 73-74.

4 Christian fundamentalism is usually identified with those who believe in the verbal inerrancy of the Bible. In this context the term includes "creationism," "creation science" and "scientific creationism," and the less extremist advocates of "intelligent design."

5 William Sweet "Science and Religious Belief: Some Conceptual Issues," in *Religion and the Challenges of Science* (eds. William Sweet and Richard Feist; Aldershot, Hampshire/Burlington, U.S.A.: Ashgate, 2007), 228-229; Riaan Venter "God after Darwin: The Promise of Trinitarian Theology," *NGTT* 50 (2009): 541-551, particularly 541. In support of this view Venter refers to the work of Barbour who recognised that various domains of knowledge should finally be consistent and contribute to a coherent world view elaborated in comprehensive metaphysics.

6 Walter Brueggemann, *Genesis* (Atlanta, Ga.: IBC, 1982), 10.

7 "Freedom of thought is best promoted by the gradual illumination of men's minds, which follows from the advance of science," Charles Darwin, quoted by Adrian Desmond and James Moore, *Darwin (The Life of a Tormented Evolutionist)* (London: Michael Joseph Ltd, 1991), 645. The neurologist Antonio Damasio, *Descarte's Error: Emotion, Reason and the Human Brain* (London: Vintage Books, 2006), 245-246, has proposed a connection between "a passion for reason" and the processing of feelings because some specific areas of the human brain have been found to process both reason and feelings.

8 Annette H. M. Evans, "A Practical Approach to Methodological Considerations in Interpreting the Bible for Children," *JSem* 19/2 (2010): 361-375.

causal connections much earlier than previously thought.[9] These results are reported in a forthcoming article.

In affirming that Christian theology "should be answerable to canons of enquiry defensible within, and across, the various domains of our common discourse," Van Huyssteen recognizes that "it is no longer possible to return to a pre-modern notion of tradition as a repository of privileged data and specially protected, exclusive criteria." He points the way for Christians to face up to the real implications of evolution: we need to move beyond "modernity's notions of universal rationality … the rigid, modernist disciplinary distinctions need to be collapsed."[10] This is the basis on which the possibility and problems of interdisciplinary coherence are explored in this article. Van Huyssteen relates the "very diverse research traditions in theology and the sciences" to social context, and warns that "our own self-awareness and self-conceptions are indispensable starting points for interdisciplinary dialogue," but we do not need to remain intellectual prisoners of our embeddedness in our own culture.

The first issue to consider in attempting to face up to the real underlying challenges in attempting to bring science and religion into a complementary relationship is epistemology.[11] Sometimes people who are not trained in scientific disciplines think that a theory is nothing more than an unverified hypothesis, whereas in the natural sciences, as opposed to the social sciences, a scientific *theory* originates as a *hypothesis which has subsequently been proved* and confirmed through stringent peer testing. When opponents of evolution say "evolution is only a theory, it is not proved," what they mean to say is "it is

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[9] Alison Gopnik, "Explanation as Orgasm and the Drive for Causal Knowledge: The Function, Evolution, and Phenomenology of the Theory Formation System," in *Explanation & Cognition* (eds. Frank Keil and Robert Wilson; Cambridge, Mass./London: the MIT Press, 2000), 299-323, particularly 302, 304; Alison Gopnik, "Scientific Thinking in Young Children: Theoretical Advances, Empirical Research, and Policy Implications" *Science* 28, no. 337/6102 (September 2012): 1623-1627.

[10] J. Wentzel Van Huyssteen, *Alone in the World? Human Uniqueness in Science and Theology*: *The Gifford Lectures, the University of Edinburgh, Spring 2004* (Grand Rapids, Mich.: Wm. B. Eerdmans Publishing Co., 2006), 18-23, 33-34; 308-309. Van Huyssteen claims that a postfoundationalist notion of rationality – a "coherent, rational truth" – can be achieved in transcontextual and cross-disciplinary conversation. He identifies Bakhtin's notion of *chronotope,* or "value-imbued space-time" as the marker of the connectedness of our various discourses: by fusing the language of epistemology with hermeneutics one can converse through interpretative critique, narrative and rhetoric, and then in a transversal performative sense, "rationality happens."

[11] The Oxford English Dictionary defines epistemology as "Theory of the method or ground of knowledge." Jeff Astley, *The Philosophy of Christian Religious Education* (Birmingham/Ala.: Religious Education Press, 1994), 292, is more specific: "the branch of philosophy concerned with knowledge theory: i.e. what can be known and our ways of securing and justifying knowledge."

only a hypothesis." International scientific publication provides a well-documented memory of the sources and reasoning behind scientific knowledge, and this documentation is either falsified or verified by other scientists. In the natural sciences, a theory is always fruitful in that it leads to new discoveries, sometimes in a variety of new scientific disciplines, as is the case with the theory of evolution.[12] Although scientific theories provide the foundations that lead to new discoveries, the latter may necessitate adjustments in the original theories as a result of subsequent discoveries, but such new insights do not invalidate the former foundations.[13]

On the other hand, religion, including Christianity upholds a time-honoured way of finding truth which cannot be tested and proved by scientific methodology, i.e. "revelation."[14] Francis Collins has pointed out that "if we are using the scientific net to catch our particular version of the truth, we should not be surprised that it does not catch the evidence of Spirit."[15]

Any definition of "Spirit" is difficult. Roelkepartain *et al* helpfully postulate spiritual development to be "a developmental wellspring out of which emerges the pursuit of meaning, connectedness to others and the sacred, purpose, and contributions, each and all of which can be addressed by religion or other systems of ideas and belief."[16] Universally, religions conceive of God as the origin of meaning, a supreme purposeful force.[17] Different religions offer different ways in which a "Supreme Consciousness" can be known in personal experience, but these "ways" are not empirically verifiable.[18] Barbour explains:

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[12] Jerry A. Coyne, *Why Evolution is True* (Oxford: Oxford University Press, 2009), xii, 20.

[13] Cf. Karl Popper, *Collection and Refutations: The Growth of Scientific Knowledge* (London: Harper & Row 1963), who points out that to be verifiable, science must be falsifiable.

[14] John Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship* (London: SPCK, 2007), 2, 3, defines revelation as a "record of unique and uniquely significant events of divine disclosure that form an indispensable part of the rational motivation for religious belief."

[15] Francis Collins, *The Language of God: A Scientist Presents Evidence for Belief* (New York/London: Free Press, 2006), 229.

[16] Eugene C. Roehlkepartain, Linda Wagener, Pamela Ebstyne King and Peter L. Benson, "Spiritual Development in Childhood and Adolescence: Moving to the Scientific Mainstream," in *The Handbook of Spiritual Development in Childhood and Adolescence* (eds. Eugene C. Roehlkepartain, Pamela Ebstyne King, Linda Wagener and Peter Benson; California/London/New Delhi: Sage Publications, 2006), 1-15, particularly 5.

[17] Charles H. Townes, *Making Waves: Masters of Modern Physics* (vol. 14; Woodbury, N.Y.: American Institute of Physics Press, 1995), 161.

[18] Keith Ward, *The Big Questions in Science and Religion* (West Conshohocken, Pa.: Templeton Foundation Press, 2008), 270.

> Rational argument in theology is not a single sequence of ideas … it is woven of many strands, like a cable many times stronger than its strongest strand … religious beliefs are like an interlocking network that is not floating freely but is connected at many points to the experience of the community.[19]

The problem for both scientists and fundamentalists is that the reception of revelation depends upon a belief in divine action which is not empirically testable.[20] In our contemporary global context religions can only be seen as "sets of beliefs, symbols and practices about the reality of superempirical orders that *make claims* (my italics) to organize and guide human life."[21]

Certain conservative sectors of the population are able to find some areas of science acceptable, whilst other established areas, e.g. organic evolution, are scorned.[22] Arguments in the interdisciplinary field of science and reli-

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[19] Ian G. Barbour, *Religion and Science: Historical and Contemporary Issues* (London: SCM, 1997), 157-9.

[20] Daniel P. Veldsman, "What Have our Genes to Do with Religion?" in *Can Nature Be Evil or Evil Natural? A Science-and-Religion View on Suffering and Evil* (Proceedings of the Twelfth Seminar of the South African Science and Religion Forum (SASREF) of the Research Institute for Theology and Religion, held at the University of South Africa, Pretoria on 11-12 August 2005; ed. Cornel du Toit:, Pretoria: UNISA, 2006), 189-211, particularly 189. Divine action is "physically undetectable," all we can actually detect are "the interrelated causes and effects of creaturely existence," Denis Edwards, *The God of Evolution: A Trinitarian Theology* (New York: Paulist Press, 1999), 52. Entitlement to form a perceptual belief based on perceptual experience "perhaps only exists if the nature of the intention is recognized to be fundamentally *a priori*," Christopher Peacocke, *The Realm of Reason* (Oxford: Oxford University Press Inc, 2004), 4, 52, 148)). *A priori*: "statements or concepts that can be known to be true without reference to experience" (Astley, *Philosophy*, 290); "an argument where the premises and conclusions are known to be true *independently* of experience, i.e. ontological," Brendan Sweetman, *Religion: Key Concepts in Philosophy* (London/New York: Continuum, 2007), 45. Wesley J. Wildman reports on the inconclusive results of "The Divine Action Project (1988-2003)" *Theology and Science* 2/1 (2004): 37-39, 65, which distinguished between "General" and "Specific" divine action. The latter was considered as either objectively or subjectively significant, or causally significant (i.e. providential). The scholars involved in the project displayed a large variety of opinions, for example, God cannot act intentionally (Wildman); God can choose to act intentionally only in some events (Edwards, Stoeger); a causal joint of Divine Action can be discussed compatibly to some degree, i.e. that human freedom is compatible with physical determinism (Peacocke); the causal joint of Divine Action is incompatible with human freedom (Polkinghorne).

[21] Van Huyssteen, *Alone in the World?*, 291.

[22] Jurie van den Heever, "Creationism in the Colonies: Science, Religion and the Legacy of Apartheid in South Africa" in *Can Nature Be Evil or Evil Natural? A Science-and-Religion View on Suffering and Evil* (Proceedings of the Twelfth Seminar of the South African Science and Religion Forum (SASREF) of the Research Institute

gion are tricky and sometimes involve faulty interpretations of scientific discoveries.[23] Scientific research is never complete, but it is essential to distinguish between what is established, what is very likely, and what is still speculative.[24] Another stumbling block is that sometimes science and metaphysics are combined in an invalid way.[25] To understand the real difficulties of achieving coherence between Christianity and evolution the following brief explanation of the mechanisms of evolutionary change is offered.[26]

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for Theology and Religion, held at the University of South Africa, Pretoria on 11-12 August 2005; ed. Cornel du Toit:, Pretoria: UNISA, 2006), 145-163, particularly 145.

[23] The reason for rejection of "Intelligent Design" by both mainstream scientists and theologians is that ID adherents make unjustified assumptions which are inconsistent with existing scientific knowledge, for example that only one kind of life, ours, is conceivable in every possible configuration of universes. See Matt Young and Taner Edis, eds., *Why Intelligent Design Fails: A Scientific Critique of New Creationism* (New Brunswick/New Jersey/London: Rutgers University Press, 2004), 183-184. Creationism bases its belief that the universe and life on earth were created immediately and separately by God on a literal interpretation of the verbal inerrancy of the Bible as the word of God. The inevitable implication for creationists is that the earth cannot be older than 10000 years, as opposed to the scientific estimate of 4.54 billion years. Intelligent Design theorists differ from creationists in that they do not believe in a "young" earth, nor do they refer to the Bible in support of their views of nature, but they claim there is an actual scientific basis for intelligent design, that it is empirically detectable. Creationism and Intelligent Design are ideologies which do not have the potential to lead to a progressive research program. ID may have a valid point that it is immensely improbable that chance events would have led to creation, but unwarranted claims are made, for instance that the astonishing complexity of subcellular organic structure proves that an intelligent designer has been at work. The ID argument does not take into account that there are many examples in nature of bad design, in the vestiges that reflect signs not of "celestial engineering," but of the tortuous path of evolution (Coyne, *Why Evolution is True,* 60-68; 86-91).

[24] Peter E. Hodgson, *Theology and Modern Physics* (ASRS; Aldershot UK/Burlington U.S.A.: Ashgate Publishing Ltd, 2005), xii, xiii, 225, 236.

[25] See for instance the discussion in Christopher Southgate, *God, Humanity and the Cosmos: A Textbook in Science and Religion* (Harrisburg, Pa.: Trinity Press International, 1999), 36-39, 121-123, on the faulty interpretation of the big bang theory as evidence of creation, and hence of a creator. For example, Kenneth Miller's claim that "the big bang casts a distinctly theological light on the origin of the universe." See Kenneth Miller, *Finding Darwin's God*: *A Scientist's Search for Common Ground between God and Evolution* (New York: Harper Collins Publishers, 1999), 225. Such an interpretation oversteps the limits of science.

[26] This necessarily brief and simplified explanation is indebted to the following mainstream scientists, the majority of whom are professing Christians: Jeff Astley, David Brown and Ann Lodes, *Science and Religion* (vol. 4 of *Problems in Theology*; eds. Jeff Astley, David Brown and Ann Lodes; London/New York: T&T Clark, 2004); Francisco J. Ayala, "Darwin's Greatest Discovery: Design Without Designer," in *Adaptation and Complex Design* (vol. 1 of *In the Light of Evolution*; eds. John

B DARWIN'S UNCOVERING OF HOW CREATION CAME ABOUT

Darwin's theory of evolution was based on personal observations which he made during his five year voyage round the world on the Beagle from 1821-1826. Other contributing factors brought him to a point where his observations forced him to formulate a hypothesis which he named "natural selection," which he developed into the concept of "descent with modification."[27] Only later was it called the theory of evolution when it was verified and accepted by other foremost scientists. In contradiction to a literal reading of the biblical version of creation, the modern theory of evolution explains how, over many generations spanning either a short period (e.g. the twenty-minute life cycle of viruses and bacteria), or millions of years, a species can evolve into new species or subspecies.[28] Descent with modification depends on two primary factors:

(i) Genetic mutations in the DNA which apparently occur randomly, but rarely. If the mutations lead to physical changes that are useful for survival in the specific natural environment in which the life form exists, then almost inevitably, that individual survives to procreate and pass on its new genetic code through reproduction.

(ii) "Natural selection" is largely determined by environmental factors, for instance if the genetic mutation is not useful for adaptation to the environment, the individual may die and therefore cannot pass on the disabling mutation.[29] The process of natural selection explains how it came

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Avise and Francisco Ayala; Washington D.C.: The National Academic Press, 2007), 3-21; Tim M. Berra, *Evolution and the Myth of Creationism: A Basic Guide to the Facts in the Evolution Debate* (Stanford: Stanford University Press), 1990; Collins, *Language of God*; Coyne, *Why Evolution is True*; Ward, *Big Questions*; Sherrie Lyons, *Evolution: The Basics* (London/New York: Routledge, Taylor & Francis Group, 2011).

[27] Darwin's childhood environment, especially his grandfather Erasmus Darwin contributed to the development of his thought. Alfred Russel Wallace, a biologist working in South America and Asia and who had independently come to much the same conclusion, spurred Darwin on to publish his own results of twenty years of research (Huxley, *Origins of Species*, ix).

[28] The life-span of some simple organisms is very short, for example microbes (twenty minutes) so that mutations can develop very fast, as demonstrated for example by the rapid rise of drug resistance in bacteria (Coyne, *Why Evolution is True*, 4).

[29] Unfortunately the term "survival of the fittest" in association with "Darwinism" has sometimes been taken completely out of context and misapplied, for instance when regarded as one of the contributing factors to Nazism. See Eric Metaxas, *Bonhoeffer: Pastor, Martyr, Prophet, Spy*: *A Righteous Gentile vs. the Third Reich* (Nashville: Thomas Nelson, 2010), 162. Genetic variation can be effected (as a rare exception to the fidelity of the process of DNA replication) by mutation anywhere in the

about that from the basic building blocks of the universe, life spread out along endless branching pathways so that eventually one of those branches led to human beings.[30] Today molecular biology and the science of genetics confirm and deepen our understanding of the astounding complexity of the processes involved.[31]

The inescapable implication (and this is why protagonists of "Intelligent Design" reject the theory of evolution) is that the development of humankind is not the outcome of preconceived design, but a natural process that is able to generate order, functioning creatively. Understood in scientific terms, it is not an "intelligent designer" which determines the effectiveness or extent of success of the genetic mutation. It is the element of "chance" in combination with interaction with the environment that effects the development of different living species. Where does this leave religious belief in creation of mankind in the image of God? And, for that matter, where in this scheme is the love of God and divine intervention? These are very real problems that Christians have to

helical structure of DNA. Recombination of the sequence of neucleic acids in the gene produces the required diversity of offspring at each generation.

[30] Scientists still don't know for sure how life appeared, but when it did (scientifically estimated at about 3.5 billion years ago) the process of *natural selection* took over.

[31] DNA, which is present in the chromosomes which are in every cell that contains a nucleus, provides the replicating mechanism of reproduction. DNA consists of two matched strands of chemical-base pairs of nucleic acids (in humans, about three billion), in a specific sequence, wound round each other helically. Each base pair can be one of four kinds (A, C, T and G), thus providing the potential for unimaginably vast variation. See Denis Alexander, *Creation or Evolution: Do We Have to Choose?* (Oxford/Grand Rapids, Mich.: Monarch Books, 2008), 55, 57. During cell division the two strands of nucleotides (chemical "letters" of the genetic alphabet) "unzip" to replicate themselves to make two identical DNA molecules. Molecular biologists are now able to explain how natural selection affects embryonic development: the chains of the four nucleic acids which make up the helical structure of the DNA are chemically reconstructed into proteins within the cell. Various enzymes that have very specific catalytic actions on the relevant protein chains either inhibit or speed up the rate of cell division, i.e. growth. A variety of enzymes could for example react chemically with a randomly mutated gene so that a normal genetically sculpted dent in a protein molecule is reshaped within the embryo, resulting in bodies built with changed shapes or characteristics. The reshaping is effected by the gene which carries the mutation through altering the shape into which the protein chain spontaneously coils up. For instance the embryonic primordium of the jaw can be altered in such a way as perhaps shortening the muzzle and giving a more human and less "ape-like" profile. The change in jaw shape might have a subtle effect on the animal's ability to carry out certain tasks; "some or other highly complex combination of selection pressures will then bear upon the statistical success of this particular gene as it propagates itself through the gene pool by replication," see Richard Dawkins, *The Greatest Show on Earth: The Evidence for Evolution* (Detroit: The Free Press, 2009), 248, 249.

face. Fundamentalists such as Creationists, "Scientific Creationists," and Intelligent Design theorists have tried to answer these questions by contesting the theory of evolution. However, archaeological discoveries and the science of biblical criticism has shown that the Bible must be accepted as having been written by people in a historical and cultural context different to the one in which we live now.[32] Scientific facts were not part of the agenda of the biblical authors.

The following section is a survey of explorations by mainstream Christian scholars who have confronted and wrestled with vexed questions arising from the implications of randomness in the process of evolution. These questions need to be confronted before evangelising children because they are no different to questions pondered by children today. Children have to be helped to explore these troubling questions honestly in an unthreatening context. In a metaphorical sense, they must be inoculated against later cognitive dissonance.

C QUESTIONS ARISING FROM THE EMPIRICAL EVIDENCE OF RANDOMNESS IN EVOLUTION

1 How did the Universe begin? Does the Universe have a Goal or Purpose?[33]

The true gap in the scientific explanation of the origin of life is that of agency.[34] Stephen Hawking propounds "spontaneous creation" as the reason "there is something rather than nothing," thus eliminating the necessity for the agency of God as the origin of the world.[35] The problem for the theist is how to identify a first cause (a "prime mover" for the universe) with a personal God.

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[32] Keith Ward, *What the Bible Really Teaches: A Challenge for Fundamentalists* (London: SPCK, 2004), 179-182, 190. Christopher Rowland and Jonathan Roberts point out that the Bible must be seen as the *report* of the Word of God, written by men. See Christopher Rowland and Jonathan Roberts *The Bible for Sinners: Interpretation in the Present Time* (London: Society for Promoting Christian Knowledge, 2008), 22. For example, Genesis 1 is currently accepted to have been written during the Babylonian exile. In this context it functioned to assert God's orderliness in a time of chaos for the Israelites but creationists see this explanation as an invalid rationalization for arguing against the biblical creation account. See Ernst M. Conradie, "On Responding to Human Suffering: A Critical Survey of Theological Contributions in Conversation with the Sciences," in *Can Nature Be Evil or Evil Natural? A Science-and-Religion View on Suffering and Evil* (Proceedings of the Twelfth Seminar of the South African Science and Religion Forum (SASREF) of the Research Institute for Theology and Religion, held at the University of South Africa, Pretoria on 11-12 August 2005; ed. Cornel du Toit:, Pretoria: UNISA, 2006), 165-188, particulary 183.

[33] Ward, *Big Questions*, 43.

[34] Astley, Brown and Lodes, *Science and Religion*, 99.

[35] Stephen Hawking and Leonard Mlodinow, *The Grand Design* (London: Bantam Books, 2010).

This "prime mover" would have to be the same God whom many claim to recognize through sacred texts and religious experiences.[36] Interestingly, Darwin's original view was that nature evolved with a definite purpose: the final goal of man as a moral creature, "Molluscs to clergymen!"[37] In affirming evolution, Carroll points out that God concerns origins not beginnings - the distance between God as origin and the "big bang" as beginning is infinite – the core sense of creation refers to a pre-bang dependency on God.[38] Haught suggests that it is more helpful in conversations with contemporary science to think of God as "the infinitely generous ground of new possibilities for world-becoming" than as a designer or planner who has mapped out the world in every detail: "God is more and better than a planner – an infinitely liberating source of new possibilities and new life."[39]

2 Is there a Radical Split between Human Beings and the Rest of Creation?[40]

Against the background of Gen 1:26-28 every human is created in the image of God. On the other hand, as seen in a variety of other scientific disciplines concerned with consciousness and culture, human uniqueness has obviously evolved, thus the assumption of Christian theology that there is a radical split between human beings and the rest of creation must be reconsidered. Van Huyssteen makes the important point that "theology has traditionally virtually ignored the question of the evolution of human cognition," which can be attributed firstly to bipedalism which is inextricably connected to brain size, and the eventual evolution of technologies and language. He asks the question:

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[36] Pope John Paul saw an anomaly in attributing the universe's origin to chance because that would be accepting effects without a cause. Interestingly, Darwin's grandfather, Erasmus Darwin, claimed that God is the cause of causes, rather than simply the cause of events. See Andrew Parker, *The Genesis Enigma: Why the Bible is Scientifically Accurate* (London: Doubleday, 2009), 236. Ward, *Big Questions*, 43, recognizes that we can only really speak of the universe's having a goal if there was a mind who planned it that way because otherwise it is only a debatable outcome, "which may or may not happen." Simon Conway Morris counters Ward's logic here with his concept of "convergent evolution." See Simon Conway Morris, "What does evolution want?" Podcast (cited 7 Aug 2011. Online: http://ttbook.org/book/science-and-search-meaning-what-does-evolution-want).

[37] Darwin, quoted by Desmond, *Darwin*, xviii. In this view (which Darwin later modified) sexual generation exists for the purpose of bringing social animals into existence; and the final cause or purpose of social animals is to bring into existence animals with moral sentiments, namely human beings: "Man is the one great object" of nature.

[38] William E. Carroll, *Creation and Science: Has Science Eliminated God?* (London: The Incorporated Catholic Truth Society, 2011), 33-35.

[39] John F. Haught, *God after Darwin: A Theology of Evolution* (Boulder: Westview Press, 2008), 127.

[40] Van Huyssteen, *Alone in the World?*, 42.

How should theology respond to the way the sciences are challenging and even deconstructing the notion of human uniqueness? In seeking a complementary view of human uniqueness, he wonders whether there is a "way that the heart of the Christian tradition of the *imago Dei* can be recovered and revisioned through an interdisciplinary dialogue with current scientific views on human uniqueness." Van Huyssteen notes that "it is precisely evolutionary epistemology's focus on the evolution of human cognition that revealed embodied human cognition as the mediator between biology and culture."[41] Coyne recognizes that "We are the one creature to whom natural selection has bequeathed a brain complex enough to comprehend the laws that govern the universe … the only species that has figured out how we came to be."[42] The vital question is whether the possession of self-consciousness makes a qualitative difference between ourselves and other life-forms.[43]

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[41] Van Huyssteen, *Alone in the World?*, 37, 42, 106-108, 314. On the basis of medical research mostly on brain-damaged people, Vilayanur S. Ramachandran, *A Brief Tour of Human Consciousness* (New York: Pearson Education Inc., 2004), 112 is able, to some extent, to provide the scientifically informed view: "what sets us apart from other mammals, including other primates, is not any single structure … but a set of circuits. These structures are for consciousness what chromosomes and DNA were for heredity. Know how they perform their individual operations, how they interact, and you will know what it means to be a conscious human being." See also Ramachandran's more recent work, Vilayanur S. Ramachandran, "The Neurology of Self-Awareness," in *Edge: The Third Culture* (The Edge 10th Anniversary Essay, 8 January 2007 n.p. cited 8 Jan 2007. Online: http://edge.org/conversation/the-neurology-of-self-awareness.

[42] Coyne, *Why Evolution is True*, 253.

[43] Caroline van der Stichele and Alastair Hunter, eds., *Creation and Creativity: From Genesis to Genetics and Back* (Sheffield: Sheffield Phoenix Press, 2006), 76. Each species, even animals, has a different knowledge of the reality it lived in because it is a temporarily successful adaptation to a specific environment. This knowledge in animals is stored the gene pools, but in human beings, is also "partly held collectively in the memories and traditions of each society" (Van Huyssteen, *Alone in the world*, 101). John Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship* (London: SPCK, 2007), 46-47, 50, challenges the view that a "strictly neo-Darwinian account … is sufficient to explain the coming-to-be of the many distinctive features that we have claimed mark off human nature from other forms of animal life." He warns against the error of "treating our mental and spiritual experiences as no more than epiphenomenal fringe effects of the material." He thinks of humans as animated bodies, "a kind of 'package deal' of the material and the mental and spiritual in the form of a complementary and inseparable relationship," much as the Hebrew writers of the Bible did. He defines humans as "psychosomatic unities," and lists the following qualities as unique to humans: self-consciousness, language, rational skills, creative power, morality/(?immorality), god-consciousness, ability to sin.

3 Can We Really Say that God Would Not Have Chosen an Indeterminate Natural Process as his Workbench to Fashion Intelligent Beings?[44]

The problem is that the process of natural selection entails the evil of suffering and waste, which is not reconcilable with "the lordship of the Lord, the goodness of God." This "thorn in the flesh of reason" as Blocher puts it, is a major implication of evolution.[45] Thus we come to the following question:

4 How Can the Random Waste and Cruelty of Evolution be Reconciled with Creation by a Good and Almighty God?[46]

This vexed question is one that children often wrestle with. Peacocke points out that in natural selection, pain and suffering is inevitable in terms of the law of "new life through death of the old," and that it is the mutual interplay of chance and necessity that inevitably leads to the creative development of new life.[47] Stoeger distinguishes between natural evil and moral evil. He defines moral evil as that which is due primarily to consciously, freely acting agents which are earthly human beings, whereas natural evils are part of the evolution and emergent fertility of the universe and of nature.[48] In assessing these struggles

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[44] Miller, *Finding Darwin's God*, 274. Miller, *Finding Darwin's God*, 29, observes: "We know from astronomy that the universe had a beginning, from physics that the future is both open and unpredictable, from geology and paleontology that the whole of life has been a process of change and transformation. From biology we know that our tissues are … a stunning matrix of complex wonders, ultimately explicable in terms of biochemistry and molecular biology. With such knowledge we can see, perhaps for the first time, why a creator would have allowed our species to be fashioned by the process of evolution." Cf. Plato: *Tim.* 41a-d (Bury, 86-90) where the speech of the Demiurge to the assembled gods uses the basic metaphor of the craftsman using his intelligence on resistant material: "I shall begin by sowing the seed, and then hand it over to you. The rest of the task is yours."

[45] Henri Blocher, *Evil and the Cross* (Leicester: Apollos, Intervarsity Press, 1990),

[46] Ward, *Big Questions*, 43.

[47] Arthur Peacocke, *Intimations of Reality: Critical Realism in Science and Religion* (Notre Dame, Ind.: University of Notre Dame Press, 1984), 68-71.

[48] Bill W. R. Stoeger, S. J. "The Problem of Evil: The Context of a Resolution," in *Can Nature Be Evil or Evil Natural? A Science-and-Religion View on Suffering and Evil* (Proceedings of the Twelfth Seminar of the South African Science and Religion Forum (SASREF) of the Research Institute for Theology and Religion, held at the University of South Africa, Pretoria on 11-12 August 2005; ed. Cornel du Toit:, Pretoria: UNISA, 2006), 1-16, particularly 2,3; Bill W. R. Stoeger, S. J., "Evolution, God, and Natural Evil," in *Can Nature Be Evil or Evil Natural? A Science-and-Religion View on Suffering and Evil* (Proceedings of the Twelfth Seminar of the South African Science and Religion Forum (SASREF) of the Research Institute for Theology and Religion, held at the University of South Africa, Pretoria on 11-12 August 2005; ed. Cornel du Toit:, Pretoria: UNISA, 2006), 17-38, particularly 34. Keith

with theodicy, Sweetman leaves us with the question: could God have built "a natural world which mostly followed the laws of physics but which did *not* contain natural evils?"[49] Stoeger suggests that when considering theodicy we need to keep in mind that the universe and nature are dynamic and evolving – they are the source of new possibilities. He claims that God is involved in the world and participates in its slow growth; a God of persuasive love rather than a coercive power.[50]

Ward, *Big Questions*, 43, notes that the traditional answer to natural evil, i.e. that all natural evil is the consequence of moral evil (sin), is untenable in the light of what we know about the history of the universe, the Earth, and life from the natural sciences (The alternative sometimes propounded, that natural evil is due to the fall of the angels, is theologically and scientifically questionable.) The narrative of Jesus healing the man blind from birth in John 9, in which Jesus asserts that the man's blindness is so that the glory of God may be shown in his life, provides another contradiction to the traditional viewpoint, but raises new questions.

[49] Sweetman, *Religion*, 94.

[50] Stoeger, "Problem of Evil," 12-14. The main directions of thought on theodicy by Christian scholars are as follows: Astley, Brown and Lodes, *Science and Religion*, 78, details three possible responses to randomness and suffering in the process of evolution from the Christian point of view:

a) God controls events that appear to be random. However, in the face of the many blind alleys, suffering, waste and evil that we perceive in the world around us, it is not tenable to attribute every event to God's specific will, because that would contradict the wholly good aspect of God's omnipotence.

b) God designed a system of law and chance (Darwin's idea at the time he wrote Origin of the Species), thus both chance and law are expressions of God's overall design of the universe. The problem here is that this interpretation implies that God's role is limited to originating and sustaining the natural process. Cf. Plato, *Tim.* 41a-d (Bury, 86-90) where the speech of the Demiurge to the assembled gods uses the basic metaphor of the craftsman using his intelligence on resistant material: "I shall begin by sowing the seed, and then hand it over to you. The rest of the task is yours." Blocher, *Evil and the Cross*, 84, recognizes circular reasoning here in that if the "autonomous freedom" of the creator produced "created freedom" of choice in creatures, then the biblical concept of God's sovereignty is limited. Polkinghorne, *Quantum Physics and Theology*, 70-71, points out that "almighty" (or sovereignty) means that God can do whatever God wills, "but God can only will that which is in accordance with the divine nature. Christians believe that nature to be love. The God of love could not be a cosmic tyrant … the gift of love is always the gift of this kind of due independence to the object of love."

c) God influences events without controlling them: thus predestination is rejected and genuine chance in the world is accepted. According to this thinking, God is perceived as influencing and being influenced by the world, because freedom in humanity is allowed, as is spontaneity in nature. Polkinghorne and others seized on the discovery of quantum mechanics which shows that the microworld is indeterministic, to claim that this "uncertainty principle" means that by acting within the limits of quantum uncertainty, God can act freely in the world without violating the laws of physics.

E DISCUSSION

The need for revisioning divine agency has been recognized as science's greatest challenge to theology.[51] Conway Morris recognises that Christianity is an open-ended adventure, and he makes a persuasive case for "convergent evolution," i.e. the continuing tendency of biological organization to arrive at the same "solution" to a specific problem.[52] This is possible because the process of natural selection orientates evolution in a constructive direction, in that it eliminates those results of mutation which turn out to be negative.[53] Thus Conway Morris claims that the appearance of human intelligence was almost inevitable because the number of evolutionary outcomes is limited; at a very basic level natural selection orientates the result of randomness towards a beneficial outcome. Conway Morris sees this phenomenon as compatible with a providential, loving God.

Miller recognizes that "as creatures fashioned by evolution, we are filled with instinctive behaviours important to the survival of our genes" – we carry such passions within us, as the Bible attests.[54] Thus the question arises "whether our morality is constrained by our genetics … Do we carry the psychological baggage of our millions of years on the African savanna? If so, how far can we overcome it?" Coyne stresses that "genetic" does not mean "unchangeable." While noting that the use of symbolic language may be a genetic adaptation, with aspects of syntax and grammar somehow coded in our brains, Coyne reports that there is a very large category of behaviours sometimes seen as adaptations, including moral codes, religion and music, but about

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Wildman, "Divine Action Project," 50, 63, has criticized these interdisciplinary scholars, especially Polkinghorne, because they unjustifiably treat the laws of nature "as approximations to an underlying indeterminate reality within which God can act freely." Hodgson, *Theology and Modern Physics*, 169, also points out that their reasoning is faulty because "in effect our physical world is still a strictly determined reality that we only partially understand at this stage. Such arguments are neither in accord with what we know of physics, nor do justice to the omnipotence of God." Townes, *Making Waves*, 171, is also critical. He points out that this logic does not really allow a place for divine intervention anymore than before. The uncertainty principle simply shows that our previous thinking and conclusions were too limited. Peacocke, *Intimations of Reality*, 60, sees that the "very *givenness* of the parameters of the milieu of human life make human freedom and human perception possible." Polkinghorne, *Quantum Physics and Theology*, 67, claims that "a world of freely choosing beings is a better world than one populated by perfectly programmed automata."

51 Venter, "God after Darwin," 541.

52 Simon Conway Morris, *Hoe het Leven de Dingen Regelt: De Mens als Noodzakelijke Uitkomst van de Evolutie: (Life's Solution)* (Diemen: Uitgeverij Veen Magazines B.V., 2004), x. Also see the podcast referred to in n. 36.

53 Ayala, "Darwin's Greatest Discovery," 20.

54 Miller, *Finding Darwin's God*, 279.

whose evolution we still know virtually nothing, and that rigorous research in the field of evolutionary psychology is needed to clarify this question.[55]

F CONCLUSION

Arthur Peacock's open-ended understanding that "webs of interconnection" in the intricate complexity of living systems influence the behaviour of the parts of the whole system seems at this stage to be the most reasonable approach to these questions.[56] The Jesuit priest and palaeontologist Teilhard de Chardin anticipated this view with his postulation of God as the unifying truth in his concept of humankind as the epitome of the process of cosmogenesis (simply put, the ever increasing complexity of molecular combinations).[57] Evolution has become "the great unifying theory in biology" because it has solved so many problems that confronted working biologists. It is also becoming increasingly relevant for understanding human society, and has provided insight into topics such as morality, mental illness, and religion.[58] The broadening of our perspective on the world and the mechanism of its development should cause us to speak in a different way about our Christian beliefs,[59] also when we are passing on our faith to children. Bottigheimer observed that in the interests of cultural perpetuation, in the past, children's Bibles have mingled sacred text with secular values.[60] Today that need persists; children need both good science and balanced Christianity, but the secular values have changed drastically. Re-thinking Christianity is not a betrayal of our convictions concerning the creation of everything by God, and the birth, death and resurrection of Christ, traditional conceptions of God as Creator need not be abandoned in order to embrace an evolving universe.[61] The natural sciences, philosophy, and theology discover complementary, not competing, truths about nature, human nature, and God.[62] Earlier Christians who were ground-breaking scientists, such as Teilhard de Chardin and Townes anticipated our plight today: "there is no more substantial natural nourishment for the religious life than contact with properly understood scientific realities … we must open wide our minds and hearts to the new outlook and aspirations." If we are to understand more, we

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55 Coyne, *Why Evolution is True*, 245, 250.

56 Peacocke, *Biology*, 82.

57 Jaap Durand, *Evolusie, Wetenskap en Geloof: 'n Biografiese Inleiding tot die Denke van Teilhard de Chardin* (Wellington: Bybel-Media, 2013), 293-294. Cf. Klaus Nürnberger's, concept of "emergence and evolution" in Klaus Nürnberger, *Theology of the Biblical Witness: An evolutionary Approach* (Münster/Hamburg/London: Lit Verlag, 2002), 71-72, 404.

58 Lyons, *Evolution*, 14.

59 Coyne, *Why Evolution is True*, xix.

60 Ruth B. Bottigheimer, *Bible for Children, From the Age of Gutenberg to the Present* (New Haven/London: Yale University Press, 1996), 218.

61 Keith Ward, *Re-thinking Christianity* (Oxford: Oneworld Publications, 2007), 49.

62 Carroll, *Creation and Science*, 67.

must be open to new ideas and new experience, and we must expect "trouble-some reorientations" of our thinking, as in science.[63]

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[63] Pierre Teilhard De Chardin, *Science and Christ* (trans. René Hague; London: Collins, 1968), 10, 16; Townes, *Making Waves*, 173.

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