

# Zygon<sup>®</sup>

*Journal of*  
RELIGION & SCIENCE



JUNE 2025  
VOLUME 60 NUMBER 2

# Zygon®

*Journal of*  
**RELIGION AND SCIENCE**  
VOL. 60, NO. 2, June 2025

*Editor:* ARTHUR C. PETERSEN, University College London, UK

*Former Editors:* RALPH WENDELL BURHOE (1966–1979), KARL E. PETERS (1979–2009), PHILIP HEFNER (1989–2009), WILLEM B. DREES (2009–2018)

*Book Symposium Editor:* MLADEN TURK, Elmhurst University, USA

*Editorial Assistant:* SARAH JOST (University College London)

*Assistant Treasurer and Chicago Editorial Office Assistant:* DAVID M. GLOVER  
(Zygon Journal Corporation)

*Joint Publication Board, appointed by IRAS (www.iras.org), the Institute on Religion in an Age of Science (1954), CASIRAS (www.casiras.org), the Center for Advanced Study in Religion and Science (1972) and ISSR (www.issr.org.uk), the International Society for Science and Religion (2002):*

SUSAN BARRETO, Journalist, Urbana, IL, USA

WILLEM B. DREES, Prof. Emeritus of Philosophy of the Humanities, Tilburg University, The Netherlands

NIELS HENRIK GREGERSEN, Prof. of Systematic Theology, University of Copenhagen, Denmark

SOLOMON H. KATZ, Prof. Emeritus of Anthropology, University of Pennsylvania, USA

EDWIN C. LAURENSEN, Lawyer, McDermott Will & Emery LLP, San Francisco, USA (President)

SHOAIB AHMED MALIK, Lecturer in Science and Religion, School of Divinity, University of Edinburgh, UK

IGNACIO SILVA, Associate Professor, Philosophy Institute, Universidad Austral, Buenos Aires, Argentina (Secretary)

MLADEN TURK, Baltzer Distinguished Chair of Theology and Religion, Department of Religious Studies, Elmhurst University, USA

GAYLE E. WOLOSCHAK, Prof. of Radiology and Cell and Molecular Biology, Northwestern University, USA (Treasurer)

### *Editorial Advisory Board:*

THOMAS AECHTNER, Assoc. Prof. in Religion and Science, Univ. of Queensland, Australia

CHRISTINA AUS DER AU, Prof., Pädagogische Hochschule Thurgau, Bishop, Protestant Church of Thurgau, Switzerland

ZAINAL ABIDIN BAGIR, Center for Religious and Cross-Cultural Studies, Gadjah Mada Univ., Indonesia

JOSEPH BULBULIA, Prof. of Psychology, Victoria Univ., New Zealand

NA CHEN, Research Professor, Center for Social Development, Fudan University, China

ERNST M. CONRADIE, Senior Prof. of Religion and Theology, Univ. of the Western Cape, South Africa

RANA DAJANI, Prof. of Cell Biology, Hashemite University, Jordan

TERRENCE DEACON, Prof. of Anthropology, Univ. of California Berkeley, USA

CELIA DEANE-DRUMMOND, Director, Laudato Si' Research Institute, Oxford, UK

ELAINE HOWARD ECKLUND, Herbert S. Autrey Chair in Social Sciences, Prof. of Sociology, Rice Univ., Houston, TX, USA

FERN ELSDON-BAKER, Prof. of Science, Knowledge and Belief in Society, Univ. of Birmingham, UK

DIRK EVERS, Prof. of Systematic Theology/Dogmatics, Martin Luther Univ. Halle-Wittenberg, Germany

OWEN J. FLANAGAN, Prof. of Neuroscience, Duke Univ., Durham, NC, USA

MOHAMMED GHALY, Prof. of Islamic Law and Biomedical Ethics, Center for Islamic Legislation and Ethics, Doha, Qatar

MARCELO GLEISER, Prof. of Physics and Astronomy, Dartmouth College, Hanover, NH, USA

CARLOS MIGUEL GÓMEZ RINCÓN, Assoc. Prof., Theology and Religious Studies, Univ. del Rosario, Bogotá, Colombia

URSULA GOODENOUGH, Prof. Emerita of Biology, Washington Univ., St. Louis, Durham, NC, MO, USA

NIDHAL GUESSOUM, Prof. of Physics and Astronomy, American Univ. of Sharjah, United Arab Emirates

YUANLIN GUO, Prof. of Philosophy, Center for Science, Technology and Society, Tianjin Univ., China

MARK HARRIS, Andreas Ideos Prof. Science and Religion, Univ. of Oxford, UK

PETER HARRISON, Prof. Emeritus, Institute for Advanced Studies in the Humanities, Univ. of Queensland, Australia

ANTJE JACKELÉN, Archbishop Emerita of the Lutheran Church of Sweden, Uppsala, Sweden

SEUNG CHUL KIM, Director, Nanzan Inst. For Religion and Culture, Nanzan Univ., Japan

JUAN LARRAÍN, Prof. of Cellular and Molecular Biology, Pontifical Catholic Univ. of Chile, Chile

YU-TING LEE, Assoc. Prof., East Asian History and Culture, National Taiwan Univ. Taiwan

SARA LUMBRERAS, Prof., Institute for Research in Technology, School of Engineering, Comillas Pontifical Univ., Spain

AGNALDO PORTUGAL, Assoc. Prof., Department of Philosophy, Univ. of Brasília, Brazil

FABIEN REVOL, Prof. of Moral Theology of Ecology, Catholic Univ. of Lyon, France

ROBERT J. RUSSELL, Prof. Emeritus of Theology and Science, Graduate Theological Union, Berkeley, CA, USA

KNUT-WILLY SÆTHER, Prof. of Religious Studies, Volda Univ. College, Norway

CHRISTOPHER SOUTHGATE, Prof. of Christian Theodicy, Department of Theology and Religion, Univ. of Exeter, UK

ANN TAVES, Distinguished Prof. Emerita of Religious Studies, Univ. of California Santa Barbara, USA

HAVA TIROSH-SAMUELSON, Irving and Miriam Lowe Prof. of Modern Judaism, Arizona State Univ., Tempe, AZ, USA

CLAUDIA E. VANNEY, Prof. of Physics and Philosophy, Universidad Austral, Argentina

DANIE VELDSMAN, Prof. of Theology, Univ. of Pretoria, South Africa

WESLEY J. WILDMAN, Professor of Philosophy, Theology, and Ethics, Boston Univ., MA, USA

**Statement of Perspective.** The word *zygon* means the yoking of two entities or processes that must work together. It is related to *zygote*—meaning the union of genetic heritage from sperm and egg, a union that is vital in higher species for the continuation of advancement of life. The journal *Zygon* provides a forum for exploring ways to unite what in modern times has been disconnected—values from knowledge, goodness from truth, religion from science. Traditional religions, which have transmitted wisdom about what is of essential value and ultimate meaning as a guide for human living, were expressed in terms of the best understandings of their times about human nature, society, and the world. Religious expression in our time, however, has not drawn similarly on modern science, which has superseded the ancient forms of understanding. As a result religions have lost credibility in the modern mind. Nevertheless some recent scientific studies of human evolution and development have indicated how long-standing religions have evolved well-winnowed wisdom, still essential for the best life. *Zygon's* hypothesis is that when long-evolved religious wisdom is yoked with significant recent scientific discoveries about the world and human nature, there results credible expression of basic meaning, values, and moral convictions that provides valid and effective guidance for enhancing human life. *Zygon* also publishes manuscripts that are critical of this perspective, as long as such papers contribute to a constructive reflection on scientific knowledge, human values, and existential meaning.

**Organization and Governance.** *Zygon: Journal of Religion and Science* is owned and managed by Zygon: Journal of Religion and Science NFP, a not-for-profit scholarly corporation established in Chicago in 2019, which succeeds a joint venture established in 1965 and has as its members: IRAS, the Institute on Religion in an Age of Science (1954), CASIRAS, the Center for Advanced Study in Religion and Science (1972), and ISSR, the International Society for Science and Religion (2002). Over the history of the journal, funding has come from a variety of sources: an endowment has been built up from contributions from individuals, while operating costs of the corporation had been met from a share in publication revenue. With the disappearance of publication revenue after shifting to diamond open access in 2024, the main sources of income are now contributions (if any) from member organizations and individuals, as well as investment income and unrealized gains on investments. The corporation is dedicated entirely to publishing the journal. The corporation's Board of Directors ("Joint Publication Board") has nine members; each member organization appoints three directors. The selection and appointment of the Editor-in-Chief, or the joint Editors-in-Chief, is done by the Joint Publication Board. The appointment term is five years (renewable). The Editor-in-Chief can appoint Editors, Assistant Editors and Editorial Assistants. The Joint Publication Board appoints members to the Editorial Advisory Board; the appointment term is five years (renewable) and appointments are made (or renewed) with a view to diversity in the composition. The journal was formerly published by The University of Chicago Press (1966–1978), Wilfrid Laurier University Press (1979–1989) and Blackwell/Wiley (1990–2023), and from 2024 the journal is published by the Open Library of Humanities (OLH).

**Contact Information.** Editor-in-Chief: Professor Arthur C. Petersen, arthur.petersen@ucl.ac.uk, Department of Science, Technology, Engineering and Public Policy, University College London, Gower Street, London WC1E 6BT, UK. Book Symposium Editor: Professor Mladen Turk, turkm@elmhurst.edu, Department of Religious Studies, Elmhurst University, USA. Address for Corporate Affairs: 5416 S Cornell Avenue, Fourth Floor, Chicago, IL 60615, USA.

**Manuscripts.** Please submit online via <https://www.zygonjournal.org>. For author guidelines, see <https://www.zygonjournal.org/site/author-guidelines>.

## *Editorial*

### **Humans, Other Animals, and Anthropocosmic Futures**

In this Editorial for the June 2025 issue, you will find a brief overview of the articles included in this issue, both in the general section and in three thematic sections, including one Book Symposium, as well as an overview of books reviewed in the latest edition of *Reviews in Science, Religion and Theology*.

#### **Article**

This issue contains one general article. Francis Umesiri reflects on George Lemaître's contribution to the dialogue between science and faith; he shows that Lemaître's approach is more expansive and nuanced than is generally acknowledged.

#### **Habitability for Your Cosmic Future: AstroAnthropology Meets AstroEthics**

This thematic section contains three contributions from the 2024 IRAS Conference "Habitability for Your Cosmic Future: AstroAnthropology Meets AstroEthics." Ted Peters, co-organizer of that conference, introduces the articles from Lucas Mix, Shoaib Malik, and Andrew Davis.

#### **The Significance of Humans and Other Animals (by Finley Lawson)**

The animals and religion dialogue has grown significantly over the last few decades, with this increasingly leading to new branches of theological and philosophical enquiry such as ecotheology and animal theology. Whilst the move away from strictly anthropocentric approaches to environmental ethics, stewardship and/or human animal relations has moved the academic discussion forward, there are contrary concerns that placing humans "amongst" the animals risks losing sight of their soteriological status within the Abrahamic faiths.

In the Autumn of 2023 members and delegates at the Science and Religion Forum's annual conference came together in Cambridge to discuss these issues and the broader implications of scientific and interdisciplinary approaches to

non-human animals in what was a wide-ranging conference. The breadth of approaches (if not faiths) that were considered are highlighted in the collection of articles within this thematic session. The articles here represent the development of keynotes and short papers from the conference as well as winner of the Peacocke Student Essay Prize. Across the thematic section, authors examine the evolving moral, spiritual, and philosophical relationships between humans, animals, and machines. The articles invite us to consider the challenges and theological benefits to reinterpreting the significance of “other animals” (and ourselves) in an age of technology and ecological crisis.

Broadly the articles in this section fall into three themes: ethics, technology, and creativity. The first set of articles examining ethics open with Celia Deane-Drummond’s Gowland lecture. Deane-Drummond’s article argues that human morality is not a unique overlay on a brutish nature, but a co-evolved trait shared with other socially complex species. This provocation is continued in Eva van Urk-Coster’s article which reinterprets the *imago Dei* as a spiritual calling to affirm the worth of all life in the hope of furthering ecological wisdom. The final article addressing ethical concerns is Alan Furic’s bold challenge to the “dominion” narrative which argues the interconnectedness of reality evidenced in quantum theory should be taken as an ethical imperative. This article addresses Huayan Buddhism, but the provocation applies across faiths.

The second set addressing the relationship between humans, animals, and technology includes two distinctive contributions. Louis Caruana’s article forms a bridge between ethical and technological concerns if the future leads to the rise of a super humanity: can Teilhard de Chardin’s work on cephalization and socialization provide a map to ensure the rest of the biosphere is not left behind? Luca Settimo explores brain–machine interfaces and the evidence for freedom of action (over freedom of choice) in non-human animals; he suggests that moral agency and responsibility may impact on our conception of the *imago Dei*.

The final set considers wisdom, worship, and creativity. Peter Altmann’s article prompts us to consider the significance and implication of non-human animals’ connection with the divine and invites us to reflect on animal intelligences. Anne Solomon’s article provides a bridge into matters of creativity and our perception or imposition of religion/worship onto historical artefacts through a case study of the changing attitudes to human–animal relationships seen in prehistoric rock art. Finally, Gavin Hitchcock’s article draws analogies between human, animal, and AI creativity, framing co-creativity as a divine gift and challenge, linking back to Altmann’s considerations of diverse intelligences.

The last article in the thematic section falls outside the overall theme. Each year, students are invited to submit an essay on any issue in science-and-religion, Andrew Proudfoot’s 2023 winning essay concludes the thematic section engaging with Martin Buber’s relational theology and the “Other” of conscious machines to ask whether they might one day become a “Thou” to our “I.”

These articles provide a snapshot of just some of the diverse questions we must engage with as our understanding of animal consciousness and creativity continue to develop, alongside the risks and opportunities of anthropomorphizing other beings.

## Book Symposium (by Mladen Turk)

The Book Symposium in this issue features Arthur Petersen's *Climate, God and Uncertainty: A Transcendental Naturalistic Approach beyond Bruno Latour* (2023). It has four commentators: Josh Reeves, Whitney Bauman, Gijsbert van den Brink, and Lisa Sideris. Petersen responds to the comments.

## Books reviewed in *Reviews in Science, Religion and Theology*

*Reviews in Science, Religion and Theology* is a quarterly joint publication of the European Society for the Study of Science and Theology (ESSSAT) and the International Society for Science and Religion (ISSR) and is distributed free to all members of ESSSAT and ISSR. In order to give readers of *Zygon: Journal of Religion and Science* an overview of recent publications, we include the list of books reviewed in the latest *Reviews* issue (in this case, March 2025):

- Doru Costache and Geraint F. Lewis, *A New Copernican Turn: Contemporary Cosmology, The Self and Orthodox Science-Engaged Theology*, London: Routledge, 2025
- Beth Singler, *Religion and Artificial Intelligence: An Introduction*. London: Routledge, 2024

ARTHUR C. PETERSEN  
Department of Science, Technology, Engineering and Public Policy,  
University College London, London, UK  
arthur.petersen@ucl.ac.uk





## CONTENTS

### ARTICLES

Reflections on Georges Lemaître’s Contribution to Science and Faith Dialogue . . . . . FRANCIS E. UMESIRI 361

### HABITABILITY FOR YOUR COSMIC FUTURE: ASTROANTHROPOLOGY MEETS ASTROETHICS

AstroAnthropology Meets AstroTheology: Lucas Mix, Shoaib Malik, and Andrew Davis . . . . . TED PETERS 381

The Developmental Narrative and Space as Salvation in the Works of Carl Sagan . . . . . LUCAS JOHN MIX 392

Houston, al-Rāzī Has a Problem: Are Humans (*Really*) the Best of Creation? . . . . . SHOAIB AHMED MALIK 413

Extraterrestrial Metaphysics in Process Perspective: Implications of Our Anthropocosmic Nature . . . . . ANDREW M. DAVIS 440

### HUMANS AND OTHER ANIMALS: CONTRIBUTIONS FROM THE SCIENCE AND RELIGION FORUM

We See in a Glass Darkly: Exploring the Hermeneutics of Virtue and Vice beyond the Species Boundary . . . . . CELIA DEANE-DRUMMOND 467

The Spiritual Value of Biodiversity: Retrieving the Structural Theory of the *Imago Dei* for the Sake of Ecological Wisdom . . . EVA VAN URK-COSTER 483

Humanimals of Earth: Interconnectedness as an Ethical Imperative in the Dialogue between Quantum Mechanics and Buddhism . . . ALLAN FURIC 498



Future Togetherness Embracing All Living Things: Extending Some Views of Teilhard de Chardin . . . . .	LOUIS CARUANA	514
The Use of Brain–Machine Interfaces in Human and Nonhuman Beings: Philosophical-Theological Implications for Morality . . . .	LUCA SETTIMO	531
Learning from the Ravens: Worship and Wisdom with the Birds in the Hebrew Bible . . . . .	PETER ALTMANN	548
Animals and Ancient Religion: What Can Prehistoric Art Tell Us? . . . . .	ANNE SOLOMON	567
Imagining, Imitating, Being: A Kind of Fugue on Three Words Celebrating Human Co-Creativity . . . . .	A. GAVIN HITCHCOCK	589
Peacocke Prize Essay—How to Say Thou to a Conscious Machine . . . . .	ANDREW PROUDFOOT	606
 <i>PETERSEN’S CLIMATE, GOD AND UNCERTAINTY</i>		
The Nature of Nature: Engaging Arthur Petersen’s <i>Climate, God and Uncertainty</i> . . . . .	JOSH A. REEVES	622
Transcendental Naturalism, New Materialisms, and Emerging Planetary Values . . . . .	WHITNEY A. BAUMAN	631
For Kantians Only? Arthur Petersen on Transcendental Naturalism, Climate Change, and God . . . . .	GIJSBERT VAN DEN BRINK	642
Wonder and Encountering Nature in Transcendental Naturalism: A Reflection on Petersen’s <i>Climate, God and Uncertainty</i> . . .	LISA H. SIDERIS	655
Transcendental Naturalism’s Approach to Values, Criticism, Metaphysics, and Wonder: A Brief Response to Commentators . . .	ARTHUR C. PETERSEN	665



## Reflections on George Lemaître's Contribution to Science and Faith Dialogue

**Francis E. Umesiri**, Associate Professor of Organic Chemistry, Wheaton College, Wheaton, IL, USA, [francis.umesiri@wheaton.edu](mailto:francis.umesiri@wheaton.edu)

---

Georges Lemaître, a Belgian mathematical physicist, cosmologist, and Roman Catholic priest, is generally recognized as the founding father of modern Big Bang cosmology. However, his position and/or contributions to the dialogue between science and faith are often not well known or mischaracterized, partly because most of his writings and lectures were done in French and hence relatively unavailable in the English language. This article draws from four historic sources, two of which contain his own words on the topic—a 1933 interview he gave to *The New York Times*, a lecture he delivered at the 1936 Catholic Congress of the Malines, and his interactions, separately, with Albert Einstein and Pope Pius XII—to outline Lemaître's views on science and faith dialogue and show that his approach is more expansive and nuanced than generally acknowledged. Finally, the article provides some personal reflections on Lemaître's approach and contributions to science and faith dialogue, and potential lessons for today's scientist-Christian scholar.

---



## Introduction

After many years in relative obscurity, Georges Lemaître, Belgian Jesuit and the founding father of modern Big Bang theory, is finally beginning to get the credit he deserves both in scientific circles and scholarly publications. A good example is the fact that the International Astronomical Union recently voted to rename the Hubble Law as the Lemaître-Hubble Law (Tipler 2018) in recognition of his pioneering role in the understanding of an expanding universe.

However, Lemaître's position and/or contributions to the dialogue between science and faith are often not well known or mischaracterized, partly because most of his writings and lectures were done in French and hence relatively unavailable in the English language. Lemaître faced initial skepticism towards his scientific contributions from leading scientists of his day because they suspected him of concordism (Lambert 2012), which attempts to find specific points of agreement between science and religion. Although he started out in his early years with concordism, Lemaître's views evolved to reject it (Lambert 2012). Because of his later insistence that faith and science are separate spheres of study and two different ways of seeking truth, he is sometimes mischaracterized as having advocated for a two-spheres view, with its implied complete separation or even conflict between faith and science. However, a closer look at the life and times of Lemaître suggests a much more nuanced approach to science and faith. While his approach was definitely non-concordism in important aspects, his contributions to the dialogue between faith and science are much more robust and expansible than a purely two-spheres view would allow. There are two documented instances in which Lemaître shared in some detail his own views on science and faith in his own words: an interview he granted *The New York Times* during a 1933 trip to the United States (Aikman 1933) and a lecture he gave at the Catholic Congress of the Malines in 1936, which has now been translated and made available in the English language in its entirety (De Felipe, Bourdon, and Riaza 2015). Additionally, there are accounts of Lemaître's interaction with two representative figures of his time, Pope Pius XII (Coyne 2012), representative of the faith dialogue, and Albert Einstein, representative of the science dialogue. These interactions further illustrate Lemaître's dynamic and complex approach to science and faith.

Therefore, this article draws from the two texts in which Lemaître details his own views on science and faith to show that his was a rich and somewhat complicated approach and demonstrate why his views may not be accurately characterized as involving a complete and disconnected separation between science and faith. Additionally, his interactions with Pope Pius XII and Einstein on matters of faith and science, respectively, are discussed to show that Lemaître's views on science and faith dialogue were bold, distinct, and collaborative. Finally, some personal reflections and lessons on Georges Lemaître's contributions to the science and faith dialogue are offered.

## Georges Lemaître's Views on Science and Faith, in His Own Words

Most of Lemaître's writings and speeches were done in French, with few translations and reprints in the English language. The result is that English-speaking audiences have very little direct access to his thoughts, for example on science and faith. Fortunately, Pablo De Felipe, Pierre Bourdon, and Eduardo Riaza have provided an English translation of an important lecture Lemaître gave on faith and science at the 1936 Catholic Congress of the Malines (De Felipe, Bourdon, and Riaza 2015). Since this lecture was given during the years when Lemaître's views on the interrelationship between science and faith had already matured, it provides an important context and substance in understanding his views on the science and faith dialogue. In addition, during his seminar tours in the United States, he granted an interview to *The New York Times* in 1933. Together, these written sources provide a more accurate picture of his views on the science and faith dialogue.

### Historical Context

To better understand Lemaître's lecture of 1936 and *The New York Times* interview of 1933, a historical context is important. As others elsewhere have already noted, different historical periods/contexts shaped the development of Lemaître's science and faith views (Coyne 2012), but the focus in this article is on the role played by two important forces, namely, anticlericalism and the Catholic Church's growing emphasis on science.

### Anticlericalism in Europe in the Nineteenth Century

Anticlerical sentiments, especially against the secular influence of the Roman Catholic Church, ran deep in Europe in the late nineteenth century and played a major role in several political developments, from Germany 1871–87 and beyond to Spain in 1873, and the Netherlands and Belgium during the 1880s and 1890s (Britannica, n.d.). For example, anticlericalism was an important factor in French politics starting with the French Revolution of 1789 and provided a crucial stimulus for the Radical Party (1902–6) and beyond.

These anticlerical forces and the mistrust of the Catholic Church's scientists influenced the developing relationship between science and religion. In fact, as Sabino Maffeo (2001) makes clear in his history of the Vatican Observatory on the occasion of its 100th anniversary, the founding of the observatory in 1891 by Pope Leo XIII was mainly motivated by the need to combat such anticlericalism. In his *Motu Proprio* establishing the observatory, Pope Leo XIII stated:

So that they might display their disdain and hatred for the mystical Spouse of Christ, who is the true light, those borne of darkness are accustomed to calumniate her to unlearned people and they call her the friend of obscurantism, one who nurtures ignorance, an enemy of science and progress . . .

[I]n taking up this work we have become involved not only in helping to promote a very noble science, which more than any other human discipline, raises the spirit of mortals to the contemplation of heavenly events, but we have in the first place put before ourselves the plan . . . that everyone might see that the Church and its Pastors are not opposed to true and solid science, whether human or divine, but that they embrace it, encourage it, and promote it with the fullest possible dedication. (Coyne 2012)

Furthermore, the Catholic congresses at Malines, pioneered mainly by the “Liberal Catholics” of Belgium, came into effect partly to counter some of the negative effects of anticlericalism and situate the Catholic Church in a post-revolutionary nineteenth-century Western Europe (De Felipe, Bourdon, and Riaza 2015). The rise of the Liberal Party in 1957 and its adoption of anticlerical inclinations at the expense of the Catholic Church led to an even greater rise in secularist forces in Belgium. It was under this type of anticlerical environment that the Malines congresses were convened, the first of which held in 1863. There were four other Malines congresses held in 1864, 1867, 1891, and 1909. The sixth Malines congress, during which Lemaître delivered his paper on science and faith, was organized by Cardinal Van Roey and held September 10 through 13, 1936, with a telling theme, Catholicism and the New Age. Similar secularist forces within Belgium and the rest of Europe formed the backdrop to the sixth congress as well (Gestel and Carpenter 1936). For example, as fascist sentiments grew through the efforts of the Rexism movement (Belgian fascist party at the time), the Catholic Church became fearful of being ousted from the 1935 coalition government between Catholics, Liberals, and Socialists of the Labor Party. In fact, the 1935 government, led by Prime Minister Paul Guillaume Van Zeeland, resigned in the spring of 1936 due to agitations from the fascist party. Although the Labor Party later returned to power through the general election of May 1936 without the Catholics as part of the government, the Rexist Party received 11.5% of the votes cast, a clear indication of the growing fascist forces across Europe (De Felipe, Bourdon, and Riaza 2015). In fact, by 1936, the Spanish Civil War had already begun (“Editorial,” 1936). Anticlericalism was an important issue in Spain as well, as the Catholic Church was largely seen as hostile to the Republican regime of 1931–39.

It was within this historical environment that the Malines congress of 1936 framed its urgent need to discuss the role of the Catholic Church in an increasingly fascist and anticlerical environment within Belgium and the rest of Europe. Lemaître’s lecture on the relationship between science and religion was presented under such historical and political contexts.

### Roman Catholic’s Growing Emphasis on Science

There is yet another historical fact that must be taken into account when discussing Lemaître’s views on science and faith, namely, the growing emphasis

the Catholic Church gave to science within the first six decades of the twentieth century. This period falls within the crucial rule of Pope Pius XII, a man of rich culture who was acquainted with astronomy even as a young man through his association with Giuseppe Lais, an astronomer at the Vatican Observatory from 1890 to 1921. It was well known that Pope Pius XII had excellent college-level knowledge of astronomy and that he frequently discussed astronomical research with Daniel O'Connell, the then director of the Vatican Observatory (Coyne 2012). Little wonder then that the role of science was elevated within the Catholic Church.

One difficult aspect of this new awakening to science was the fact that Pope Pius XII's understanding of the scientific discussions and developments concerning the origins of the universe (including Lemaître's primordial atom hypothesis) leaned towards concordism (Lambert 2012). As an example, this concordist inclination became apparent during his address, *Un'Ora*, delivered to the Pontifical Academy of Sciences on 22 November 1951 (Haffner 1986), in which he attempted to examine the scientific results from which arguments for the existence of God the Creator might proceed.

Although he had entertained concordist views earlier in his life, Lemaître had become deeply wary of any attempt to use scientific results to support the existence of God as creator or any other form of concordism for that matter (De Felipe, Bourdon, and Riaza 2015). Lemaître's reaction to Pope Pius XII's address is discussed shortly but suffice it to note at this point that Lemaître was deeply troubled by this rationalist inclination and the concordism it tended to breed within the Catholic Church. Even before he had a chance to make his objections known to Pope Pius XII years later, Lemaître's lecture at the Malines congress was given with the recognition that the dangers of rationalistic concordism lurks alongside the new appreciation for scientific endeavors.

So, then, a careful reading of Lemaître's interview in *The New York Times* (Aikman 1933) and his address at the Malines congress of 1936 reveal important aspects of his views on the dialogue between science and faith as discussed here. From this point on, NYT33 refers to *The New York Times* interview, while CCM36 refers to his speech at the Catholic congress at Malines in 1936.

### **Two Paths to Truth**

Lemaître's approach was to view science and religion as two separate paths to truth. During his NYT33 interview, he recounted how he had decided at an early age of about nine years old to pursue both science and religious truth. It was clear to him that science and faith were two paths to truth, and he resolved to follow both paths at the same time:

What is more significant, he continues, is that exactly at the same time, actually in the same month as I remember it, I made up my mind to become a priest. I was interested in the truth from the standpoint of salvation, you see, as well

as in truth from the standpoint of scientific certainty. There are two ways of arriving at the truth. I decided to follow them both. Nothing in my working life, nothing that I have ever learned in my studies of either science or religion, has ever caused me to change that opinion. I have no conflict to reconcile. Science has not shaken my faith in religion, and religion has never caused me to question the conclusions I reached by strictly scientific methods. (Aikman 1933)

It is not surprising then that in the very first sections of his speech at the Malines congress of 1936, he began his lecture with this very fact and left no doubt about how he felt. For him, the pursuit of truth is so important that it must be achieved through both avenues of science and faith, natural and supernatural truth, as he framed it:

The pursuit of truth is the highest human activity. It is reason that separates us from animals and our specific activity is to grasp truth under its every guise. The supernatural truth has been made accessible to us by Christ and his Church. We could never have reached it by ourselves and it had to come down to us. The natural truth, on the contrary, is precisely proportioned to the faculties of our intellective nature. It is humanity's task to understand and value creation that surrounds it and to which it belongs, to perceive in it a reflection of the divine intelligence, by marveling at being surrounded by intelligible matter. (De Felipe, Bourdon, and Riaza 2015)

### Rejection of the Conflict Hypothesis and Complete Separation

The fact that Lemaître shared strong non-concordism views and two-truths sentiments as noted in his own words might lead some to the mistaken notion that he advocated a strict form of nonoverlapping magisteria, originally put forward by paleontologist Stephen Jay Gould. While it is correct that Lemaître was a strong proponent of two-truth domains occupied separately by science and religion, he rejected the notion of nonoverlapping dialogue and interaction between both domains. He believed that both truths must be independently pursued without interference from the other. Fortunately, there is now a rich tapestry of words and actions that illustrates a much more sophisticated intellectual frame and punctures blanket categorization of Lemaître's views.

### Mutual Respect and Unity without Confusion or Separation

After carefully analyzing this important Malines lecture given by Lemaître, Dominique Lambert (Lambert et al. 2015) proposed that Lemaître's views may be understood in the form of two principles: the principle of mutual respect and the principle of unity without confusion or separation. Lemaître aptly concluded his Milanese address with this important point (paragraph 30): "Thus, Faith and Reason, unite in human activity without improper mixing or improper conflict."

## Principle of Mutual Respect

It was Lemaître's view that science and faith must exercise mutual respect. Two paths to truth implies that each path has something to learn from the other. Thus, during his Malines speech (paragraph 3, CCM36), Lemaître contends that:

[e]ven if science is the highest human activity, it is not the most vital, and thus generally does not hold the foremost position it should in man's ordinary concerns. Man is also an animal, and the pressing demands of his bodily nature often absorb his activity. And man is also God's child, in whom the fulfilment of divine grace has nothing to do with the degree of his intellectual development.

So, he cautions (paragraph 5, CCM36) against exaggerated importance or minimization from either science or faith against the other.

These principles are sometimes forgotten, either by exaggeration, when Science is put forth as the only thing that matters, or on the contrary, and because of a fairer vision of the scale of human values, when it is not granted the consideration that scientific activity deserves.

## ***The Principle of Unity (Without Confusion or Separation)***

### No Conflict, No Confusion

The principle of unity alludes to Lemaître's rejection of the conflict hypothesis. In his view, there are no conflicts between science and religion, as the first paragraph of his NYT33 interview makes clear:

There is no conflict between religion and science, the Abbe Lemaitre has been telling audiences over and over again in this country and then proving it by explaining his view is interesting and important, not because he is a Catholic priest, not because he is one of the leading mathematical physicists of our time, but because he is both. Here is a man who believes firmly in the Bible as a revelation from on high, but who develops a theory of the universe without the slightest regard for the teachings of revealed religion on genesis. And there is no conflict! (Aikman 1933)

In his view, any perceived conflict is due to misunderstanding of the role of the Bible. The Bible teaches the way of salvation, not science, as Lemaître made clear during the NYT33 interview:

Do you know where the heart of the misunderstanding lies? he asks. It is really a joke on the scientists. They are a literal-minded lot. Hundreds of professional and amateur scientists actually believe that the Bible pretends to teach science. This is a good deal like assuming there must be authentic religious dogma in

binomial theorem. Nevertheless a lot of otherwise intelligent and well-educated men do go on to believing or at least acting on such a belief. When they find the Bible's scientific reference wrong, as they often are, they repudiate it utterly. Should a priest reject relativity because it contains no authoritative exposition of the doctrine of the Trinity? (Aikman 1933)

### ***Mutual Respect But Not Complete Separation***

Lemaître was insistent on not only mutual respect but some form of unity between science and faith in dialogue, without confusion of each domain's roles or complete separation and disengagement. He was careful in his own work to distinguish between the "beginning" and the "creation" of the world. Contrary to Friedman who had more clear marks of concordism on his work, Lemaître took great pains not to discuss the initial state of the universe in terms of "creation," which would have been closely associated with religious motives (Luminet 2011). In fact, in his original typeset manuscript of the famous letter he sent to *Nature* to put forth is primordial atom hypothesis, Lemaître crossed out the very last sentence:

I think everyone who believes in a supreme being supporting every being and every acting, believes also that God is essentially hidden and may be glad to see how present physics provides a veil hiding creation. (Luminet 2011)

Apparently aware of suspicions from the scientific community at the time that he was trying to reconcile relativistic cosmology with religious belief, Lemaître wisely removed this last sentence from the final manuscript that was submitted and published. But it clearly shows that he personally does not believe in nonoverlapping dialogue between science and faith. This allusion to a supreme and hidden God is really at the core of his belief and affected his work as a scientist.

In advocating for separate domains of truth, Lemaître was careful to avoid the extreme ends of concordism as well as the extreme end of complete irreconcilable separation. His view might be consistent with what some have termed a partial realms view (Bishop 2018). In fact, in his Malines lecture, Lemaître warns against both extremes and suggested a more centric approach (paragraph 25, CCM36):

How should the Christian researcher reconcile his religious convictions to the technical demands of his chosen scientific field? It would seem, as in many other cases, that he should keep the middle ground between two extremes. One is considering these aspects as two completely disconnected compartments from which he would in turn, according to circumstances, draw either his science or his faith. The other is, rashly and irreverently, mixing and confusing what must remain separate. (De Felipe, Bourdon, and Rianza 2015)

Furthermore, in paragraph 27 (CCM36), Lemaître posits that the Christian scientist may even have advantage of sorts over their unbelieving colleagues. He states that while both scientists are striving to solve nature's multiple enigmas, the believer has the advantage of already knowing there is a solution to the enigma, since the underlying logic is that these are the works of an intelligent being who wants the truth behind creation to be discovered in proportion to growing human intellectual ability. In his view

[t]his knowledge might not provide him with new investigation resources, but it will help him maintain a healthy optimism without which a sustained effort cannot long endure. (De Felipe, Bourdon, and Rianza 2015)

In fact, as De Felipe, Bourdon, and Rianza (2015) note, it is entirely conceivable that this idea of a comprehensible universe made by an intelligent being who wants nature to be discovered and has endowed humans with the intellectual ability to do so might have underpinned his choice for a finite but borderless universe, a concept of the universe with which Lemaître stuck till his death.

Finally, after encouraging the Christian researcher to aim for excellent scientific work for its sake without prejudice of any sort from religion, Lemaître in paragraph 29 (CCM36) of his lecture contends that for the Christian scientists, their faith adds a "supernatural" touch to their work. They are God's children when doing research as when in prayerful devotion:

But the Christian researcher knows that his faith supernaturalizes both the highest and lowest of his activities! He remains God's child when he peers through his microscope and, in his morning prayers, he puts every daily activity under his Heavenly Father's protection. Reflecting on the truths of faith, he realizes that his knowledge of microbes, atoms or stars will never help or impede him from adhering to the inaccessible light, and that, like any fellow human, he will still have to achieve the heart of a little child to enter the Kingdom of Heaven. (De Felipe, Bourdon, and Rianza 2015)

Taken together, the NYT33 and CCM36 lecture show that Lemaître's views on the relationship between science and faith were much more robust and complicated than any single label might confer. While it was clear that he rejected concordism as a mature scientist and insisted on separation of scientific and religious paths to truth, he also rejected the extreme end of complete disconnection between science and faith.

### **Interactions with Pope Pius XII and Einstein**

I now turn to discuss the interactions Lemaître had with Pope Pius XII (representing faith) and Albert Einstein (representing science) and suggest that

these interactions paint a portrait of the lived and experiential path Lemaître walked when it came to science and faith dialogue.

### **Interaction with Albert Einstein**

There are two instances in which Einstein differed sharply with Lemaître's position on science: an expanding universe and the cosmological constant. In both cases, Lemaître's disposition and eventual vindication gives a practical indication of his views and attitudes regarding science and faith engagement.

The first instance was regarding the correct model of the universe, either static or expanding. Lemaître's proposal for an expanding universe was initially met with resistance from Einstein and other eminent physicists of the time who favored a static steady-state model of the universe. In fact, during the 1927 Solvay Conference, Lemaître met Einstein for the first time, showed Einstein his work, and tried hard to convince him about this (Luminet 2011). As it was reported, after listening and reviewing Lemaître's work, Einstein concluded to the effect that Lemaître's solution was "correct calculation, abominable physics" (Rovelli 2018).

However, after Hubble collected and published detailed experimental data on spectral redshifts of extragalactic nebulae, which confirmed the same linear velocity–distance relationship Lemaître had already calculated two years earlier (Kragh and Smith 2003), the scientific community finally warmed up to the idea of an expanding universe. Afterwards, Einstein, to his credit, came around to embrace Lemaître's idea of an expanding universe and embarked on a lecture tour across the United States with Lemaître.

The second instance had to do with the importance of the cosmological constant in the general relativity equation. Einstein's theory of relativity played a central role in Lemaître's professional development (Lambert et al. 2015). Here is the equation of general relativity and a crude general-purpose description, since it forms the basis of understanding the importance of the cosmological constant and why it became a point of contention between Einstein and Lemaître.

$$R_{\mu\nu} - \frac{1}{2}R g_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

**Figure 1:** Einstein's general relativity equation.  $R_{\mu\nu}$  depends on Riemann's curvature;  $g_{\mu\nu}$  represents the spacetime metric; together,  $R_{\mu\nu}$  and  $\frac{1}{2}R g_{\mu\nu}$  represent curvature of spacetime;  $T_{\mu\nu}$  stands for energy of matter;  $G$  stands for gravitational constant;  $c$  is the speed of light in vacuum;  $\Lambda$  stands for cosmological constant, which was added two years later (in 1917) by Einstein.

An important concept from the general theory of relativity is that spacetime curves. An oversimplification, perhaps, but sufficient for the purpose of this article. Using Riemann's curvature,  $R$ , Einstein relates  $R$  to be proportional

to mass-energy (which includes both matter and photons). In other words, spacetime curves more where there is more mass-energy. The bigger the mass-energy, the greater the curvature. Spacetime may then be understood in terms of gravitational field, a kind of fabric in which we are immersed. Therefore, “space” is no longer an empty void, a “nothing.” Consequently, mass-energy may then be understood to be made up of particles and spacetime (fields) (Rovelli 2018).

Another important implication of Einstein’s theory of general relativity is that the universe can be both finite and borderless at the same time, just like the Earth is finite but borderless. In three-dimensional space as envisioned in the theory of relativity, space can be curved. Space or even the universe can be understood as a 3-sphere. If you take a space flight and journey always in the same direction, you will eventually arrive back on Earth where you started. Start from one point on the Earth itself, go only in the same direction, and you will eventually arrive at exactly the same spot you started. This is a 3-sphere, a curved space. For a clearer layperson’s description and understanding of Einstein’s theory of relativity (special relativity and general relativity), see *Reality Is Not What It Seems: The Journey to Quantum Gravity* (Rovelli 2018).

Interestingly, when Einstein first proposed this theory in 1915, it did not have the cosmological constant (highlighted in grey, Figure 1). Einstein introduced the cosmological constant two years later in a vain attempt to make the equation more compatible with a static universe. So, when Einstein and others abandoned the idea of a static universe and embraced the notion of an expanding universe, he turned against the cosmological constant, calling it his “biggest blunder” (Holder and Mitton 2012).

Again, it was Lemaître who dared to go against Einstein on this count, confident in his calculations. While working on solutions to Einstein’s field equations of relativity, assuming a positively curved space, nonzero cosmological constant, time-varying matter density and pressure, he had obtained a model of the universe with an expanding universe, which also showed that while the cosmological constant is not necessary for a static universe, it is nevertheless important at large cosmological scales. Lemaître tried to convince Einstein and others that the cosmological constant was indeed important, but again, Einstein resisted (Holder and Mitton 2012).

Today, however, physicists increasingly agree that the cosmological constant can produce an acceleration of the expansion of the universe. In short, the cosmological constant is a leading candidate for the universe’s force of expansion, as gravity is the universe’s force of contraction. Put another way, the cosmological constant could help account for the counteracting effect of gravity, which then leads to expansion.

Here again Lemaître was right. His singular approach to follow science wherever it leads has vindicated him. The courage to oppose Einstein on science, twice, shows something about Lemaître’s practical views on science and faith interrelationship. Specifically, Lemaître’s quiet resolve and confidence

in his science, even when scientific leaders of his time questioned his science and motivation, give an indication of his view as to how a Christian scientist ought to engage with science and faith communities in dialogue. In paragraph 26 and 28 of CCM36 (De Felipe, Bourdon, and Rianza 2015), he noted:

The Christian researcher should master, and astutely apply, the proper technique for his problem. His means of investigations are the same as those of his unbelieving colleague. So, is his freedom of mind, but only if his idea of religious truth measures up to his scientific education.

In a way, the researcher leaves his faith aside in his research, not because it could hamper him, but because it has no immediate bearing on his scientific activity. Thus would a Christian walk, run or swim no different from an unbeliever.

As far as Lemaître was concerned, the Christian and non-Christian scientist have the same tools to work with and the same kind of problems to solve. As in his life and work, he strongly advocated for excellence in scientific endeavor. There is no “Christian” science as opposed to a “non-Christian” science. Great science will hold up to scrutiny whether done by a Christian or not. So, confident in his ideas and respectful of more prominent colleagues like Einstein, Lemaître held firm until he was exonerated scientifically.

### **Interaction with Pope Pius XII**

If Lemaître’s interaction with Einstein is somewhat representative of what the Christian scientist’s approach should be in their dialogue with science and the scientific community at large, then Lemaître’s encounter with Pope Pius XII holds some clues about such interaction with the religious community.

As the idea began to be accepted that the universe may have emerged from the Big Bang, Pope Pius XII declared in a public address to the Pontifical Academy of Sciences on November 22, 1951 (Luminet 2011) that the Big Bang theory confirmed the creation account given in Genesis:

[C]ontemporary science with one sweep back across the centuries has succeeded in bearing witness to the august instant of the primordial *Fiat Lux*, when along with matter there burst forth from nothing a sea of light and radiation . . . Thus, with that concreteness which is characteristic of physical proofs, modern science has confirmed the contingency of the Universe and also the well-founded deduction to the epoch when the world came forth from the hands of the Creator. (Coyne 2012)

Instead of feeling flattered by such papal attention to his work, Lemaître reacted with significant alarm at the news. Aware that the scientific community already viewed his proposal with suspicion of concordism, Lemaître insisted

that the primeval atom hypotheses be viewed only as a physical hypothesis and that religious matters should be kept separate. Pope Pius XII had based his public assertions on Lemaître's publication on the primeval atom hypothesis. But Lemaître knew the hypothesis was still unfolding and could be modified as time went on. Science is a dynamic discipline. Theoretical frameworks get modified as new data and better interpretations emerge. Lemaître recognized the danger of using science to validate faith. Therefore, he encouraged the church to view the Big Bang theory solely as a physical theory that must be kept distinct from theology.

Therefore, as preparation was underway for another address Pope Pius XII was planning to give to the Eighth General Assembly of the International Astronomical Union to be held in Rome in September 7, 1952, Lemaître took action. It has been reported that on his way to a scientific congress in Cape Town, South Africa, Lemaître stopped in Rome to consult with Daniel O'Connell SJ, President of the Pontifical Academy of Sciences, concerning the pope's pending address (Coyne 2012). While details of that meeting are not available, it appears Lemaître's appeal to Pope Pius XII (either directly or through Daniel O'Connell SJ) must have been successful (Holder and Mitton 2012), because although Pope Pius XII referenced many advances in astrophysics in the 1952 address (Coyne 2012), he made no specific mention of the Big Bang hypothesis, and from then on refrained from attributing any philosophical or religious implications to the Big Bang theory (Lambert et al. 2015).

While the Big Bang Theory is now the dominant theory of origins in cosmology, it has undergone important revisions from Lemaître's primeval atom hypothesis. In fact, new fields in string theory and quantum gravity are now exploring what might have happened just before the Big Bang, with some hypothesizing that the contracted phase of the universe (Lemaître's primeval atom) that gave birth to the current universe through the Big Bang might have been the quantum rebound of a previously expanding universe that was then contracting. This is why some now speak of the Big Bounce instead of the Big Bang (Rovelli 2018). While some of these competing theories are controversial and in the very early stages of development, they nevertheless highlight the difficulty in flippant appropriation of scientific data to support theology.

On this note, Lemaître's approach again was vindicated. While many Christians do not see the Big Bang theory as inconsistent with the God-initiated creation, many would easily caution against making the Big Bang theory a scientific underpinning of a Genesis-based intelligent design, as well as make a careful distinction in the study of natural beginnings versus creation origins.

## Reflections

Having outlined Lemaître's views on science and faith both from his own words and from his dealings with Einstein (scientific community) and Pope Pius XII (religious group), it is fitting now to draw some practical reflections and lessons

from this scientist-priest. How does a Christian scientist maintain a healthy dialogue with both science and faith?

### ***The Role of Personal Faith***

An active faith in Jesus Christ was very important to Lemaître. On a personal level, he was a devout Roman Catholic and unapologetically a man of faith. Although he chose the path of secular priesthood to focus on his scientific pursuits, he remained a committed member of a community of priests called the “Friends of Jesus” that was marked by a deep spirituality for about forty-six years, from 1920 to 1966 (Lambert 2012).

Therefore, Lemaître did not see himself as merely a Christian doing science nor as a scientist who happened to be a Christian. Instead, he viewed himself as both a Christian and a scientist at the same time. Within the competitive academic culture in which science is done, marked by the professional advancement needs required by tenure and promotional trajectories, there might be a tendency for a scientist to view a life of faith itself as incidental or merely tangential to a life of scientific pursuits—as though he or she is a scientist first and foremost who also happens to be a Christian. Lemaître rejected this false choice between science and faith. As he noted during his Malines address (paragraph 29, CCM36), the Christian researcher “remains God’s child when he peers through his microscope and, in his morning prayers, he puts every daily activity under his Heavenly Father’s protection.”

### ***“Touching Both Extremes at Once and Every Point in Between”***

Lemaître shatters this false dilemma, this false choice between committed Christian life and science. He stands on the unquestionable pinnacle of science and sends a clear message across the annals of history that a Christian may do great science and still be a devoted Christian, even a committed worker in the church.

Sure, someone may counter with the following words attributed to C. S. Lewis many years ago, that “the modern idea of a Great Man is one who stands at the lonely extremity of some single line of development.” However, the whole point Lewis was making is that although that quote seems to represent a modern idea of what constitutes or leads to greatness, he was really advocating taking a “centrist” position that mediates both extremes. For Lewis and for Lemaître (based on his life and work), a more appropriate mantra would be the following quote by Pascal, “One does not achieve greatness by being at an extreme, but by touching both extremes at once and every point in between” (Lewis 2017).

Here is how Michael Ward summarized this:

It is instructive to see how often Lewis arrives at his ethical conclusions by seeking out a “centrist” position that can mediate between extremes and maintain balance. “Goodness is a middle point for Alfred no less than for

Aristotle,” as he puts it in *The Allegory of Love* (1936), p44. “The modern idea of a Great Man is one who stands at the lonely extremity of some single line of development,—one either as pacific as Tolstoi or as military as Napoleon, either as clotted as Wagner or as angelic as Mozart,”—so says Lewis in *A Preface to Paradise Lost* (1942, pp. 7–8).

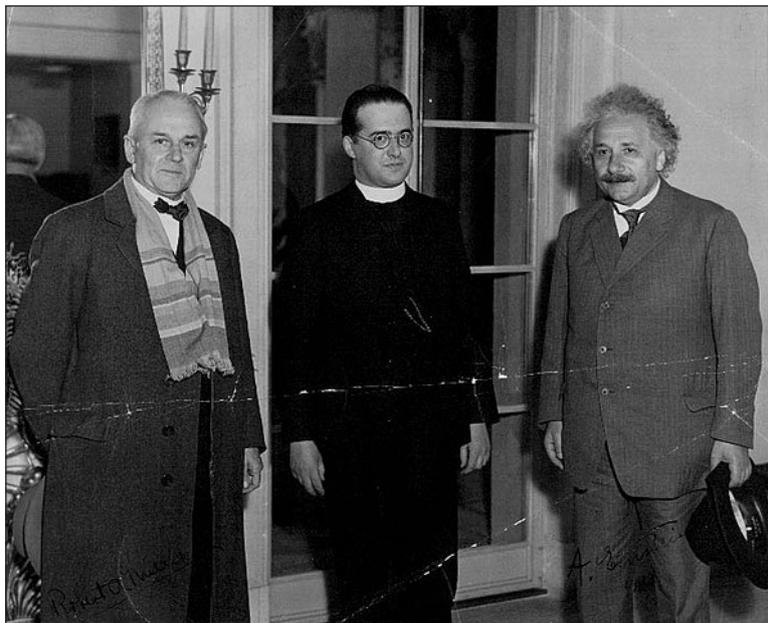
In identifying this as a characteristically modern problem, he is echoing Yeat’s famous lines from the “*The Second Coming*” (1919), “Things fall apart; the center cannot hold; / Mere anarchy is loosed upon the world.” Lewis would rather follow Pascal (whom he quotes in his Preface, p. 8): “One does not achieve greatness by being at an extreme, but by touching both extremes at once and every point in between.” (Lewis 2017, 159–60)

Lemaître did not acknowledge a choice between doing good science and being a devoted follower of Jesus Christ. He chose greatness by “touching both extremes at once and every point in between.” His successes as a scientist suggest it is possible to touch both “extremes” of faith and science and every point in between with success. Of course, there is a most important place for focus and prioritization, for carefully choosing a vocation and fully committing one’s effort and time to it. After all, Lemaître himself chose the path of secular priesthood to focus on his work as a faculty member, scholar, mathematician, and cosmologist. So, yes, sharpening one’s focus and choosing vocational priorities are indispensable for success in any endeavor, especially in science. After all, a Christian life dedicated to scientific pursuit is by itself a life in holy order of reading and interpreting the book of nature that reveals the Creator. Yet, the life of Lemaître as a priest and scientist cautions against one extreme over another.

It is said that a picture speaks louder than a thousand words. Perhaps nothing speaks more loudly about Lemaître’s decision to touch both “extremes” of science and faith than the image in Figure 2. There, he stands among the luminaries of science and intellectual fame, Robert Andrews Millikan (left) and Einstein (right), in well-deserved recognition of his own important contributions to science, yet visibly and stoically dressed in his priestly collar. His decision to wear his priestly collar to this all-important lecture in 1933 and all other scientific meetings and conferences, more than anything else, says something about the man: firm and resolute in his personal conviction and faith, yet a person with an open mind so big that he dared propose groundbreaking new theories such as the expansion of the universe and the Big Bang theory.

### ***Dialogue with Science***

We turn now to the question of how a Christian scientist, and the church as a whole, dialogues with the scientific community. What role do philosophy and ideology play in the interpretation of scientific data?



**Figure 2:** Georges Lemaître (middle) poses for a picture with Robert Andrews Millikan (left) and Albert Einstein (right) after Lemaître's lecture at the California Institute of Technology, January 1933. Source: [https://www.gliscritti.it/gallery3/index.php/Georges-douard-Lema-tre-il-prete-che-per-primo-ipotizz-il-Big-Bang-negli-anni-1927-1931/Lemaitre\\_Einstein](https://www.gliscritti.it/gallery3/index.php/Georges-douard-Lema-tre-il-prete-che-per-primo-ipotizz-il-Big-Bang-negli-anni-1927-1931/Lemaitre_Einstein).

Einstein, Arthur Eddington, and Fred Hoyle, among others, were some of the biggest names in cosmological studies in Lemaître's time. And yet, as noted, their initial resistance to the Big Bang theory, though having some genuine basis in science, might have been arguably influenced by their personal philosophies as well. For instance, Einstein and Eddington obtained similar results from their calculations as Lemaître. Yet, it seemed their philosophy and general resistance to the idea of a beginning for the current universe affected their interpretation of empirical data. To be clear, this was not always a matter of religious belief but more of personal philosophy and ideology.

A specific example here will be helpful. Although Eddington was a committed Christian and a Quaker, he rejected the idea of a beginning to the current order of nature due to personal philosophy, although he had almost come to the same conclusion about a singularity, as evidenced from his address in *The Mathematical Gazette* and his 1931 *Nature* article titled "The End of the World (From the Standpoint of Mathematical Physics)" (Eddington 1931):

Following time backwards we find that more and more organization in the world. If we are stopped earlier we must come to a time when the matter and energy of the world had maximum organization. To go back further is impossible. We have come to an abrupt end of space-time—only we generally call it the "beginning." I have no philosophical axe to grind in this discussion. Philosophically the notion of a beginning of the present order of Nature

is repugnant to me. I am simply stating the dilemma to which our present fundamental conception of physical law leads us.

Eddington captured the core issue rather succinctly: “[P]hilosophically, the notion of a beginning of the present order of Nature is repugnant to me.” Philosophy as used by Eddington here clearly is not a fundamental search for truth but a worldview, a philosophy of life and science, or an outlook on life. It seems Eddington was suggesting that there is something about his personal philosophy of life (perhaps the need to maintain a clear and sharp separation between religious and metaphysical considerations and science) that makes “the notion of a beginning of the present order of nature repugnant” to him. In other words, it is a tacit admission, as all scientists know too well, that scientific knowledge is mediated by persons who have certain philosophies, which may in turn affect their interpretation of scientific data (Bishop 2018).

In his own correspondence titled *The Beginning of the World from the Point of View of Quantum Theory*, which was a response to Eddington’s paper, Lemaître (1931) courageously began by directly referencing this philosophical admission by Eddington:

Sir Arthur Eddington states that, philosophically, the notion of a beginning of the present order of Nature is repugnant to him. I would rather be inclined to think that the present state of quantum theory suggests a beginning of the world very different from the present order of Nature.

There are certain implications of this understanding of the role of philosophy in interpretation of science for the Christian scientist who seeks a balanced dialogue between faith and science.

First, care must be exercised against a rush to accept willy-nilly every interpretation given by scientists to emerging scientific discoveries. For sure, it is important to be at the center of cutting-edge science, to be educated about the newest discoveries in science, even those around the edges of cosmological and biological origins. But it must not be forgotten that philosophy still affects how scientific data may be interpreted. The key word here is *interpreted*. If interpretation of science is expectedly impacted by philosophical considerations, then the church ought not to be hasty in revising theology just to show a skeptical world that the church (and its Christian scholars) is progressive and open to science. Lemaître’s life warns us against haste to reinterpret theology to be compatible with the latest cutting-edge science. This does not mean a stubborn refusal to modify our interpretation or explanation of certain aspects of theology in line with exploding knowledge in science. Instead, a careful, deliberate, and consultative science-engaged theological approach is helpful. As Harrison (2021) summarized:

It is particularly encouraging to see references to the new boldness of theology in a series of articles that seek to rethink the intersection between theological and scientific questions in ways that are not incipiently scientific. Science-engaged theology, as essayed here, involves steering a challenging course that avoids three common pitfalls: a pattern of subservience in which science always trumps theology; an anti-science agenda that either rejects the legitimacy of science or denies that it has anything useful to offer theologians; an assertion of the total independence of the science and theology that disavows any significant points of contact.

Therefore, Harrison (2021) advocates for a kind of science–religion dialogue in which individual sciences provide relevant resources for critical theological reflections “instead of a one-way relation that amounts largely to making defensive theological revisions in light of the findings of ‘science.’”

At any rate, the history of science itself cautions against such exaggerated, unquestioned acceptance of the supremacy of science and its interpretation in all matters on one hand and the danger of reducing religion to theology on the other. For example, while evolution itself may be unquestioned scientific fact, a neo-Darwinian reading of evolution, with its philosophical underpinnings of atheism and eugenics, does not have to go unchallenged. In fact, Andrew G. Gosler, professor of ethno-ornithology at the University of Oxford, has spoken and written quite freely about how the unease he felt with the neo-Darwinian framing of evolution pioneered by Richard Dawkins eventually led him to faith. He recently noted in an essay:

Furthermore, as a scientist, I came to reject Dawkins’s strident, unquestioning belief (unwavering even in the face of contrary evidence) that only the peculiarly masculinist, neo-Darwinian framing of evolution could possibly yield adaptive change in living organisms over time. This was the same neo-Darwinism that spawned eugenics and thence the Holocaust: a post-Darwinian legacy that left deep scars across my own family in the Netherlands from 1942 onwards. For a young naturalist evolving a career path out of a love of nature in general, and birds in particular, I sensed a deep hurt in being told by a distinguished academic through the authority of a book that, while it’s unfortunate if you find these truths distasteful, that’s the way of the world, so grow up and deal with it . . . With its scoffing rejection—based on the crudest of experiments—of Lamarckian evolutionary processes (contrary to Darwin himself who accepted them) and the assumption that adaptation could only result from directed selection operating on randomly generated genetic variation, the neo-Darwinian framing of evolution is profoundly flawed. Through science, we now know that these things are not true. (Alexander and McGrath 2023, 108–98)

The second implication stems from Lemaître's courage to take opposite stands from prevailing scientific notions of his time. His proposal for a dynamic universe was in sharp contrast to eminent scientists of his time. When he met Millikan, Lemaître would have been in the presence of as much a defender of a steady-state model as William Duncan MacMillan, who was the first person to propose a steady-state model to explain redshifts as far back as 1918 (Bishop 2018). Interestingly, both MacMillan and Millikan were Christians, which further underscored how well the steady-state model was entrenched within scientific circles in Lemaître's time and the audacity of his opposition. While different scientists had good scientific reasons to support the steady-state model, for others such as Fred Hoyle, there might have been philosophical reasons as well. Irrespective of the reason behind their support, the steady-state model was entrenched within Lemaître's sphere of scientific vocation. A person of faith in science ought to have the courage and confidence in their own work to go against the grain when need be. Lemaître went toe-to-toe against prominent scientists of his time on the issues listed here, and each time, he was vindicated. This was possible, of course, because of his commitment to a life of excellent scientific vocation. Even at the risk of being ridiculed—after all, he was an ordained Catholic priest—he stayed true to the scientific data and facts before him. He might have been a lonely figure among those luminaries, holding on to an unpopular scientific position, still, he had the courage to stay with valid science and take it wherever it led.

Finally, the scientist-Christian is not only a scientist but also a Christian. So, the Christian scientist is invited to be the whole person they are even during science. Their faith and its underlying ethical implications need not be a burden. They can and should see beauty or the hand of God at work behind the marvelous work of creation. But that is personal. That appreciation of beauty or order is a result of the scientist's worldview, a personal faith, a philosophy that accepts a creator. This is the right of all scientists, Christian or not. For example, some scientists describe some synthetic processes in organic chemistry as elegant. "Elegant," then, is a part of the intrinsic response and appreciation of a scientist to the workings of nature as it is being unfolded in complex organic structures. In this context, it has nothing to do with a belief in God or otherwise. Therefore, any scientist, Christian or not, has a right to experience and express their appreciation of the dynamic nature of science in whatever form they choose based on their philosophy of life. Christian scientists are certainly entitled to experience and/or share such joys or pleasures of science with their students and colleagues. Philosophy in science need not be evil or suspect. Ethics and justice, for example, are very important principles to many scientists, and even more so for many Christian scientists whose faith further strengthens such positions.

---

## References

- Aikman, Duncan. 1933. "Lemaître Follows Two Paths to Truth; The Famous Physicist, Who Is Also a Priest, Tells Why He Finds No Conflict between Science and Religion; Abbe Lemaître's Two Paths: The Famous Physicist Tells Why He Finds No Conflict between Science and Religion." *The New York Times*, February 19, 1933. <https://www.nytimes.com/1933/02/19/archives/lemaître-follows-two-paths-to-truth-the-famous-physicist-who-is.html>.
- Alexander, Denis, and Alister E. McGrath, eds. 2023. *Coming to Faith through Dawkins: 12 Essays on the Pathway from New Atheism to Christianity*. Grand Rapids, MI: Kregel Publications.
- Britannica. n.d. "Anticlericalism." Accessed July 14, 2024. <https://www.britannica.com/topic/anticlericalism>.
- Bishop, Robert C., ed. 2018. *Understanding Scientific Theories of Origins: Cosmology, Geology, and Biology in Christian Perspective*. BioLogos Books on Science and Christianity. Downers Grove, IL: InterVarsity Press.
- Coyne, George V. 2012. "Georges Lemaître: Science and Religion." In *Georges Lemaître: Life, Science and Legacy*, edited by Rodney D. Holder and Simon Mitton, 69–74. Berlin: Springer. [https://doi.org/10.1007/978-3-642-32254-9\\_6](https://doi.org/10.1007/978-3-642-32254-9_6).
- De Felipe, Pablo, Pierre Bourdon, and Eduardo Riaza. 2015. "Georges Lemaître's 1936 Lecture on Science and Faith." *Science and Christian Belief* 27 (2): 154–79.
- Eddington, Arthur S. 1931. "The End of the World: From the Standpoint of Mathematical Physics\*." *Nature* 127 (3203): 447–53. <https://doi.org/10.1038/127447a0>.
- "Editorial." 1936. *New Blackfriars* 17 (198): 647–49. <https://doi.org/10.1111/j.1741-2005.1936.tb05609.x>.
- Gestel, G. Van, and Hilary J. Carpenter. 1936. "The Sixth Malines Congress." *New Blackfriars* 17 (198): 674–78. <https://doi.org/10.1111/j.1741-2005.1936.tb05614.x>.
- Haffner, Paul. 1986. *Discourses of the Popes from Pius XI to John Paul II to the Pontifical Academy of Sciences 1936–1986*. Vatican City: Pontifical Academy of Sciences. <https://www.pas.va/en/publications/scripta-varia/sv66pas.html>.
- Harrison, Peter. 2021. "A Historian's Perspective on Science-Engaged Theology." *Modern Theology* 37 (2): 476–82. <https://doi.org/10.1111/moth.12693>.
- Holder, Rodney D., and Simon Mitton. 2012. "Georges Lemaître: A Brief Introduction to His Science, His Theology, and His Impact." In *Georges Lemaître: Life, Science and Legacy*, edited by Rodney D. Holder and Simon Mitton, 395:1–7. Berlin: Springer. [https://doi.org/10.1007/978-3-642-32254-9\\_1](https://doi.org/10.1007/978-3-642-32254-9_1).
- Kragh, Helge, and Robert W. Smith. 2003. "Who Discovered the Expanding Universe?" *History of Science* 41 (2): 141–62. <https://doi.org/10.1177/007327530304100202>.
- Lambert, Dominique. 2012. "Georges Lemaître: The Priest Who Invented the Big Bang." In *Georges Lemaître: Life, Science and Legacy*, edited by Rodney D. Holder and Simon Mitton, 395:9–21. Berlin: Springer. [https://doi.org/10.1007/978-3-642-32254-9\\_2](https://doi.org/10.1007/978-3-642-32254-9_2).
- Lambert, Dominique, P. J. E. Peebles, Luc Ampleman, and Karl A. Van Bibber. 2015. *The Atom of the Universe: The Life and Work of Georges Lemaître*. Kraków: Copernicus Center Press.
- Lemaître, G. 1931. "The Beginning of the World from the Point of View of Quantum Theory." *Nature* 127 (3210): 706. <https://doi.org/10.1038/127706b0>.
- Lewis, C. S. 2017. *The Abolition of Man: C. S. Lewis's Classic Essay on Objective Morality: A Critical Edition by Michael Ward*. United Kingdom: LogosLight.
- Luminet, Jean-Pierre. 2011. "Editorial Note to: Georges Lemaître, The Beginning of the World from the Point of View of Quantum Theory." *General Relativity and Gravitation* 43 (10): 2911–28. <https://doi.org/10.1007/s10714-011-1213-7>.
- Maffeo, Sabino S. J. 2001. *The Vatican Observatory: In the Service of Nine Popes*. 2nd ed. Città del Vaticano: Vatican Observatory Publications.
- Rovelli, Carlo. 2018. *Reality Is Not What It Seems: The Journey to Quantum Gravity*. Translated by Simon Carnell and Erica Segre. First Riverhead trade paperback edition. New York: Riverhead Books.
- Tipler, Frank J. 2018. "Georges Lemaître and the Hubble–Lemaître Law." *Astronomy & Geophysics* 59 (6): 6.10. <https://doi.org/10.1093/astrophys/aty268>.



## **AstroAnthropology Meets AstroTheology: Lucas Mix, Shoaib Malik, and Andrew Davis**

**Ted Peters**, Emeritus Professor of Systematic Theology at Pacific Lutheran Theological Seminary and the Graduate Theological Union, Berkeley, CA, USA, [tedfpeters@gmail.com](mailto:tedfpeters@gmail.com)

---

The 2024 Institute on Religion in an Age of Science Summer Conference at Star Island featured the future of the human race on Earth as we travel to off-Earth locations and make contact with extraterrestrial neighbors. Scholars Lucas Mix, Shoaib Ahmed Malik, and Andrew Davis provide *Zygon: Journal of Religion and Science* with articles that engage the space sciences with philosophical, theological, and ethical analysis along with constructive proposals.

---



The scientific field of astrobiology has spawned progeny such as astrotheology and, of course, astroethics. Writing in the *International Journal of Astrobiology*, Peruvian astronomer and philosopher Octavio Chon-Torres, along with his colleagues, introduces astrotheology:

Astrotheology, an emerging discipline at the intersection of theology and natural sciences, ventures beyond traditional multidisciplinary approaches, aiming for a transdisciplinary integration . . . This field emphasizes the need to expand our theological perspective to include astrobio-centric considerations, recognizing that our understanding of life and its existential questions should not be limited to Earth. (Chon-Torres, et al. 2024, 13)<sup>1</sup>

The definition of *astrotheology* we work with at the Center for Theology and the Natural Sciences in Berkeley is:

Astrotheology is that branch of theology which provides a critical analysis of the contemporary space sciences combined with an explication of classic doctrines such as creation and Christology for the purpose of constructing a comprehensive and meaningful understanding of our human situation within an astonishingly immense cosmos. (Peters 2018, 11)

One of the first astroanthropological issues to be taken up by the astrotheologian is the place of *Homo sapiens* living on Earth within the unfathomably immense cosmos. The Copernican principle in astronomy seems to demote us. In the pages of *Astronomy Today* magazine, we find that the Copernican principle means Earth is decentered both physically and culturally. “This removal of the Earth from any position of great cosmological significance is generally known, even today, as the *Copernican Principle*. It has become a cornerstone of modern astrophysics” (Chaisson and McMillan 2014, 43). Does the fact that we are small imply that we are marginal and insignificant? Even if we humans sit atop the intelligence ladder on Earth, might it be the case that we are really mediocre or even miniscule when measured cosmically? These are questions the astrotheologian asks.

In what follows, we introduce an astroethics that recognizes paradoxically our terrestrial decenteredness tied to our sense of cosmic responsibility. We then turn to three speakers from the 2024 Institute on Religion in an Age of Science Star Island (IRAS) summer conference: Lucas Mix, Shoab Ahmed Malik, and Andrew Davis. Here, we preview the esemplastic skills of each as they formulate illuminative proposals for understanding our place within God’s unfathomable yet magnificent creation.

## Astroethics

When we turn to astroethics, the terms most frequently used are *astrobioethics* and *space ethics*. “Astrobiotics is a new, exciting, hybrid, cultural sector of science and philosophy,” avers hybrid scientist and theologian Julien Chela-Flores (2021, 58).

Astronomer and IRAS supporter Grace Wolf-Chase reminds us that to pursue astroethics we need science, to be sure. But we need more than science. “Although science can, and arguably should, inform ethics, science cannot dictate ethics” (Wolf-Chase 2012, 110).

Like Wolf-Chase, Jacques Arnould, astroethicist at France’s Centre National d’Etudes Spatiales, seeks extra-scientific input for astroethics. “Ethics is a new mission and a new frontier for the international space community. It demands serious philosophical and humanistic engagement” (Arnould 2005, 253). Here, the public theologian has an opportunity, if not responsibility, to enhance the scientific contribution to the common good—perhaps even the cosmic common good (Peters 2021).

Life, whether microbial or intelligent, is the first matter to be addressed by the astroethicist. Might we call this *astrobiocentrism*? “Astrobiocentrism is a vision that places us in a scenario of confirmation of life in the universe, either as a second genesis or as an expansion of humanity in space” (Chon-Torres et al. 2024, 1). Are we earthlings morally obligated to treat life off-Earth as if it has intrinsic value? Are we obligated to cede dignity to extraterrestrial intelligence (ETI)? Can we expect ETI to treat us with dignity? Astroethicists ask these kinds of questions. At the moment, such questions are only speculative.

Of the panoply of more concrete issues to be taken up by the astroethicist, most urgent is the weaponization of space. Already in 1967 the United Nations *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies* stipulated:

§ 1. The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

§ 2. Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

Thus, weaponizing space was outlawed by the 1967 United Nations Outer Space Treaty (United Nations 1967). The United States did not sign on to this

agreement, however. So today, America and certain other spacefaring nations pose a threat to the world, and to otherworldly beings living elsewhere in space. Independent researcher Jensine Andresen is worried. She makes the de-weaponizing of space number one on her list of moral commitments.

Demilitarizing and de-weaponizing space—and raising our voices so that space is neither privatized nor commercialized—is the right thing to do from a social justice standpoint. It also is the right thing to do given that ETI/UAP are present along human spacecraft and satellites in space (Andresen 2023, 106).

The well being of extraterrestrial neighbors who either remain at home on their exoplanet or visit us in UFOs is endangered by our terrestrial violence. The astroethicist asks us earthlings to pay heed.

The paradoxical value of religious and ethical reflection on outer space is that it reminds us how we on Earth constitute a single planetary community. Within our Earth's ecology, we *Homos sapiens* share a responsibility for the wellbeing of all living creatures. Now is the time to consider whether and how we might also have responsibility for ecospheres elsewhere in this magnificent cosmos, off-Earth.

### **The Institute on Religion in an Age of Science (IRAS)**

With this background in mind, we created an agenda for the sixty-ninth Star Island Summer Conference in 2024. I along with IRAS colleagues Maynard Moore and Jennifer Wiseman set the theme: “Habitability for Your Cosmic Future: AstroAnthropology Meets AstroEthics.” We sought to weave together diverse interdisciplinary threads from the natural and social sciences along with the humanities to consider the place and purpose of humanity in a context in which Earth might not be our only home and in which we may not be alone.

Among the group of august scientists, ethicists, and theologians making presentations were Lucas Mix, Shoaib Malik, and Andrew Davis. These three distinguished scholars have articles in this issue of *Zygon: Journal of Religion and Science*.

### **Lucas John Mix, “The Developmental Narrative and Space as Salvation in the Works of Carl Sagan”**

“Astrobiology is the scientific study of life in space. It happens when you put together what astronomy, physics, planetary science, geology, chemistry, biology, and a host of other disciplines have to say about life and try to make a single narrative” (Mix 2009). That’s how hybrid astrobiologist and Anglican theologian Lucas John Mix opens his informative book *Life in Space: Astrobiology for Everyone*.

In his presentation, now an article in this issue of *Zygon: Journal of Religion and Science*, Mix selects the indefatigable and popular astronomer Carl Sagan to partner in his treatment of the religious dimensions inherent in our space imaginary.

Sagan, reports Mix, framed humanity's future in space as a secular narrative of salvation. The late Cornell University professor aligned technical advancement with ethical growth, what we might refer to as the myth of progress. On television and his writings, Sagan presented an evolutionary epic. Within this scientized epic, humans are still growing up and going up to the stars. Future space travel will mark adulthood for our species.

The human species is . . . tentatively breaking the shackles of Earth . . . in voyaging to the planets and listening for the messages from the stars. (Sagan 2013, 338)

Sagan's Cosmos perspective promises secular salvation among the stars. What could this mean?

Mix is critical of Sagan. Sagan's biological terms reflect outdated biological science. Specifically, theories of progressive evolution are deemed both unproductive and ethically problematic by biologists. Sagan's narrative owes more to a mythology of progress than to biology as science.

Mix then turns to religion as an analytical tool. Viewing evolution on Earth or elsewhere in space through the lens of religion helps reveal its contours and effects. Although Sagan was a scientist, Mix reads Sagan's works such as *Broca's Brain*, *Cosmos*, and *Pale Blue Dot* as religious texts.

Mix treats Sagan as I have elsewhere: scientist Sagan practices theology without a license (Peters 2022). My method is dubbed a *hermeneutic of secular experience*, wherein the theologian analyzes secular self-understanding to uncover the religious dimensions within its presuppositions. Mix does not use this vocabulary, but I think this is what he is doing.

Sagan's technological and celestial optimism can be maintained, argues Mix, only if properly distinguished from the life sciences and their limitations. The human epic can be viewed hopefully if set in a context that affirms its religious character yet rejects both evolution and development as scientific justification.

Mix shares Carl Sagan's hope for the future, love of scientific exploration, and enthusiasm for human space travel. At the same time, Mix thinks these fundamentally religious propositions deserve scrutiny in the context of theology and comparative religion.

Mix concludes by testifying that his hope is set on Christian ideas of salvation rather than scientific overreach. Even though Mix prefers a distinctively Christian soteriology, he still loves science precisely because it reveals new and unexpected perspectives. And because it stimulates enthusiasm for space travel as pilgrimage rather than conquest.

## Shoaib Ahmed Malik, “Houston, al-Rāzī Has a Problem: Are Humans (*Really*) the Best of Creation?”

Attendees at Star Island were treated to a fascinating tour through Islam’s approach to natural science by Shoaib Ahmed Malik. Malik, a chemical engineer and lecturer on science and religion at the University of Edinburgh, has just launched a new book series on Islam and Science with Palgrave. In his *Zygon: Journal of Religion and Science* article, “Houston, al-Rāzī Has a Problem: Are Humans (*Really*) the Best of Creation?”, Malik confronts the prospect that ETI might demote *Homo sapiens*.

Through the centuries, it has been common for Muslim scholars to affirm the superiority of humanity among all of God’s creatures. Recent advances in evolutionary theory have challenged such human uniqueness, giving rise to modern theological debates (Malik 2021). And if evolution alone is not enough to demote our human status, certainly the Copernican principle should close off any human hopes for cosmic superiority.

In opening up a new discussion against the horizon of ETI speculations, Malik interrogates Persian theologian Fakhr al-Dīn al-Rāzī (c. 1150–1209 CE or c. 544–606 AH) on the relative superiority of humans and angels. It was al-Rāzī’s position that angels are superior to humans. Why? Because angels worship God without interruption. Angels are pure. Angels are metaphysically proximate to God. Therefore, human beings do not hold highest rank among God’s creatures. If we in the human race do not like being subordinate to creatures who are our superiors, it is time for us to get over it.

Might this apply to ETI as well? Yes, says Malik (2023). Malik proceeds with this precedent to comfort us when challenged with meeting more highly evolved and superior ETI. God’s creation is vast. And we earthlings occupy at most a humble and modest place within it. This perspective urges theological humility, Malik argues. We need to adopt a view of humanity not as the apex of creation but as one of many expressions of divine creativity.

## Andrew M. Davis, “Extraterrestrial Metaphysics in Process Perspective: Implications of Our Anthropocosmic Nature”

What happens when we turn to metaphysics to ask about the possible existence of extraterrestrial creatures like us? If the first principles of metaphysics are universally applicable, then we might find affirmation that we share our cosmos with intelligent neighbors on exoplanets. At least this is what Whiteheadian process theologian Andrew M. Davis (2024, 146) thinks:

Humanity is an exemplification rather than an exception to everything that is going on in the universe . . . while our cosmological de-centering is a fact, our metaphysical re-centering is required if we are to pierce the deepest nature and character of things, whether terrestrial, extraterrestrial, or divine.

Davis is not buffaloes by the Copernican principle. “The *Copernican Principle*,” Jacques Arnould (2021, 80–81) reminds us, “postulates that there is no privileged point of view in the universe, especially none that is related to the human observers that we are.” Physically decentered? Yes. But is Earth philosophically decentered too? Should we feel miniscule, humble, or worthless? Not according to Andrew Davis.

Recall how Alfred North Whitehead provided us with a speculative metaphysical scheme so comprehensive that nothing could escape its inclusion:

Speculative philosophy is the endeavour to frame a coherent, logical, necessary system of general ideas in terms of which every element of our experience can be interpreted . . . [T]he philosophical scheme should be coherent, logical, and in respect to interpretation, applicable and adequate. Here “applicable” means that some items of experience are thus interpretable, and “adequate” means that there are no items incapable of such interpretation. (Whitehead [1929] 1978, 3)

Davis turns this comprehensiveness into a warrant for drawing inferences about extraterrestrial consciousness we have yet to engage. We *Homo sapiens* include in our creatureliness both a physical and mental pole, both an objective body and a subjective consciousness. If we on Earth exhibit conscious subjectivity, we can darn well bet that consciousness is characteristic of the cosmos universally. Does this mean the human person is a microcosmic map of the entire cosmos?

In this issue of *Zygon: Journal of Religion and Science*, Davis offers us his argument in “Extraterrestrial Metaphysics in Process Perspective: Implications of Our Anthropocosmic Nature.” He embiggens Whitehead to introduce us to extraterrestrial metaphysics in both theory and practice. In theory, he stresses the nature of metaphysical endeavor as consisting in the transplanetary exploration of those abiding and stable features of reality that necessarily obtain in any and all possible worlds. In practice, he views our life on Earth as a particular expression of extraterrestrial metaphysics applicable to everywhere in the cosmos.

As mentioned, Davis is a disciple of Whitehead, for whom first principles are as universal as they can be. So, in dialogue with Whitehead along with Teilhard de Chardin and Charles Hartshorne, Davis augments this tradition of process metaphysics to include extraterrestrial realities. He concludes by extending an invitation to all terrestrial metaphysicians to become more deliberately extraterrestrial in both theory and practice.

## Conclusion

Strict science is nonreligious in its method. I am not making a complaint. Only an observation. Yet, the subject matter of science is nature. And nature herself

may exhibit erumpent inspiration (Wiseman 2018). Writing in *Zygon: Journal of Religion and Science*, religious naturalist JD Stillwater ascribes to nature the status of sacred text, revealing to us the depth of reality:

Understood as a source of information and inspiration about the mind of the creator, natural reality is, by definition, a common scripture for all the world's religious faiths as well as those with no religious faith. Natural reality is the only source of inspiration about ultimate reality that is common to all humanity. (Stillwater 2024, 1061)

This certainly applies to sciences that read nature's text, such as astrobiology and its sister disciplines astronomy, astrophysics, and cosmology. By simply being there, our magnificent cosmos is inspiring, haunting, daunting (Peters 2022). Harvard astronomer Owen Gingerich (2009, 29) says, "Cosmology is a voyage of the human spirit." This calls for poetry.

Let me conclude with a poem by Linda Groff, who was also among the presenters at the 2024 IRAS Summer Conference at Star Island.

Encountering Newness  
In Alien Species from Space

Diversity on a much bigger scale  
If we discover intelligent life  
Beyond Earth's current shores  
Co-habiting Space with us humans from Earth.

Are we ready to share space with new species  
To interact and negotiate together  
In a spirit of curiosity and nonviolence  
And the joy of discovering we're not alone?

When diverse humans first encountered each other  
Wars often ensued over territory and fear  
Will we repeat that with Space alien species  
Or master our fears and aggression  
Living together on a bigger new system level  
Where we both can belong and prosper?

Now that my dear human friends  
Is a pressing question for our human futures  
That we may all be facing much sooner  
Than any of us could have imagined.

Namaste—the God in me salutes the God in you  
Will we humans be capable of that  
With whole new alien species  
We encounter near Earth or in Space  
When we can't figure out how to deal well  
With our fellow human beings here on Earth?

Or will humans finally unite with each other  
Against the strangeness of alien species  
Who will also be seeing us as an “alien” species  
So we'll both be challenged by each other.

Can we prepare for a more positive outcome  
That will require us all to expand  
Our consciousness and our tolerance for diversity  
Transforming it from a negative to positive outcome?

Diversity on bigger system levels  
Can expand our creativity and our vision  
By what we can learn from each other  
Now that is a goal we should strive for.

And so it is. AMEN, AMEN, AMEN.

© Linda Groff, used with permission.

---

## Note

<sup>1</sup> Note the use of the term *transdisciplinary*. *Zygon: Journal of Religion and Science* is an interdisciplinary journal. Is there room here for disciplinary and transdisciplinary scholarship? Yes, of course. Hybrid scientist-theologian Arvin M. Gouw (2024) connects transdisciplinarity with Ian Barbour's integration model for science–religion discourse: “Transdisciplinarity represents a progressive and integrative approach to research and problem solving that extends beyond the confines of traditional disciplinary boundaries. Unlike disciplinarity, multidisciplinarity, or interdisciplinarity, transdisciplinarity seeks to merge methodologies and knowledge from various fields into a novel discipline embedded in real-world, non-academic settings, such as communities and forms of activism. This approach not only involves multiple disciplines but transcends them, creating new ways of understanding and addressing complex issues.”

## References

- Andresen, Jensine. 2023. *Safe Space*. New York: Andresen.
- Arnould, Jacques. 2005. “The Emergence of the Ethics of Space: The Case of the French Space Agency.” *Futures* 37 (2): 245–50.
- . 2021. “Who Goes There? When Astrobiology Challenges Humans.” In *Astrobiology: Science, Ethics, and Public Policy*, edited by Octavio Chon-Torres, Ted Peters, Joseph Seckbach, and Richard Gordon, 79–94. Hoboken, NJ: Wiley.
- Chaisson, Eric, and Steve McMillan. 2014. *Astronomy Today*. Boston: Pearson.
- Chela-Flores, Julian. 2021. “Moral Philosophy for a Second Genesis.” In *Astrobiology: Science, Ethics, and Public Policy*, edited by Octavio Chon-Torres, Ted Peters, Joseph Seckbach, and Richard Gordon, 57–78. Hoboken, NJ: Wiley.
- Chon-Torres, Octavio, Julian Chela-Flores, David Dunér, Erik Perrson, Tony Miligan, Jesús Martínez-Frías, Andreas Losch, Adam Pryor, and César André Murga-Moreno. 2024. “Astrobiocentrism: Reflections on Challenges in the Transition.” *International Journal of Astrobiology* 23:1–17.
- Davis, Andrew M. 2024. “Metaphysics Beyond Earth: Whitehead, Teilhard, and the Emergence of Process Exotheology.” In *Whitehead and Teilhard: From Organism to Omega*, edited by Ilia Delio and Andrew M. Davis, 135–75. Maryknoll, NY: Orbis.
- Gingerich, Owen. 2009. “Mankind’s Place in the Universe.” *Nature* 457 (7225): 28–29.
- Gouw, Arvin M. 2024. “Undisciplining the Science and Religion Discourse on the Holy War on Obesity.” *Religions* 15 (12): 1538.
- Malik, Shoab Ahmed. 2023. “Extraterrestrial Life and Islamic Beliefs: Investigating Six Potential Conflicts.” In *Islamic Theology and Extraterrestrial Life: New Frontiers in Science and Religion*, edited by Shoab Ahmed Malik and Jörg Matthias Dettermann, 98–114. New York: Bloomsbury Academic.
- . 2021. *Islam and Evolution: Al-Ghazali and the Modern Evolutionary Paradigm*. London: Routledge.
- Mix, Lucas J. 2009. *Life in Space: Astrobiology for Everyone*. Cambridge, MA: Harvard University Press.
- Peters, Ted. 2018. “Introducing Astrotheology.” In *Astrotheology: Science and Theology Meet Extraterrestrial Life*, edited by Ted Peters, Martinez Hewlett, Joshua M. Moritz, and Robert John Russell, 3–26. Eugene, OR: Cascade Books.
- . 2021. “Astrotheology’s Contribution to Public Theology: From the Extraterrestrial Intelligence Myth to Astroethics.” *HTS Theologise Studies* 77 (3): 1–8.
- . 2022. “Astrobiology: The Almost Religious Science.” *Theology and Science* 20 (3): 271–75.
- Sagan, Carl. 2013. *Cosmos*. New York: Ballantine.
- Stillwater, JD. 2024. “Nature’s Scripture: The Interfaith Promise of Science.” *Zygon: Journal of Religion and Science* 59 (4): 1057–69.
- United Nations. 1967. *Outer Space Treaty*. <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>, <http://history.nasa.gov/1967treaty.html>.
- Whitehead, Alfred North. (1929) 1978. *Process and Reality* (Corrected Edition). New York: Macmillan.

Wiseman, Jennifer. 2018. "Exoplanets and the Search for Life Beyond Earth." In *Astrotheology: Science and Theology Meet Extraterrestrial Life*, edited by Ted Peters, Martinez Hewlett, Joshua M. Moritz, and Robert John Russell, 124–32. Eugene, OR: Cascade.

Wolf-Chase, Grace. 2012. "Astronomy: From Star Gazing to Astrobiology." In *The Routledge Companion to Religion and Science*, edited by James W. Haag, Gregory R. Peterson, and Michael L. Spezio, 103–12. London: Routledge.





## The Developmental Narrative and Space as Salvation in the Works of Carl Sagan

**Lucas John Mix**, Co-Director, Equipping Christian Leadership in an Age of Science,  
Durham University, Durham, UK, [lucasjmix@gmail.com](mailto:lucasjmix@gmail.com)

---

Carl Sagan frames humanity's future in space as a secular narrative of salvation. He aligns technical advancement with ethical growth. He presents an evolutionary epic, with humans growing up and going up to the stars, identifying space travel with species adulthood. His works *Cosmos*, *Broca's Brain*, and *Pale Blue Dot* develop this theme to promote space travel and foster hope for the future. The biological terms, however, reflect outdated science, particularly theories of progressive evolution, deemed both unproductive and ethically problematic by biologists. The narrative owes more to a mythology of progress than to biology as science. Viewing it through the lens of religion helps reveal its contours and effects, allowing both proponents and opponents to understand it better. In that light, alternative metaphors, such as space travel as pilgrimage, may better serve Sagan's aspiration of scientifically motivated beliefs.

---



## Introduction

The human species is now undertaking a great venture that if successful will be as important as colonization of the land or the descent from the trees. We are haltingly, tentatively breaking the shackles of Earth—metaphorically, in confronting and taming the admonitions of those more primitive brains within us; physically, in voyaging to the planets and listening for the messages from the stars.

Carl Sagan, *Cosmos*

Carl Sagan promised us the stars, if only we will choose them. Like others before him, he cast the story of humanity as a developmental epic, evolving from animals, overcoming our beastly tendencies, and rising to take up our proper place in the heavens. He framed the present historical moment as adolescence, the first flush of adult awareness, power, and morality. His developmental narrative orients humans in space and time as well as in moral space—telling us what to value and what to choose. Moreover, it presents life in space as our highest good—spiritually as well as physically. Thus, it operates religiously as a doctrine of salvation. It identifies our best end and a means to get there. Meanwhile, it fails to operate biologically. The historically popular analogy between individual development and species evolution has been rejected by biologists. Continuing a long tradition of culturally scientific salvation stories, Sagan's developmental epic lacks epistemically scientific backing, leaving followers of Sagan in an awkward position. What justifies Sagan-inspired hope for space science if not science itself?

Sagan's *Cosmos* perspective promises salvation among the stars. Like traditional ascent narratives in ancient Greek philosophy and medieval Christianity, it values higher, ascended life over lower, Earth-bound life; it promises escape from the limitations of weight and embodiment, and it does so through metaphors of growth and development.<sup>1</sup> The *Cosmos* perspective differs from other stories of salvation in its appeal to science, in this case, the science of evolutionary biology. In the words of Ann Druyan, "For Carl, Darwin's insight that life evolved over the eons through natural selection was not just better science than Genesis, it also afforded a deeper, more satisfying *spiritual* experience" (Sagan 2007, 10). Appeals to evolution and development were not incidental to the perspective but an essential feature of its ethos. Science motivated his claims of truth. This justifies asking how Sagan crossed the is-ought gap (in arguing for space exploration) and whether he successfully crosses that gap by his own standards.

This article begins by asking whether we ought to read Sagan's scientific works as religious texts and the developmental narratives as salvific. It then turns to how the developmental narrative operates ethically in *Broca's Brain*,

*Cosmos*, and *Pale Blue Dot*. Next, it looks at the history and character of the developmental narrative, before concluding with a discussion of alternative perspectives. Sagan's technological and celestial optimism can be maintained if properly distinguished from the life sciences. The human epic can be viewed hopefully if set in a context that affirms its religious character and rejects both evolution and development as scientific justification.

### **Should We Read Sagan's Writings as Religious Texts?**

Sagan enjoyed a complicated relationship with religion. As a world-class science communicator, he reveled in engagement with religious believers on the big questions of human life: our place in the universe, our significance, and the choices we make. He embraced the language of cosmos, creation, and purpose. And yet, on precisely these issues, he felt science could save us from the perils of religious dogmatism and credulity. He cared deeply about fundamental questions of reality and value and, as such, regularly spoke on traditionally religious questions. Sagan's writings operate sociologically and psychologically in religious ways. He self-consciously employed religious language and is read in religious ways. His *Cosmos* perspective is a narrative frame for human life that orients individuals within the universe morally as well as physically. Thus, we are justified in using tools appropriate to religious texts and religious doctrines. Sagan's hopeful view of human development in space—and dismal view of the alternatives—operates as a doctrine of salvation, raising questions of what humans are saved from, by, and for.

### **Sociological Function**

A common definition of religion invokes belonging, believing, and behaving. Religions orient believers within a community (to which they belong), provide shared language and concepts (in which they believe), and dictate shared practices (by which they behave). These themes occur repeatedly in *Broca's Brain*, *Cosmos*, and *Pale Blue Dot*. Crucially, they advocate movement from scientific behavior to science-informed beliefs and common humanity.

*Cosmos* characterizes religion as proto-astronomy, emphasizing the role of both in creating worldview and situating humans within their environment. Of religious language, Sagan ([1980] 2013, 274) says, "These profound and lovely images are, I like to imagine, a kind of premonition of modern astronomical ideas." "The chief difference between them and our modern scientific myth of the Big Bang is that science is self-questioning, and that we can perform experiments and observations to test our ideas" (Sagan [1980] 2013, 273). *Cosmos* also orients humans in time, exploring a developmental epic of evolution in which humans arise from animal forebears and aspire to a more elevated future, where elevation has spiritual as well as physical aspects (more on this later). Thus, Sagan sees himself inheriting the priest's role of orienting humans

ethically as well as physically. The difference is not one of function but of efficacy. He claims to do it better.

*Pale Blue Dot* spells out the process. Scientific behavior, by expanding human perspectives, improves both individuals and the species. Space science in particular opens the vistas of deep space and displays the fragility of human environments. “An emerging cosmic perspective, an improved understanding of our place in the Universe, a highly visible program affecting our view of ourselves might clarify the fragility of our planetary environment and the common peril and responsibility of all the nations and peoples of Earth” (Sagan 1994, 278).<sup>2</sup> We are made of starstuff, but we are also the universe becoming capable of comprehending itself.<sup>3</sup> And the more we comprehend the universe, the better off we are.<sup>4</sup>

Sagan does not neglect the inner cosmos of the subconscious. He has a great respect for investigations of human interiority and motivations. He spends most of his words on astronomy, his own area of expertise, but repeated references to human psychological development demonstrate the importance he places on this aspect of worldview. “And this two-pronged investigation into the nature of the world and the nature of our selves is, to a very major degree, I believe, what the human enterprise is all about” (Sagan 2007, 212). Our core identity as a species is fulfilled by looking inward as well as outward.<sup>5</sup>

A second approach to identity emphasizes human unity. “Pale blue dot” imagery, both in the book and in the popular imagination, leans into the idea of a common identity (as passengers) and a shared responsibility (as crew) on a small and fragile vessel (spaceship Earth). Space science reveals this truth literally through the image of Earth by the *Voyager 1* spacecraft. Occasionally, this value of humanity transcends even scientific insight, as Sagan identifies the continued survival of humanity (or possibly rational life, capable of science) as the highest good. In discussing care for the planet, he says: “It seems to me this is the issue above all others on which religions can be calibrated, can be judged. Because certainly the preservation of life is essential if the religion is to continue. Or anything else” (Sagan 2007, 205).<sup>6</sup>

Belonging, believing, and behaving are inherently teleological. They do more than describe the state of humanity. They dictate its proper end. They orient us toward values and actions. Sagan’s view of space science goes beyond advocacy for science (as one good among many) toward worship, as the highest good and proper end of humanity.<sup>7</sup> Science operates within society as public worship. It uncovers ultimate reality and orients us to a common highest good.<sup>8</sup>

### **Psychological Function**

Moving from the role of science for society to the role of science for the individual, Sagan explicitly identifies his perspective with religion.

I would suggest that science is, at least in part, informed worship. My deeply held belief is that if a god of anything like the traditional sort exists, then our curiosity and intelligence are provided by such a god. We would be unappreciative of those gifts if we suppressed our passion to explore the universe and ourselves. On the other hand, if such a traditional god does not exist, then our curiosity and our intelligence are the essential tools for managing our survival in an extremely dangerous time. In either case the enterprise of knowledge is consistent surely with science; it should be with religion, and it is essential for the welfare of the human species. (Sagan, 2007, 31)

His *Varieties of Scientific Experience*, written for the 1985 Gifford Lectures on Natural Religion in Glasgow, consciously echoes William James's *Varieties of Religious Experience*, arising from the Gifford Lectures a century earlier (1901–1902) in Edinburgh. Sagan's definition of science fits well with James's (2014, 53) definition of religion: “[T]he belief that there is an unseen order, and that our supreme good lies in harmoniously adjusting ourselves thereto.” Sagan might argue that the order is only as-yet unseen. It may be seen eventually through science. Of course, all religions promise eventual revelation. The key difference is epistemic—science uses empirical methodology—once again highlighting the preeminence of science among human activities.<sup>9</sup>

On the last page of *Pale Blue Dot*, Sagan identifies astronomy with religion in a more tangential way. “The pioneering psychologist William James called religion a ‘feeling of being at home in the Universe.’” (405) Sagan goes on to distance the two, saying old religions pretend the Universe is as they would have it be; true religion will embrace the *real* Universe.<sup>10</sup> For Sagan, that is the job of science.

### **Use of Language**

Sagan unapologetically uses religious language throughout his works. In her introduction to *Varieties*, Druyan reflects on the original *Cosmos* television series. “We were consciously going for a biblical cadence, words that would scope out the ambitious territorial range of our explorations in space and time” (Sagan 2007, xvii). The language of creation, myth, and purpose invites readers to view the material through a religious lens. This has rhetorical effect precisely because it presents to the reader an alternative to previous religious beliefs. In the introduction to *Cosmos*, Druyan again says Sagan set out to steal the thunder of religious fundamentalists (Sagan 2007, xviii).

Images of light and darkness provide one clear example of Sagan's religious vocabulary. Druyan and Sagan's 1995 book puts salvation clearly in the title: *The Demon-Haunted World: Science as a Candle in the Dark*.<sup>11</sup> The powerful image conjures circling malevolent entities (from which one needs to be saved) and

an opposing force (by which one is saved). The language parallels the opening lines of the Christian New Testament, where Jesus is presented as the light in the darkness. “What has come into being in him was life, and the life was the light of all people. The light shines in the darkness, and the darkness did not overcome it” (John 1:3b–5 NRSV). Nor is this an accident of enthusiastic speech or editorial imposition. In the opening of *Varieties*, Sagan (2007, 2) states that the universe is mostly darkness, but he is on the side of light. It would be hard to ask for a clearer religious comparison.

### **Reader Response**

Readers continue to interpret Sagan in religious ways. Two prominent followers, Druyan and Neil DeGrasse Tyson, praise him in religious terms. Druyan’s introductions to *Cosmos* and *Varieties* were noted in the previous section. In the latter, she compares Sagan to the Hebrew prophet Joshua, Moses’s successor as leader of Israel (Sagan 2007, ix). Tyson’s 2013 introduction to *Cosmos* speaks of Sagan providing “knowledge shaped into wonder, the foundation of a Cosmos perspective on the world. Dare I assert that *Cosmos* wielded this power in ways that profoundly influenced how we would observe, interpret, and conduct our lives?” (Sagan 2007, xiii). These remarks make it clear that Sagan’s works do more than inform, they provide identity, shape thinking, and motivate action.

Concrete examples abound. The Ministry of Saganism identifies Saganism as a brand of scientism, naming Sagan the “apotheosis” of science presentation and the “high priest” of science.<sup>12</sup> More common is a kind of quiet Saganism that identifies him as a fearless explorer, brilliant communicator, and inspiration. The careers of scientists such as Tyson, David Grinspoon, and Bill Nye owe much in spirit and practice to Sagan’s influence, which they proudly express. On April 6, 2023, Dr. Makenzie Lystrup was sworn in as the fourteenth director of the NASA Goddard Space Flight Center; she used *Pale Blue Dot* for her oath of office. Fulfilling ritual and ethical roles as well as linguistic and explanatory ones, the Cosmos perspective operates religiously in the lives of many scientists.

### **Sagan as Prophet**

Sagan repeatedly contends he is not against religion per se. He rejects only irrational myths and practices. Reading Sagan as religious does not mean attributing dogmatic or supernatural beliefs. It opens the door for a close analysis of his words using methods honed through theology and comparative religion. It creates space to distinguish between his more careful methodological remarks (e.g., see for yourself) and his more expansive and value-laden narratives (e.g., spaceflight as human adolescence). I have great respect for Sagan. “His argument was not with God but with those who believed that our understanding of the sacred had been completed” (Druyan in Sagan 2007, xi). He regularly asserts the importance of humility. In this regard, he is much like Jesus. The test

of a religious perspective is not the humility preached by the founder but the humility practiced by their followers.

Sagan challenges Christians to live up to their ideals of love and humility. He holds up the stories they tell, particularly in scriptures, and the acts they perform. He then asks what impact they have on future generations of humans and the future of the Earth. Are the stories and practices consonant with the ideals? Sagan's ideals warrant the same scrutiny. The Cosmos perspective is, in my opinion, worthy of study and sharing. And, as a worthy perspective, it is also worthy of critical analysis. I commend Sagan's humility to those who follow Sagan's soteriology. From the perspective of theology and comparative religion, these are clearly religious texts with a doctrine of salvation. They orient humanity within the cosmos—physical, historical, and moral. They provide a myth of where we come from and where we are going. And, critically, they identify harms from which we must be saved, choices we must make, and a way forward.

### The Developmental Narrative

In orienting humanity in space and time, Sagan places science and spaceflight within a developmental epic. He describes an evolutionary childhood bracketed by two significant points, the origin of life (birth) and spaceflight (adulthood). Technological and ethical development for the species parallel physiological and psychological development for an individual. To understand spaceflight as adolescence, it will be necessary to unpack the broader developmental trajectory, or at least those elements Sagan provides for us.<sup>13</sup> True to his epistemology, he draws on contemporary palaeontology and developmental psychology. More than a narrative device, the epic involves ethical improvement for the species. Humans literally rise above their biological limitations. It might sound odd to say that adulthood saves the individual from childhood. It is perfectly sensible, however, to speak of saving an individual from an early demise, or from perpetual childhood. In Sagan's story, we are saved from a lower animal nature *by* science and *for* life in space.

One of Sagan's favored moves is to compare humans to lower life forms, especially when speaking about potential alien intelligences. He refers to "climbing the phylogenetic tree from insect intelligence to crocodile intelligence to squirrel intelligence and [eventually] to dog intelligence" (Sagan 1979, 290). Elsewhere, he speaks of more advanced civilizations and species. This suggests a one-dimensional hierarchy of value on which species can be placed based on their intelligence, technological power, and moral insight. It entails a knowable, evolutionary trajectory from lower to higher life.

The concluding chapters of *Broca's Brain*, *Cosmos*, and *Pale Blue Dot* each elaborate a developmental theme. They place the science of the book in ethical context, producing a moral take-home. In one sense, science and space

exploration are the expected future for humanity, the next stage of development. In another sense, they are goods that must be chosen. Something in our past haunts us, something from which we must be saved. Sagan, ever keen on human agency, thinks we must save ourselves; no one else will save us. But, in true religious form, this salvation requires choice and sacrifice.<sup>14</sup>

### ***Birth and Religion in Broca's Brain***

The final chapter of *Broca's Brain* bears the title "The Amniotic Universe." It argues for space exploration with a three-part analogy, comparing three processes: the transition of birth, the transition from religious to scientific cosmology, and the transition from Earthbound to a space-faring species. Working from the psychological theories of Stanislav Grof, Sagan suggests that all religion is, fundamentally, an attempt to make sense of perinatal trauma.<sup>15</sup> Being expelled from the womb, we seek to understand our feeling of alienation. Sagan goes on to note a common religious narrative of creation as the mating of a male sky god and a female Earth god. Religion attempts to explain origins biologically and, in terms of personal experience, looks backward. This linkage marks religion as undeveloped, a conscious or unconscious association between infancy and an infantile worldview.

Sagan draws our attention to doctrines of judgment and salvation. "Might not the Western fascination with punishment and redemption be a poignant attempt to make sense of perinatal stage 2 [when uterine contractions begin]?" (Sagan 1979, 361). Doctrines of sin and salvation stand out as infantile. He asks if they are responsible for the oppressive power structures he considers so detrimental in the major religions: unquestioned authority, dogmatic belief, and coercive behavior. Science, on the other hand, requires curiosity, humility, and cooperation.

On the very last page, Sagan (1979, 368) comes to his moral, quoting the father of Russian rocketry Constantine Tsiolkovsky: "The Earth is the cradle of mankind. But one does not live in the cradle forever." Humans should give up childish ways and embrace our destiny: mental growth in science and physical expansion in space.<sup>16</sup> Both Earth and religion can, and ultimately should, be transcended as humans grow to adulthood.

### ***Reptiles and Mammals in Cosmos***

In the final chapter of *Cosmos*, Sagan presents a stark choice between two possible uses of modern technology: nuclear war and space exploration. Again, he relies on a narrative of growth, weaving individual development, social development, and species development together into an evolutionary epic leading to the stars. Again, he uses a three-part analogy: reptilian versus mammalian behaviors, reptilian versus mammalian structures in the human brain, and (reptilian) war versus (mammalian) love and exploration. The argument relies on intuitive links

between physically cold-blooded reptiles and morally cold-blooded killers, as well as between both and “less evolved” species.<sup>17</sup> He does not refer to mammals as more evolved than reptiles (carefully saying more recently evolved), but it is hard to avoid the comparison, especially in the context of “cosmic evolution” (Sagan [1980] 2013, 359). And, problematically, he describes human societies as having more or less mammalian behaviors and social structures. They are, by extension, more and less evolved societies.

Sagan draws on neuroscientist Paul McLean’s theory of brain evolution.<sup>18</sup> The theory describes the evolution of mammalian brains in three stages, resulting in three layered structures moving outward from the brain stem. Humans share structures in the inmost layer with reptiles. In Sagan’s ([1980] 2013, 291) words, “Capping the brain stem is the R-complex, the seat of aggression, ritual, territoriality and social hierarchy, which evolved hundreds of millions of years ago in our reptilian ancestors.” The next layer, shared with non-primate mammals, houses other moods and emotions; the limbic system relates to touch, prosociality, and care for young. Outermost is that region unique to humans, the “cerebral cortex, where matter is transformed into consciousness . . . the point of embarkation for all our cosmic voyages” (Sagan [1980] 2013, 291). Here, we see spaceflight as adolescence in the broader context of cosmic evolution. Physical, moral, and, ultimately, technological progress play out across the stratigraphy of the human brain.<sup>19</sup>

Sagan uses this story to judge human cultures more and less advanced. Drawing on the work of developmental psychologists Harry and Margaret Harlow and James Prescott, he suggests a relationship between how children are treated in a society and how adults behave. More advanced mammalian behaviors can be encouraged by promoting physical displays of affection ranging from frequent touch to sexual freedom. More brutal and selfish reptilian behaviors result from childhood isolation and sexual repression. “Where physical affection is encouraged, theft, organized religion and invidious displays of wealth are inconspicuous; where infants are physically punished, there tends to be slavery, frequent killing, torturing and mutilation of enemies, a devotion to the inferiority of women, and a belief in one or more supernatural beings who intervene in daily life” (Sagan [1980] 2013, 350). More evolved societies produce more evolved individuals, and more enlightened individuals make for a more enlightened society.<sup>20</sup>

Sagan relies on individual mental development (towards cooperation and reason) recapitulating evolutionary change (towards more advanced life). Thus, the evolutionary epic plays out—and must play out—at three levels. Only at the individual level does development (in a biological sense) operate in a linear, normative progression toward adulthood. Only at the species level can we invoke evolution (in a biological sense) or compare such diverse groups as humans, mammals, and reptiles (and aliens). And yet, only at the level of cultures,

societies, or civilizations can we discuss the types of social belonging, believing, and behaving Sagan wants to address. He needs to bring them together with a single developmental–social–evolutionary arc to set up the dichotomy that will be his key theme: life and death. Developmental psychology provides a linear teleology: from birth to adolescence. Evolution provides the scope: deep time. Linked, they provide an existential and social choice: forward to the stars or backward into barbarism; growth or decay; life or death. Space exploration and nuclear war represent that stark dichotomy. Like Moses, Sagan sets before us life and death and asks us to choose life.<sup>21</sup>

### ***Technological Adolescence in Pale Blue Dot***

In the final chapter of *Pale Blue Dot*, Sagan focuses on the existential choice for humanity—self-destruction or the stars. He starts with the Tower of Babel in the Torah and other narratives of hubris punished. He then says we need other myths, ones that urge us onward and upward. Our development has not (or should not) ended with the current level of technology; there is more. He praises Hindu, Gnostic, and Mormon doctrines of apotheosis—becoming gods.

The evolutionary epic is less visible, but it still motivates the argument. Rather than presenting multiple paths forward, Sagan presents his existential choice as one between growth (associated with science) and death. He explicitly rules out the possibility of sustainable constancy and argues for the importance of planetary colonies for long-term survival. Do not put all your eggs in one basket.

He sets forth the now common argument for exponential growth in technology. He provides back-of-the-envelope diagrams plotting the maximum velocity of human transport against year, showing an exponential curve from the stagecoach (1640) to the Voyager spacecraft (1977). “Even a modest extrapolation of our recent advances in transportation suggests that in only a few centuries we will be able to travel close to the speed of light” (Sagan 1994, 395). Surely, we will achieve faster-than-light travel within a century or two and “colonize the sky.”

This improvement is undoubtedly “growth” in a developmental sense and not just increase. Our descendants will be better than us.

It will not be we who reach Alpha Centauri and the other nearby stars. It will be a species very like us, but with more of our strengths and fewer of our weaknesses, a species returned to circumstances more like those for which it was originally evolved, more confident, farseeing, capable, and prudent—the sorts of beings we would want to represent us in a Universe that, for all we know, is filled with species much older, much more powerful, and very different. (Sagan 1994, 398)

Only mature species make it to the interplanetary stage, and maturity requires wisdom as well as power. Sagan even speculates that we may, in the distant future, become “Creators” in our own right, seeding and guiding life on other planets. Sagan presents cautions, but he does not shy from calling this project of colonizing other worlds a “telos” and “a sacred project.” It is a flowering of, if not a replacement for, traditional religion: space travel as salvation.

### **Contact**

Among all of Sagan’s works, *Contact* most transparently and consistently presents the Cosmos perspective as religious and soteriological in character. The science fiction novel focuses on radio astronomer Dr. Eleanor “Ellie” Arroway, who receives alien transmissions instructing her to build a machine. Once built, the device proves effective for interstellar travel, bringing her and several companions to the center of the galaxy. There, they interact with aliens of advanced intelligence, who appear in the form of deceased loved ones. Their message: pursue science and space exploration as means toward species maturity. Upon return, the travelers find that no one on Earth believes them. The journey was, to outside observers, an instantaneous out-of-body experience. The travelers must rely on memory and faith in the face of opposition. Ellie describes the event as a conversion and her new perspective as “experimental theology” (Sagan 1986, 425–26).

The developmental narrative occurs throughout. Comparisons between animals and humans serve as a proxy for comparisons between humans and advanced aliens. The “ant is to human as human is to alien” analogy provides a recurring motif, reinforcing an evolutionary hierarchy.<sup>22</sup> The Caretakers, a benevolent superior civilization, include diverse species from around the galaxy. They reveal a distinction between civilizations. More aggressive civilizations rarely achieve spaceflight and, even when they do, usually destroy themselves. “It’s in their nature” (Sagan 1986, 359). Civilizations that favor lovingkindness can grow in knowledge, wisdom, and power to join the galactic civilization, capable of galactic scale technology.<sup>23</sup> The Caretakers help lower species in their path toward enlightenment, albeit favoring minimal intervention. They, in turn, aspire to follow in the footsteps of an even more advanced civilization. The Tunnel Builders left a message for the Caretakers to unravel, much as the Caretakers reached out to humans. Provocatively, near the very end of the book, Sagan asks whether there may be an even higher civilization to which the Tunnel Builders appear as worms—and humans as bacteria (Sagan 1986, 427). *Contact* may be read as an extended meditation on conversations between higher and lower life forms.<sup>24</sup> Using words from *Broca’s Brain* (Sagan 1986, 368), “In some very real sense they will appear to us as godlike. There will be a great deal of growing up required of the infant human species.”

## A Key to Sagan's Ethos

The evolutionary epic provides a key to unlock Sagan's ethical worldview. The proper end of humanity is growth as a species along a fixed trajectory toward greater knowledge, power, and wisdom. Humans have the option of turning off that path, but diversion brings destruction. The three elevations are coupled. To reject one is to reject the others. From *Broca's Brain* in 1979 through *Pale Blue Dot* in 1994, the developmental narrative provides the ethical groundwork for decision-making in Sagan's works. It justifies the importance of Sagan's work in, and words about, space exploration. It motivates the decisions he asks readers to make—against (old) religion and for science, against war and for exploration, against stasis and for technological advance.

After *Cosmos*, Sagan intended to write a companion volume called *Ethos* that would explore his ethical perspective in greater detail. He took extensive notes but never wrote this book, though elements appear in *The Demon-Haunted World* and *Varieties*.<sup>25</sup> I have chosen to focus on *Broca's Brain*, *Cosmos*, and *Pale Blue Dot* because they are expressly popular science books. Sagan viewed the developmental narrative as a product of science. It had authority because of the biological evidence behind it. Many readers interpret Sagan's works as scientific *as opposed to* religious in character—empirical rather than dogmatic, discovered rather than inherited—for this reason. They are written, sold, and read as scientific texts. This makes the soteriological reading more difficult, and yet, at the same time, more important. If the texts operate in a religious manner—orienting readers in the cosmos, identifying value (and disvalue), advocating choices, and calling for sacrifice—we should ask two key questions: whether the science supports the conclusions and, whether it does or does not, if we wish to adopt this perspective.

### **Development versus Evolution**

Despite being told as an evolutionary saga, the tale is developmental. Biologists draw a clear line between the two kinds of change. Development and evolution were intertwined historically in problematic ways—ethical as well as scientific. Development describes a program of individual change from birth through adolescence, adulthood, senescence and eventually to death. The path is known. It is linear and normative. Failure to achieve adulthood is viewed as tragic; resistance perverse. Modern biology undergirds this teleology by invoking a genetic program designed by evolution, stored in genes, and carried out metabolically. Individual organisms do follow a preset path to adulthood. Natural selection optimizes them for survival in a given environment, within which the path to adulthood has been geared for survival and reproduction.

Evolution, on the other hand, describes the probabilistic divergence of species as they explore multiple environments and adopt (and adapt) diverse strategies. It is radial and nonnormative. The path is unknown, depending

on chance events and various options. Early theories of evolution (in the nineteenth and early twentieth centuries) were developmental. They hung on ideas of God or nature “unrolling a scroll” of preplanned changes. They were teleological. They climbed the ladder of nature or, in the words of Lamarck, the “path to perfection.”

A similar idea dominated the human sciences at the time, which viewed human societies as developing/evolving toward a higher state. Auguste Comte’s law of three stages described the evolution of societies through theological and metaphysical stages to positive (or scientific) maturity. Similarly, the social Darwinism of Thomas Malthus, Francis Galton, Herbert Spencer, and others imagined natural selection bringing about better humans, often with a strong theological angle.

Darwin’s theory of evolution by natural selection provided a non-developmental lens through which to view evolution. Natural selection required neither preset telos nor normative character. The modern synthesis in biology, in the mid-twentieth century, explicitly ruled out progressive or developmental theories as too teleological. They had proved unfruitful and were replaced with random (properly stochastic) models that provided adaptation to local environments without any overall improvement or directionality.

The rise of Postmodernism in the mid-twentieth century also discouraged theories of social evolution. Germany—the most advanced technological society of the early twentieth century—behaved barbarically in World War II, and the pursuit of the atomic bomb proved the technology could be ethically horrific. Thus, confidence in social and species development was badly damaged. Postcolonial approaches later in the century further eroded the idea as the consequences of comparing societies on a single developmental ladder was seen to be complicit in the worst abuses of eugenics, communism, and colonialism.

Modern biologists reject the teleology of reliable evolution toward higher forms of life (Ruse 1996; Mix 2022). Butler (2009) expressly rejects the developmental narrative in McLean’s theory of brain evolution.<sup>26</sup> In biological circles, evolution is no longer described in progressive or developmental terms. Because of the scientific and social excesses of the twentieth century, these ideas are not just avoided (as disproven) but actively rejected (as causing harm).

Sagan (2007, 157) cautions against such biological narratives in *Varieties*: “I think in the West it’s quite clear that there is a human or animal life-cycle model that has been imposed on the cosmos. It’s a natural thing to think about, but after a while its limitations, I think, become clear.” He clearly understood the challenges of viewing evolution through the developmental lens. His awareness, however, failed to reach the evolutionary epic that forms the core of his ethical reasoning in *Broca’s Brain*, *Cosmos*, and *Pale Blue Dot*. As discussed, the link between individual development and species advance is critical to the arguments he made there.

Blurring development and evolution provides a further problem. If species do develop analogously to organismal development, we should expect species senescence and death. Thus, the infinite, exponential progress Sagan imagines works neither under the developmental nor the evolutionary paradigms as modern biologists understand them.

### **A History of Progress**

Sagan's telos comes instead from the mythology of science. Although the developmental narrative (of evolution) was firmly rejected in twentieth century biology, that battle was hard fought, and the salvific characterization of scientific progress remains well entrenched. Its history and ubiquity can be seen broadly in discussions of science as well as narrowly in the fields of astronomy and astrobiology, which shaped Sagan's thinking. David Noble (1999) documents the roots of scientific soteriology in medieval Christian millennial movements, focused on the role of humanity in bringing about God's kingdom. Francis Bacon and other pioneers of science saw themselves participating in divine salvation. Science was restoring human dominion over nature just as Christianity was reconciling humans to God. It was a divine calling. Mary Midgley (1992) looks more closely at scientific soteriology in modern cosmology, focusing on John Barrow and Frank Tipler, Freeman Dyson, and Paul Davies. Each was influential in modern astrophysics and invested in a developmental narrative of human apotheosis. DeWitt Kilgore (2003) explores utopian ideas at the intersection of science and science fiction in mid-twentieth century writing. The genre of "hard" science fiction blends fiction and science with a progressive policy agenda deeply entwined with colonial narratives and projects. Similarly, John Traphagan (2021) discusses an evolutionary eschatology common to *Star Trek* and SETI.<sup>27</sup>

Developmental narratives of science as salvation were common among Sagan's contemporaries. This should come as no surprise, noting the prevalence of progressive "evolutionary" thinking among scientists fifty to a hundred years earlier, particularly those interested in space travel and life beyond Earth. Marxist and positivist views among scientists have been well documented, but two specific scientists deserve special attention, being influential on Sagan's thought. Biophysicist J. D. Bernal is best known for his pioneering work on x-ray crystallography and early promotion of space stations (or Bernal spheres). Before Sagan's influential entry in *Encyclopedia Britannica*, Bernal was the scientific authority trusted to expound on "Life." He was deeply involved in discussions of the origin, future, and extent of life in the universe. His 1929 book *The World, the Flesh, and the Devil* sets forth a plan for science saving humanity for God-like maturity in space.<sup>28</sup> The world is gravity, escaped with rockets; the flesh is the limitation of human bodies, escaped through mechanical augmentation; the devil is the human unconscious, escaped through Marxism. One generation

earlier, Camille Flammarion was the preeminent popular science author. A French astronomer, he wrote prolifically to share the latest findings and promote citizen science. His books *Lumen* and *Urania* describe the transmigration of souls, growing in knowledge and wisdom as they move to more advanced bodies on more advanced planets orbiting other stars.<sup>29</sup> Scholars debate how literally to take these accounts but, much like *Contact*, they set forth the evolutionary epic as both species development and a path to salvation. Straddling the divide between science, futurism, and fiction, Flammarion and Bernal modelled what it meant to be a popular science writer and discuss life in space.<sup>30</sup>

The developmental or progressive view of evolution was popular through the early twentieth century. It drew heavily on the language of biology, though it reflects a much older tradition of the *scala naturae*—or ladder of nature—connecting the lowliest creatures, through humanity and angels, to the throne of God (Lovejoy 2009; Ruse 1996; Mix 2018). Originating in biology, it was rapidly adopted by philosophers and theologians as a way of speaking about human improvement, growing holiness (sanctification), and possible growth to god-like power (apotheosis). Jesuit paleontologist and theologian Pierre Teilhard de Chardin may be the most well-known twentieth century proponent of the idea as both science and Christian doctrine. Biologists, however, moved decisively away from the idea, leaving it more ideology and history than science. Remnants of progressive biology lingered in neuroscience (as in McLean) and astronomy (as in Sagan) but disappeared from the discourse of mainstream and evolutionary biology.

## Conclusion

If we continue to the planets and the stars, our chauvinisms will be shaken further. We will gain cosmic perspective. We will recognize that our explorations can be carried out only on behalf of all the people of the planet Earth. We will invest our energies in an enterprise devoted not to death but to life: the expansion of our understanding of the Earth and its inhabitants and the search for life elsewhere. (Sagan [1980] 2013, 362–63)

The Cosmos perspective on humanity places us within an evolutionary epic in which intelligent species emerge from a background of life, ubiquitous in the universe. Arising often from the material background, ecosystems occur on planets throughout the galaxy—and galaxies throughout the cosmos. A trait called intelligence—never fully explained but identified with radio telescopes and rocketry—elevates us above other species on Earth as uniquely adult or advanced. That trait, unambiguously adaptive regardless of environment and metabolic constraints, must arise from within ecosystems on a regular basis. It progresses uniformly through childhood, outgrowing violence, tribalism,

social hierarchies, ritual, and theism, through to a scientific mindset culminating in radio astronomy and rocketry. Those particular developments open the doorway to a cosmic adulthood of interplanetary travel and, eventually, galactic colonization and mastery of worlds through technology.

And, though this is but one way of telling our story, it was for Sagan the only way. Science revealed the dangers of our reptilian impulses as well as our highest good—life among the stars, informed by the cosmos perspective, recognizing our common humanity (or a cosmic brotherhood of intelligent species) and valuing science above all else. Science produces truth. We are saved from the imaginary demons of our unconscious minds and from the very real harm they lead us to do to one another. We are saved by science and technology. And we are saved for life in space, contemplating the truths only science and space travel can provide.

In casting human evolution as an epic, Sagan has recapitulated a traditional narrative of salvation by ascent—physical, biological, technological, and moral—to the stars. But this developmental narrative fits poorly with modern biology. Evolution is less an epic and more a Picaresque dialogue between species and their surroundings, less Dante and more Don Quixote or Huckleberry Finn. The end is not known, ascent is not guaranteed, and the whole idea of salvation is called into question. This does not make the tale any less significant. We can be defined by evolution and exploration without claiming they make us better than our neighbors . . . or our ancestors. We can value the science while respecting that biology does not reveal a preordained path to perfection. It reveals instead an exploration of possibility.

A proper theological analysis would move on to judge the quality of the story. Does it accurately reflect the moral structure of the cosmos? Does it inspire in us, both individually and collectively, the right actions? Does it stir within us faith, hope, and love? In short, is it God's story as well as Sagan's? That analysis calls for a paper of its own, one that begins with a thorough exploration of the theologian's ontological, epistemic, and axiological grounding.<sup>31</sup> In short, it requires serious attention to metaphysics. As a scientist, Sagan has avoided this type of analysis but, insofar as his evolutionary epic is based in biology, it is no longer justified by science. Arguably, it was not justified biologically even at the time of publication. We must ask then where it comes from, what work it is doing, and whether we wish to accept it on those terms, whatever they may be.

Here, I wish only to identify the prevalence of this developmental narrative within Sagan's writing and the immense ethical work it does therein. The cosmic perspective with its evolutionary epic justifies science in general and space science in particular, exploration in general and space exploration in particular. It values scientific knowledge over other forms of knowing, labeling religious perspectives as enemies of rationality, sociality, and human persistence. It asks believers to reject other forms of belonging, believing, and behaving as less advanced and aligned with death.

The Cosmos perspective operates as a narrative of salvation, addressing questions of highest value, that is, worship. It has consequences for both belonging and behaving in believers, as it calls them to identify more with more advanced individuals, societies, and perspectives and to actively choose them over less advanced alternatives. Quasi-biological ideas of evolution and development justify an anthropological divide—between lower and higher aspects of self—and a sociological divide—between lower and higher civilizations. Those divides cannot help but have ethical and policy consequences. Those consequences deserve close attention and cannot be glossed over as rhetorical flourishes, the *adiaphora* of science communication. They are central to the motivation of science authors like Sagan (in research and writing) and science readers.

By noting the soteriological function of Sagan's texts, we can begin to analyze how they fulfill this function and whether we as readers are happy with the doctrine they provide. I share Sagan's hope for the future, love of scientific exploration, and enthusiasm for human space travel. At the same time, I think these fundamentally religious propositions deserve scrutiny in the context of theology and comparative religion—fields honed to address such questions. Or perhaps a new field is needed. I am certain, however, that biologists—as empirical scientists—have neither the methodology nor the desire to answer these questions in this context. Insofar as they have, they have not come to these conclusions. For my own part, I will continue to set my hope on Christian ideas of salvation (rather than scientific), a love of science precisely because it reveals new and unexpected perspectives, and enthusiasm for space travel as pilgrimage rather than conquest. Science and technology serve purposes beyond themselves and our journey outward must transcend their bounds, just as we transcend the confines of our planet. I suspect Sagan could conceive of no greater legacy than to see his ideas actively debated, his perspectives compared with the latest scientific research, and hope for human progress lived out in critical thought and exploration.

---

## Notes

- <sup>1</sup> I refer to Sagan's overall worldview as the "Cosmos perspective" following Neil deGrasse Tyson. Sagan himself referred to a "cosmic perspective."
- <sup>2</sup> Elsewhere in *Pale Blue Dot*: "Planetary science fosters a broad interdisciplinary point of view that proves enormously helpful in discovering and attempting to defuse those looming environmental catastrophes" (Sagan 1994, 228). "Exploratory spaceflight puts scientific ideas, scientific thinking, and scientific vocabulary in the public eye. It elevates the general level of intellectual inquiry. The idea that we've now grasped something never grasped by anyone who ever lived before" (Sagan 1994, 281). He concludes that the discovery of alien intelligence would be "the last of the Great Demotions" following those of Copernicus, Charles Darwin, and Sigmund Freud (Sagan 1994, 365).
- <sup>3</sup> "For we are the local embodiment of a Cosmos grown to self-awareness . . . starstuff pondering the stars" (Sagan [1980] 2013, 364).
- <sup>4</sup> Note the similarity to Aristotle's *eudaemonia*, in which the rational soul is fulfilled in contemplation of contemplation itself. Sagan has introduced a similar precept but applied it to the universe and the human species as well as individuals. He has also specified natural science as the highest form of *scientia* or knowing more generally. On the contraction of *scientia* from a way of being to a way of knowing, see Peter Harrison's *Territories of Science and Religion*. Sagan expands the idea outward again.
- <sup>5</sup> Sagan echoes J. D. Bernal's more explicit soteriology in *The World, the Flesh, and the Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul*. The "world" represents the shackles of gravity, from which we are saved by rockets and space stations; the "flesh" represents the limits of animal bodies, from which we may be saved by cybernetic augmentation; and "the devil" represents the unconscious, from which we are saved by Marxism. Sagan may not be drawing on Bernal for his solutions, but he is clearly in the same lineage—both influential astrobiologists and science popularizers, writing on space exploration and the origin of life. Neither hesitated in speculating on the religious function of space science.
- <sup>6</sup> For more on the religious context of pale blue dot anthropology, see Lucas John Mix (2016).
- <sup>7</sup> Etymologically, worship shares a root in Saxon with *worth* and indicates the subject is of very high, perhaps highest, worth.
- <sup>8</sup> "If we continue to the planets and the stars, our chauvinisms will be shaken further. We will gain a cosmic perspective. We will recognize that our explorations can be carried out only on behalf of all the people of the planet Earth. We will invest our energies in an enterprise devoted not to death but to life: the expansion of our understanding of the Earth and its inhabitants and the search for life elsewhere" (Sagan [1980] 2013, 362–63).
- <sup>9</sup> Druyan, citing Gottfried Wilhelm Leibniz, suggests that in religious epistemology, God is a wall that stops further questions (Sagan 2007, 15). For more on historical shifts in the definition of religion and James's place in this process, see Kevin Schilbrack (2022).
- <sup>10</sup> At the surface level, the distinction between old religion and astronomy has no teeth. Sagan is claiming knowledge of the real Universe for neither religion nor astronomy. This is a curious move for the last page of a book whose authority rests squarely on the author's claim to have astronomy-based knowledge of the real Universe. The distinction, then, rests on Sagan's epistemology: religious pictures are inherently dogmatic and incapable of change while astronomy progresses. Sagan must believe that science has, in some sense, delivered in a way that promises future knowledge.
- <sup>11</sup> Sagan and Dryan (1996).
- <sup>12</sup> <https://ism.co/saganism/>.
- <sup>13</sup> Sagan refers to early space flight as "planetary adolescence" in *Pale Blue Dot* (372) and "technological adolescence" in *Varieties of Scientific Experience* (115). More commonly, he simply refers to advanced civilizations. "We define an advanced civilization as one capable of radio astronomy." (Sagan [1980] 2013, 315) "We must be the most backward technical society in the Galaxy. Any society still more backward would not have radio astronomy at all." (Sagan [1980] 2013, 326) Thus

we are just barely adult or advanced. He takes for granted that both rocketry and nuclear power would be contemporaneous discoveries for a civilization. A similar line of reasoning can be found in *Varieties* (115–18).

- <sup>14</sup> Mary Midgley (1992, 15) notes how science talks and books can promote salvation narratives in their introduction and conclusion. They escape critical analysis, being viewed as merely instrumental to communicating science. These narratives, however, motivate readers and often remain with them long after the scientific details are forgotten. “Scientific reviewers, when discussing writings of this kind, often treat the myths as a side-issue. Concentrating on what is acceptable as science, they expect the rest to fade away harmlessly into the general culture. But it does not necessarily do this. It can hang around like a fog, changing the atmosphere of thought and influencing ideas quite strongly. It tends to be the part of the book that people remember. In particular, it can be expected to have a strong effect on students” (Midgley (1992, 15).
- <sup>15</sup> “All successful religions seem at their nucleus to make an unstated and perhaps even unconscious resonance with the perinatal experience” (Sagan 1979, 363). “I do not propose that theology is physiology entirely. But it would be astonishing, assuming we really can remember our perinatal experiences, if they did not affect in the deepest way our attitudes about birth and death, sex and childhood, on purpose and ethics, on causality and God” (Sagan 1979, 365–66).
- <sup>16</sup> Sagan echoes Biblical language of spiritual growth. “I fed you with milk, not solid food, for you were not ready for solid food. Even now you are still not ready, for you are still of the flesh” (I Corinthians 3:2–3a NRSV). “When I was a child, I spoke like a child, I thought like a child, I reasoned like a child; when I became an adult, I put an end to childish ways” (I Corinthians 13:11 NRSV).
- <sup>17</sup> These links are not based on modern biology, nor even the biology of the mid-twentieth century when they were written, as will be discussed later. They rely on late-nineteenth century theories of progressive evolution, which had already been scrubbed from biology but remained popular among psychologists . . . and astronomers.
- <sup>18</sup> See Sagan ([1980] 2013, 291); also see Ann B. Butler (2009) for discussion of the theory. Butler notes in the abstract, “While this model has been enthusiastically adopted by some neuroscientists, particularly those with interests in psychiatry, it has been dismissed as evolutionarily incorrect and of no heuristic value by those in comparative, evolutionary neurobiology.”
- <sup>19</sup> McLean and Sagan echo the tripartite souls of antiquity and the Middle Ages, with the lowest, most selfish, and most physically oriented soul (appetitive or vegetative) fighting a socially oriented middle soul (spirited or animal), both controlled by a rational soul in humans. For more on the history and influence of tripartite souls, see Mix (2018).
- <sup>20</sup> Sagan reiterates his argument in *Varieties* (2007, 173): “[Prescott] concludes that all cultures in which the children are hugged and the teenagers can have sex wind up without powerful social hierarchies and everybody’s happy. And those cultures in which children are not permitted to be hugged because of some social ban and a premarital adolescent sexual taboo is strictly enforced wind up killing, hating, and having powerful dominance hierarchies.” Here, he is more direct in stating that theistic societies are the extreme case of (reptilian) dominance hierarchy, leading to a repression of touch and sexuality, causing their members to “torture their enemies” and “brutalize their children.”
- <sup>21</sup> Cp. Deuteronomy 30:19
- <sup>22</sup> Pages 9, 37, 307, 361, and 427. Monkeys fill a similar role on page 313.
- <sup>23</sup> Type III on the Kardashev scale.
- <sup>24</sup> This is not a new genre. Emmanuel Swedenborg, founder of the New Church, wrote of such conversations in *Planets in Our Solar System and in Deep Space, their Inhabitants, and the Spirits and Angels There* (1758, republished as *Other Worlds* in 2018). This work is counted as scripture among Swedenborgians, who have been divided on how literally it should be interpreted. Subsequent works are usually classed as science fiction, albeit with a very high philosophical/theological content. Examples include Olaf Stapledon’s *Star Maker* (1937), C. S. Lewis’s *Space Trilogy* (1938–45), and more ambiguously, Ursula K. LeGuin’s *Hainish Cycle* (1969–94).

- <sup>25</sup> Sagan's notes can be found in the Seth MacFarlane collection of the Carl Sagan and Ann Druyan archive (1860–2004) at the Library of Congress.
- <sup>26</sup> “The triune brain hypothesis, by essentially dismissing interest in pallial elaboration within the sauropsid line, errs by instead promoting the scientifically contradicted but still widespread popular view of a scala naturae, a linear ranking of animal taxa, with fish near the bottom, reptiles not much higher, nonhuman mammals higher and ranked in sequence (such as rat-to-cat-to-monkey), and with humans at the top” (Butler 2009).
- <sup>27</sup> “In this article, I am interested in exploring the scientific search for extraterrestrial intelligence (SETI) as a practice of imagination expressed via an evolutionary and moral eschatology in which intelligent species are saved as a result of perceived long-term benefits that come with progress” (Traphagan 2021, 120). Traphagan borrows the term *evolutionary eschatology* from an earlier article on religion in *Star Trek* by Gregory Peterson (1999).
- <sup>28</sup> J. D. Bernal (2017). The trio of world, flesh, and devil is traditional Christian language describing the temptations of Jesus in the wilderness in Matthew 4:1–11 and Luke 4:1–13. Viewed as enemies of the soul, they describe worldly concerns, bodily concerns, and the worship of Satan or other spirits.
- <sup>29</sup> Camille Flammarion (1890, 2002).
- <sup>30</sup> For more on the deep, entwined history of religious, scientific, and science-fictional accounts of interplanetary travel, see Mix (2022). That article was inspired and informed by Sagan's own notes on the influence of works like *Lumen* and *Anatomy of Melancholy* on his thinking.
- <sup>31</sup> Ontology addresses the qualities of being—what is. Epistemology tackles how we understand where knowledge comes from. Axiology covers principles of good and bad.

---

## References

- Bernal, J. D. 2017. *The World, the Flesh and the Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul*. Brooklyn, NY: Verso.
- Butler, Ann B. 2009. “Triune Brain Concept: A Comparative Evolutionary Perspective.” In *Encyclopedia of Neuroscience*, edited by Larry R. Squire, 1185–93. Cambridge, MA: Academic Press.
- Flammarion, Camille. 1890. *Urania*. Translated by A. R. Stetson. Boston: Estes and Lauriat.
- . 2002. *Lumen*. Translated by B. Stableford. Middleton, CT: Wesleyan University Press.
- James, William. 2014. *Varieties of Religious Experience: A Study in Human Nature*. Project Gutenberg. <https://www.gutenberg.org/cache/epub/621/pg621-images.html>.
- Kilgore, De Witt Douglas. 2003. *Astrofuturism: Science, Race, and Visions of Utopia in Space*. Philadelphia: University of Pennsylvania Press.
- Lovejoy, Arthur. 2009. *The Great Chain of Being*. New York: Routledge.
- Midgley, Mary. 1992. *Science as Salvation: A Modern Myth and its Meaning*. New York: Routledge.
- Mix, Lucas John. 2016. “Life-Value Narratives and the Impact of Astrobiology on Christian Ethics.” *Zygon: Journal of Religion and Science* 51 (2): 520–35.
- . 2018. *Life Concepts from Aristotle to Darwin: On Vegetable Souls*. New York: Palgrave MacMillan.
- . 2022. “Decoupling Physical and Spiritual Ascent Narratives in Astronomy and Biology.” In *The Institutions of Extraterrestrial Liberty*, edited by Charles Cockell, 233–53. Oxford: Oxford University Press.
- Noble, David F. 1999. *The Religion of Technology: The Divinity of Man and the Spirit of Invention*. New York: Penguin.
- Peterson, Gregory. 1999. “Religion and Science in Star Trek: The Next Generation: God, Q, and Evolutionary Eschatology on the Final Frontier.” In *Star Trek and Sacred Ground: Explorations of Star Trek, Religion, and American Culture*, edited by Jennifer E. Porter and Darcee L. McLaren, 61–76. Albany, NY: SUNY Press.
- Ruse, Michael. 1996. *Monad to Man: The Concept of Progress in Evolutionary Biology*. Cambridge, MA: Harvard University Press.

- Sagan, Carl. 1979. *Broca's Brain: Reflections on the Romance of Science*. New York: Ballantine Books.
- . 1986. *Contact*. New York: Pocket Books.
- . 1994. *Pale Blue Dot: A Vision of the Human Future in Space*. New York: Random House.
- . 2007. *The Varieties of Scientific Experience: A Personal View of the Search for God*. New York: Penguin Books.
- . (1980) 2013. *Cosmos*. New York: Ballantine Books.
- Sagan, Carl, and Ann Druyan. 1996. *The Demon-Haunted World: Science as a Candle in the Dark*. New York: Random House.
- Schilbrack, Kevin. 2022. "The Concept of Religion." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta. <https://plato.stanford.edu/archives/sum2022/entries/concept-religion/>.





## Houston, al-Rāzī Has a Problem: Are Humans (*Really*) the Best of Creation?

**Shoaib Ahmed Malik**, Lecturer in Science and Religion, University of Edinburgh, Edinburgh, UK, [shoaib.malik@ed.ac.uk](mailto:shoaib.malik@ed.ac.uk)

---

This article explores Fakhr al-Dīn al-Rāzī's (d. 1210) theological insights on the metaphysical hierarchy of creation to address the question: Can there be extraterrestrial intelligence (ETI) superior to human intelligence? By revisiting a long-standing debate in the Islamic tradition concerning the superiority (*afḍaliyyah*) of angels versus humans, this article positions al-Rāzī as a pivotal case who diverges from the majority Ash'arī stance by advocating for angelic superiority. Through a detailed analysis of al-Rāzī's deconstruction of pro-human superiority arguments and his construction of arguments favoring angels, the article demonstrates how his framework challenges anthropocentric assumptions and broadens theological possibilities. If al-Rāzī's arguments are deemed successful, his scripturally and rationally grounded framework provides a foundation for envisioning ETI that may surpass humanity in spiritual or intellectual rank. This article contributes uniquely by unveiling al-Rāzī's underexplored ideas on angelic superiority and integrating them into the context of Islam and ETI, thereby advancing modern discourse on Islamic theological anthropology.

---



## Introduction

The dynamic interplay between science and religion has continually reshaped humanity's understanding of its place in the cosmos. In the modern era, advancements in evolutionary biology, artificial intelligence (AI), and the exploration of extraterrestrial intelligence (ETI) have brought profound challenges to traditional theological anthropologies, compelling religious traditions to reassess long-standing assumptions. Theological anthropology, which examines the nature, purpose, and hierarchy of human existence within a broader metaphysical framework, is being reimagined in light of these developments (Cortez 2009; Fisher 2010; Schwarz 2013; Feser 2024).

Evolutionary biology has caused us to question the notion of humanity's exceptionalism, suggesting that humans are the product of gradual natural processes rather than (strictly) unique divine intervention. This has implications for Abrahamic religious thought, which traditionally positions humanity as the pinnacle of creation, particularly in light of the creation narrative of Adam (van den Brink 2020; Swamidass 2021). AI, on the other hand, raises questions about intelligence, creativity, and agency, areas historically ascribed to humans and often linked to divine attributes (Dorobantu 2022; Herzfeld and Peters 2023; Lennox 2024). The creation of machines capable of performing tasks that were once thought to be exclusively human challenges the boundaries of what it means to be human and forces a rethinking of humanity's spiritual and ontological distinctions. Lastly, the prospect of ETI introduces the possibility of intelligent beings beyond Earth, posing questions about the scope of divine creation and the metaphysical hierarchies that underpin Islamic cosmology (Vainio 2018; Parkyn 2021). Could other intelligent beings rival or surpass humanity in spiritual or intellectual capacity? And if so, what would that mean for humanity's perceived status as the best of creation?

All three conversations have stimulated research from the Islamic perspective. Evolutionary theory has spurred new interpretations of human origins in Islamic theology (Jalajel 2009; Malik 2021; Malik and Jalajel 2024), while AI has provoked discussions on the nature of intelligence, creativity, and morality in relation to human nature (Çelik 2023; Ghaly 2024; Malik 2024a). The prospect of ETI uniquely challenges and enriches this discourse, as the potential existence of intelligent life beyond Earth necessitates a re-examination of humanity's role in the creation and the metaphysical hierarchies that define Islamic cosmology (Weintraub 2014; Iqbal 2018; Determann 2021; Haider, Ansar, and Asdaq Naqvi 2023).

Recent scholarship on Islam and ETI reflects an emerging engagement with the challenges posed by the possibility of intelligent life beyond Earth (Malik and Determann, 2024). This discourse is particularly significant for Islamic theological anthropology, as it probes the long-standing notion of humanity as the best of creation. Three contemporary thinkers—Muzaffar Iqbal (2018), Hamza Karamali (2024), and I (Malik 2024b)—have contributed to this

discussion, each offering distinct perspectives on how the possibility of ETI intersects with Islamic theological anthropology, particularly in relation to the hierarchy of creation.

Iqbal (2018) adopts an open stance, using Qur'ān 17:70—“And We have certainly preferred them over much of what We have created”—to argue that the Qur'ān leaves open the question of what constitutes the best of creation. While recognizing humanity's honored position, Iqbal does not see this as precluding the existence of beings that may surpass humans in spiritual or intellectual rank. This interpretation invites a dynamic understanding of humanity's role, one that remains transformative but also receptive to the possibility of superior creations.

Karamali (2024) draws from the late Sunnī *kalām* tradition to present a robust defense of human superiority, anchoring his argument in two key theological constructs: the Qur'ānic concept of humanity's vicegerency (*khalīfa*) and the divine subjugation of creation for human benefit. He contends that humans hold a unique ontological and spiritual rank as the most honored of God's creations, citing Qur'ānic verses such as “We have certainly honored the children of Adam” (Qur'ān 17:70) and “It is He who has made everything in the heavens and on Earth subservient to you” (Qur'ān 45:13). Karamali interprets these as clear affirmations of humanity's elevated status, grounded in its moral responsibility, spiritual capacity, and intellectual faculties. For Karamali, the unique role of humans as recipients of divine revelation and their centrality in the Qur'ānic narrative further underscore this privileged position. While he acknowledges the theoretical possibility of ETI within the divine creation, Karamali asserts that any such beings would not surpass humans in rank, as the Qur'ānic emphasis on human centrality leaves no room for beings with a higher ontological status. His approach seeks to harmonize Islamic theology with the challenges of modern scientific discourse while maintaining humanity's unparalleled significance in the cosmic hierarchy.

In my earlier work, I mapped three theological positions intersecting with the question of ETI and explored their implications (Malik 2024b). The first position asserts angelic superiority over humans, allowing for the possibility that either humans or ETI could occupy the second-best rank in the cosmic hierarchy. The second position upholds human superiority as the best of creation, leaving angels or ETI potentially occupying the second tier, depending on how their roles are framed within creation. The third position adopts a non-committal stance, avoiding definitive claims about hierarchical rankings altogether. This openness makes it remarkably adaptable, allowing for intellectual humility and flexibility in accommodating discoveries, including the existence of advanced ETI. By outlining these three positions, I highlight the theological options within the Islamic tradition, demonstrating how each perspective shapes the conversation about humanity's place in the cosmic order and its engagement with the possibility of other intelligent beings. This article is an extension of that discussion, probing deeper into the Ash'arī tradition's diverse approaches to this topic.

Ash‘arī scholars have traditionally categorized this debate into two distinct camps (al-Jurjānī 1998, 309; al-Rāzī 2018, 516; al-Fihri 2024, 594). One, representing the dominant stance among the majority of Ash‘arī scholars and Shī‘īs, upholds the superiority of prophets and righteous humans. This perspective highlights their unique moral and spiritual capacities as well as their ability to overcome challenges and fulfill divine mandates. The other camp argues for the superiority of angels, viewing them as the best of creation due to their purity, intellect, and unwavering obedience to God. This position is supported by the Muslim Peripatetic philosophers (*falāsifa*), the Mu‘tazilīs, and two Ash‘arī theologians, Abū ‘Abdullāh al-Ḥalīmī (d. 1012) and Abū Bakr al-Bāqillānī (d. 1013), who stand apart from the majority of their peers in this regard. Often overlooked are those who intentionally refrain from taking a definitive position on the matter. These include Abū ‘Abd Allāh al-Tilimsānī (d. 1291),<sup>1</sup> Taj al-Dīn al-Subkī (d. 1370),<sup>2</sup> and Sa‘d al-Dīn al-Taftāzānī (d. 1390),<sup>3</sup> all of whom adopt a posture of non-commitment (*tawaqquf*) due to lacking absolute certainty on the issue. Notably, al-Tilimsānī suggests that al-Bāqillānī may have considered non-commitment a possible stance on this matter.<sup>4</sup>

Against this backdrop emerges Fakhr al-Dīn al-Rāzī (d. 1210), a towering figure in the Ash‘arī tradition whose contribution provides a distinct and nuanced perspective on theological anthropology. Al-Rāzī’s significance lies in two key factors. First, his stance favoring angelic superiority sets him apart from the majority of Ash‘arī theologians, who advocate human superiority. This divergence underscores his intellectual boldness in rethinking humanity’s rank within creation. Second, his unparalleled authority in both Islamic dialectic theology (*kalām*) and Qur’ānic exegesis lends considerable weight to his views. His monumental *The Grand Exegesis (al-Tafsīr al-Kabīr)*, also known as *The Keys to the Unseen (Maḥāṭib al-Ghayb)*, exemplifies his ability to integrate theology and exegesis, addressing philosophical questions at the intersection of Islamic theology and cosmology. Together, these factors make al-Rāzī’s position authoritative, compelling, and exciting to explore, especially as this article delves into his theological works to examine their relevance to contemporary inquiries.

Al-Rāzī’s discussions on angelic superiority and the metaphysical hierarchy of creation provide a valuable lens for exploring the implications of ETI within Islamic theological anthropology. His inclination toward angelic superiority challenges anthropocentric assumptions, offering a framework to consider how intelligent beings beyond Earth might fit into the broader metaphysical order. While contemporary thinkers such as Iqbal, Karamali, and I have engaged with the question of humanity’s cosmic status, al-Rāzī’s insights provide a distinct opinion that can expand the discourse. This study builds on his thought to expand Islamic theological anthropology, reflecting on the possibility of non-angelic beings as superior to humans and their roles in creation.

Al-Rāzī engages extensively with this discussion across several works. In *The Compendium (al-Muḥaṣṣal)*, he argues for human superiority (al-Kātibī 2018,

577–79); in *The Book of Forty Discussions on Theology* (*Kitāb al-Arbaʿīn fī Uṣūl al-Dīn*), he appears more inclined toward angelic superiority but refrains from issuing a final judgement (al-Rāzī 2018, 516–37); whereas in *The Sublime Objectives in Metaphysics* (*al-Maṭālib al-ʿĀliya min al-ʿIlm al-Ilāhī*), he categorically upholds the superiority of angels (al-Rāzī 2024, 617–61). While this may initially appear contradictory, it is more plausibly indicative of a vacillation of thought, characteristic of an eclectic thinker like al-Rāzī. His writings demonstrate an engagement with both *kalām* and Muslim Peripatetic philosophy (*falsafa*), the latter mainly being the ideas of Avicenna (2005). This intellectual cross-pollination, common in the post-Classical period, reflects the growing integration of Avicennan thought into the framework of *kalām*, with al-Rāzī being a prominent example of this trend (Griffel 2021). As *The Sublime Objectives* is widely considered his final theological work, it is often regarded as the most reflective of his mature theological views. It is this work that is the primary focus of this article.

In *The Sublime Objectives*, he dedicates an extensive section to the topic of which is the best of creation, presenting numerous objections alongside numerous counter objections for both sides. However, the breadth and depth of that particular work exceeds the scope of this article. Accordingly, this study will primarily rely on an abridgement (*talkhīṣ*) by Afdal al-Dīn al-Khūnajī (d. 1248), who succinctly condenses al-Rāzī’s ideas into manageable arguments (al-Khūnajī, 2021, 488–95).<sup>5</sup> To be sure, insights from *The Sublime Objectives* are incorporated where necessary to provide additional context and depth. Additionally, references to scriptural evidence not included in al-Khūnajī’s presentation are added to enhance the discussion and benefit the reader.

Al-Khūnajī’s presentation of al-Rāzī’s ideas is divided into four key parts, which also form the structure of this article. The first section evaluates arguments for human superiority, addressing counterarguments and offering clarifications that challenge their validity (al-Khūnajī, 2021, 488–89). The second section focuses on scriptural evidence supporting angelic superiority, drawing on Qur’ānic and theological sources to build the case (al-Khūnajī, 2021, 489–94). The third section explores rational arguments for angelic superiority, providing a philosophical perspective grounded in metaphysical reasoning (al-Khūnajī, 2021, 494–95). The fourth and final section explores how al-Rāzī’s insights can inform contemporary discussions in relation to ETI, ultimately contributing to developing a modern perspective on Islamic theological anthropology.

### Engaging Arguments Favoring Human Superiority

This discussion begins al-Rāzī’s critique with a striking statement: “Whoever believes that humans are superior to angels does not truly understand the nature of angels but rather imagines them to be birds flying in the sky” (al-Khūnajī 2021, 488). This remark immediately signals his position, emphasizing that any claim of human superiority is rooted in a misunderstanding of the exalted nature of angels. For al-Rāzī, such simplistic comparisons diminish the

profound metaphysical and spiritual realities of angels, reducing them to mere creatures of flight. This initial framing makes it clear that al-Rāzī's argument is fundamentally about correcting misconceptions and elevating the theological discourse beyond superficial interpretations.

Al-Rāzī's critique of human superiority is methodical, engaging with three key arguments commonly presented by its proponents: Adam's prostration and vicegerency (first subsection), the value of hardship in worship (second subsection), and the unique duality of human intellect and desires (third subsection). Collectively, these critiques adopt a primarily deconstructive approach, systematically dismantling the claims through alternative interpretations rooted in scripture and rational analysis. His objections are informed by positive arguments that underpin his perspective, but these will be fully articulated in subsequent sections, where he substantiates his case for angelic superiority through scriptural evidence (second section) and rational arguments (third section).

### ***The Argument from Adam's Prostration and Vicegerency***

The first argument for human superiority revolves around the story of Adam, particularly the divine command for the angels to prostrate before him. According to the Qur'ānic narrative, after creating Adam from clay, God commanded the angels to prostrate before him as a sign of respect and recognition of Adam's unique status. This was not an act of worship directed toward Adam but rather a gesture of obedience to God's command and acknowledgment of Adam's elevated role in creation. All the angels complied except for Satan (Iblīs), who arrogantly refused. Satan's defiance is recorded in several verses, including his statement: "You have honored him above me" (Qur'ān 17:62). Here, Satan expresses his envy and disdain for Adam, framing the prostration as an unjust elevation of a being he deems inferior. In another verse, Satan justifies his refusal by claiming superiority based on his origin: "You created me from fire, and him from clay" (Qur'ān 7:12), underscoring his belief that the nature of his creation made him superior.

Building on this narrative, proponents of human superiority over the angels develop their argument through four interconnected points. First, they interpret the angels' prostration as a direct acknowledgment of Adam's elevated status, not merely as a symbolic gesture. The Qur'ān's account, particularly Satan's protest in Qur'ān 17:62—"You have honored him above me"—is seen as evidence that the act signified Adam's intrinsic superiority. Second, Adam's designation as a *khalīfa* (vicegerent) on Earth further underscores his unique status. In this view, the role of a vicegerent, representing divine authority, naturally places Adam above the rest of creation. Third, the Qur'ānic affirmation of Adam's divine selection in Qur'ān 3:33—"Indeed, God chose Adam, Noah, and the family of Abraham"—is presented as explicit proof of his privileged position. Finally, Adam's capacity to learn and teach the names of all things, as described in Qur'ān 2:31, demonstrates a level of knowledge unparalleled by the angels.

This unique intellectual ability is interpreted as a mark of Adam's superiority, as Islamic theology often associates greater knowledge with higher rank. Together, these points affirm Adam's superior status in the cosmic hierarchy.

Al-Rāzī critically addresses these interconnected points by offering alternative interpretations that challenge their underlying assumptions. First, he questions whether the command to prostrate to Adam included the celestial angels, who are traditionally considered closer to God in Islamic cosmology. Proponents of Adam's superiority cite the general wording of the verse: "And when We said to the angels: Prostrate to Adam" (Qur'ān 2:34). However, al-Rāzī argues that this generality can be restricted by other Qur'ānic verses (*takhsīṣ 'umūm al-Qur'ān bi naṣṣ al-Qur'ān*), a principle widely accepted in Islamic hermeneutics.

To substantiate his argument, al-Rāzī references the verse: "Indeed, those who are near your Lord are not too proud to worship Him; they glorify Him, and to Him they prostrate" (Qur'ān 7:206). He focuses on the placement of the phrase "to Him" (*lahu*) before the verb "they prostrate" (*yasjudūn*), which indicates exclusivity in Arabic rhetoric. The forward placement of *lahu* emphasizes that the celestial angels direct their prostration solely to God. In classical Arabic, this kind of syntactical arrangement is often employed to limit or restrict the action to the specified subject (*taqdīm wa ta'khr*)—in this case, God alone. Therefore, al-Rāzī concludes that the celestial angels are excluded from the command to prostrate to Adam because their prostration is reserved exclusively for God (also see al-Rāzī 2012, 105).<sup>6</sup>

Building on this distinction, al-Rāzī proposes that the command to prostrate was instead directed at the terrestrial angels, who are assigned specific roles on Earth.<sup>7</sup> These angels, whose ranks and responsibilities differ significantly from their celestial counterparts, would have been the intended recipients of this command. By narrowing the scope of the prostration, al-Rāzī reframes the act as one tied to terrestrial dynamics while maintaining the singular devotion of the celestial angels to God (al-Rāzī 2024, 621).

Second, al-Rāzī challenges the argument that Adam's designation as a *khalīfa* (vicegerent) inherently implies superiority. Proponents equate this role with an elevated status, asserting that a vicegerent's position surpasses that of other beings. Al-Rāzī counters by clarifying that Adam's vicegerency is explicitly tied to Earth and does not extend to the heavens. He further notes that, according to the cosmological understanding of his time, the Earth is relatively insignificant compared to the vastness and grandeur of the heavens (al-Rāzī 2024, 621).<sup>8</sup> This comparison undermines the assumption that an earthly vicegerency automatically elevates Adam above celestial beings, whose domain and proximity to God remain unparalleled.

Third, al-Rāzī addresses the claim that Adam's knowledge establishes his superiority. While he acknowledges Adam's intellectual distinction, particularly his ability to learn and teach the names of all things as described in Qur'ān 2:31, al-Rāzī confines this distinction to Adam's relationship with the terrestrial

angels. He questions the extension of this claim to the celestial angels, for whom no evidence exists that Adam's knowledge surpassed theirs. Al-Rāzī emphasizes that the breadth and depth of the celestial angels' knowledge, derived from their proximity to the divine and their unique roles, cannot be easily compared to human capacities (more on this point in the next section). Without clear evidence, any assertion of Adam's superiority in knowledge over the celestial angels remains speculative and unsubstantiated (al-Rāzī 2024, 621).

Finally, al-Rāzī critiques the argument based on divine selection in Qur'an 3:33: "Indeed, Allah chose Adam and Noah and the family of Abraham and the family of 'Imrān over all the worlds." Proponents interpret this verse as evidence of Adam's universal superiority. Al-Rāzī (2024, 622), however, contextualizes the term "the worlds" (*al-‘ālamīn*) as referring specifically to the inhabitants of the earthly realm (*ahl al-ard*). By doing so, he limits the scope of Adam's selection to his distinction within the earthly domain without extending it to celestial beings. In this way, al-Rāzī affirms Adam's unique role and status on Earth while avoiding conclusions that would contradict his position on the greater rank of celestial beings.

### ***The Argument from Hardship and Divine Reward***

The second argument for human superiority hinges on two related points. First, proponents emphasize the hardship of obedience, arguing that human worship is inherently more valuable because it is performed despite significant challenges. Unlike angels, who are free from desires and distractions, humans must overcome internal inclinations and external obstacles to remain obedient. This struggle, they argue, makes human devotion uniquely praiseworthy. This is supported by the Qur'anic principle that striving for God entails divine guidance: "And those who strive for Us—We will surely guide them to Our ways. And indeed, Allah is with the doers of good" (Qur'an 29:69).<sup>9</sup>

Second, proponents assert that equitable reward for hardship further underscores the superiority of human worship. They argue that the increased difficulty humans face in their acts of devotion must correspond to a proportionate increase in divine reward. This idea resonates with the Qur'anic statement: "Indeed, the patient will be given their reward without account" (Qur'an 39:10).<sup>10</sup> Failing to account for such effort, proponents contend, would conflict with the wisdom and justice of God. This point strengthens the claim that human worship, marked by struggle and sacrifice, surpasses the pure but effortless worship of angels.

Al-Rāzī challenges the reasoning behind these claims by focusing on the limitations of hardship as a basis for superiority and the presumption of proportional reward for hardship. He offers two vivid analogies to make his point. First, he compares the situation to a baker or butcher who expends significant effort to secure basic necessities like food and clothing, while a

ruler enjoys these without hardship due to their elevated status. Would anyone argue that the laborious efforts of the former make them superior to the ruler? Similarly, al-Rāzī argues, human struggles in worship, while admirable, cannot automatically place them above angels, whose uninterrupted and pure devotion demonstrates a higher quality of worship (al-Rāzī 2024, 622).

Building on this, al-Rāzī presents another analogy: consider a person prone to illness who expends great effort to maintain their health. Would such a person be deemed superior to someone who enjoys perfect health without such challenges? Common sense suggests otherwise, as the latter's consistent state of health is inherently more desirable and reflects a greater excellence (al-Rāzī 2024, 622–23). For al-Rāzī, these analogies together demonstrate that hardship, even if rewarded, does not inherently confer superiority. Instead, he prioritizes the constancy and purity of angelic worship, which embodies a form of excellence that human challenges in worship cannot surpass.

### ***The Argument from Human Duality: Intellect and Desires<sup>11</sup>***

The third argument for human superiority is rooted in the distinctive dual nature of humans. Unlike other beings, humans possess both intellect (*al-ʿaql*) and base desires (*al-shahawāt*), which places them in a unique position within creation. Animals are driven solely by desires and lack intellect, while angels are characterized by intellect but are devoid of desires. Humans, possessing both, are seen as capable of navigating between these extremes (see Table 1).

Proponents of human superiority put forth two related claims. The first is that when humans are ruled by their desires, they fall below the level of animals, as they fail to use their intellect to moderate their behavior. This is often supported by the Qurʾānic verse: “They are like cattle; rather, they are more astray” (Qurʾān 7:179), which is interpreted as evidence of this degradation. The second claim builds on the first, suggesting that if humans have the capacity to descend below animals, they must also possess the potential to ascend above angels when guided by reason and intellect. These two claims together frame humans as beings capable of both extreme vice and sublime virtue, depending on which of their faculties they cultivate.

Al-Rāzī critically challenges both claims. He begins by addressing the first claim, that humans can fall below animals, and rejects its literal interpretation. According to al-Rāzī, the Qurʾānic verse 7:179, often cited to support this notion,

	Animals	Humans	Angels
Desires ( <i>al-shahawāt</i> )	✓	✓	✗
Intellect ( <i>al-ʿaql</i> )	✗	✓	✓

**Table 1:** A comparison of animal, human, and angelic compositions.

is meant as a rhetorical warning or deterrent, not a definitive statement about an ontological hierarchy. By casting doubt on the scriptural basis of the first claim, al-Rāzī simultaneously weakens the second claim, that humans, by the same logic, can surpass angels. If the premise about humans being lower than animals lacks literal force, the symmetrical inference about humans ascending above angels cannot stand either (al-Rāzī 2024, 623).

### **Concluding Reflections**

Through his critiques of the arguments for human superiority, al-Rāzī systematically dismantles their foundational premises while rooting his objections in a broader theological framework. First, he challenges the interpretation that the prostration of angels before Adam signifies human superiority. He argues that the command to prostrate was limited to terrestrial angels and reflects Adam's unique earthly role rather than an indication of universal human precedence over celestial beings. Second, he critiques the argument that the hardship of human worship confers superiority, contending that while human struggles in devotion are admirable, they do not surpass the excellence of angelic worship, which is uninterrupted and pure. Finally, he examines the claim that humans, having both intellect and desires, occupy a unique position that enables them to surpass angels. Al-Rāzī rejects this by challenging the analogy underpinning the argument. He contends that the Qur'ānic verse 7:179 cited as evidence for humans falling below animals is rhetorical rather than literal, undermining the symmetry needed to argue that humans can ascend above angels. Without a solid basis for the first claim, the second claim collapses as well.

These critiques expose the flawed anthropocentric assumptions underlying claims of human superiority. At the same time, they prepare the ground for al-Rāzī's affirmative case for angelic superiority, which is developed in subsequent sections. The section "Scriptural Arguments Favoring Angelic Superiority" examines scriptural evidence supporting angelic excellence, while the section "Logical Arguments Favoring Angelic Superiority" presents rational arguments to reinforce this perspective.

### **Scriptural Arguments Favoring Angelic Superiority**

Al-Khūnajī (2021, 489–94) presents al-Rāzī's arguments in a comprehensive set of eleven scriptural proofs advocating for the superiority of angels over humans. To facilitate clarity and analysis, these arguments are organized into six thematic clusters, each addressing a distinct dimension of the discussion. This structured approach allows for a focused examination of each cluster, which will be reviewed in detail, highlighting its key arguments and supporting evidence. A summary of these clusters is provided in Table 2 for an overarching view.

Cluster name	Emphasis	Verses used	Arguments
<b>Dedication to Worship and Piety</b>	Angels engage in continuous worship, maintain constant fear of God, and surpass humans in closeness and piety.	Q.21:19–20, Q.56:10–11, Q.16:50, Q.21:28, Q.49:13	1, 3
<b>Proximity to God and Role as Divine Messengers</b>	Angels are God’s messengers to prophets, emphasizing their spiritual priority and unique relationship with God.	Q.6:50, Q.4:172, Q.12:31	2, 4
<b>The Qur’ān’s Silence on Human Superiority</b>	The verse implies that humans are not the most superior beings since such a claim is not explicitly stated.	Q.17:70	5
<b>Forgiveness and Guardianship</b>	Angels seek forgiveness for others and oversee human deeds, highlighting their spiritual and functional roles.	Q.40:7, Q.42:5, Q.82:10–11	6, 7
<b>Priority in Divine Recognition</b>	Angels are listed before books and messengers, emphasizing their superior rank in the sequence of belief.	Q.2:285, Q.3:18	8, 9
<b>The Superiority of Gabriel over Muḥammad</b>	Gabriel’s attributes and his role in delivering revelation indicate his superiority over prophets.	Q.81:19–22, Q.53:5, Q.39:9	10, 11

**Table 2:** A summary of the eleven arguments used by al-Rāzī as presented by al-Khūnajī.

### ***Dedication to Worship and Piety***

The first cluster, based on the first and third arguments, emphasizes the angels’ continuous devotion and their precedence in creation as evidence of their superiority over humans (al-Rāzī 2024, 624–27; 629–33). This argument highlights how uninterrupted worship, combined with a higher degree of piety and awe of God, establishes the angels’ elevated rank in the cosmic hierarchy.

This claim is substantiated by several Qur’ānic verses. God says: “And those near Him are not too proud to worship Him; they glorify Him night and day, they do not slacken” (Qur’ān 21:19–20). This verse highlights the angels’ perpetual worship and servitude, marking them as beings entirely dedicated to the glorification of God without pause or distraction. In contrast, humans are constrained by their physical and temporal limitations, which prevent them from achieving this level of uninterrupted devotion.

The angels’ precedence in creation further underscores their rank. The verse “And the foremost are the foremost; they are the ones brought near” (Qur’ān 56:10–11) is interpreted to signify the angels’ spiritual proximity to God due to their earlier existence. Their precedence in the divine order is seen as an indication of their higher status, setting them apart from humans and prophets who came later.

Another dimension of this argument is the angels’ unwavering piety and fear of God. As God states, “They fear their Lord above them” (Qur’ān 16:50) and “[t]hey are apprehensive of Him out of awe” (Qur’ān 21:28). Unlike humans, whose piety can fluctuate due to external influences and internal struggles, the

angels maintain a constant state of reverence and awe. This unwavering piety aligns with the Qur'ānic principle: “Indeed, the most noble of you in the sight of Allah is the most pious among you” (Qur'ān 49:13), reinforcing the notion that their superior piety elevates their rank above humanity.

The Prophet Muḥammad also acknowledged human fallibility, saying, “There is no one among us who has not sinned or contemplated sin, except Yaḥyā ibn Zakariyyā.” This contrasts with the sinless nature of angels, further highlighting their moral and spiritual superiority.

Together, these verses and traditions form a cohesive argument affirming the angels' superior station. Their uninterrupted worship, precedence in creation, and unwavering piety distinguish them as beings of unparalleled dedication and proximity to God, solidifying their higher rank in the divine hierarchy.

### ***Proximity to God and Role as Divine Messengers***

This cluster, based on the second and fourth arguments, highlights the angels' unique role as divine messengers and their elevated status compared to prophets (al-Rāzī 2024, 627–28; 633–36). Angels, as intermediaries between God and humanity, hold a privileged position due to their proximity to the divine and their role in transmitting His revelations.

The Qur'ān underscores the closeness of angels to God, describing them as “those who are near” (Qur'ān 4:172). This verse situates angels within a distinct spiritual hierarchy, emphasizing their exalted station. Their nearness to God signifies an unparalleled alignment with divine will, setting them apart from prophets, who serve a different function in the divine plan. The Prophet Muḥammad himself, in Qur'ān 6:50, humbly acknowledges this distinction when he says: “I do not say to you that I have the treasures of God or that I know the unseen, nor do I say to you that I am an angel.” By distancing himself from attributes associated with angels, the Prophet indirectly affirms their unique qualities, such as access to divine knowledge and the unseen, which are beyond human capability.

Further highlighting this elevated status, Qur'ān 12:31 recounts the reaction of the women of Egypt upon seeing Prophet Yūsuf (Joseph). Struck by his beauty, they exclaimed: “This is no ordinary human; this is but a noble angel.” This description reflects how angels are perceived as beings of unparalleled nobility, transcending even the most extraordinary qualities found in humans.

Moreover, the hierarchical relationship between angels and prophets further reinforces this argument. Angels are entrusted with delivering God's commands to prophets, who then convey these messages to humanity. This chain of communication positions angels at a higher level in the cosmic order, akin to a royal envoy who delivers the sovereign's decree directly to his subjects. Their role as divine messengers emphasizes their spiritual priority and unique responsibilities in the divine scheme.

### ***The Qur'ān's Silence on Human Superiority***

The third cluster highlights that the Qur'ān does not explicitly affirm human superiority over angels (al-Rāzī 2024, 636). This argument takes a negative approach, suggesting that the absence of a clear scriptural declaration of human supremacy supports the claim of angelic superiority.

The central verse for this cluster, “And We have certainly preferred them over much of what We have created” (Qur'ān 17:70), is one we encountered earlier in this article when discussing Muzaffar Iqbal's perspective. While the verse acknowledges that humans are favored over much of creation, it stops short of declaring them the most superior of all beings. Proponents of angelic superiority argue that if humans were indeed superior to angels, the Qur'ān would have made this explicit. The absence of such a statement is interpreted as evidence that humans do not surpass angels in rank. The use of this verse by contemporary thinkers like Iqbal underscores its enduring relevance in theological discussions about the hierarchy of creation.

By focusing on what the Qur'ān does not state, this argument shifts the burden of proof to those who assert human superiority. Without unequivocal scriptural evidence, such claims remain speculative, reinforcing the position that angels hold a higher rank in the divine order. This approach underscores the importance of grounding assertions of human supremacy in explicit Qur'ānic evidence, which proponents of this argument contend is notably absent.

### ***Forgiveness and Guardianship***

The fourth cluster of arguments highlights the role of angels as intercessors and stewards over humanity, further reinforcing their superiority (al-Rāzī 2024, 637–38). Two distinct aspects are emphasized: their unique role in seeking forgiveness for others and their responsibility for recording human deeds.

The sixth argument draws attention to the angels' role as intercessors. Angels are depicted in the Qur'ān as beings who seek forgiveness for others but do not request it for themselves. For instance, Qur'ān 40:7 states: “Forgive those who have repented and followed Your way,” and Qur'ān 42:5 mentions their plea for the forgiveness of those on Earth. This selflessness contrasts with prophets, who are shown acknowledging their sins and seeking forgiveness for themselves and others, as seen in the prayers of Adam (Qur'ān 7:23), Noah (Qur'ān 71:28), and Abraham (Qur'ān 14:41). This contrast suggests a higher degree of spiritual purity and selflessness in angels, underscoring their elevated status.

The seventh argument focuses on the stewardship of angels, particularly their role in recording human deeds. Qur'ān 82:10–11 states: “And indeed, appointed over you are keepers, noble and recording.” This responsibility implies a hierarchical relationship where angels are positioned above humans, entrusted with observing and documenting their actions. Their role as divine recorders underscores their authority and reinforces their superior status.

Together, these arguments portray angels as morally impeccable beings who act selflessly in their intercessory roles and are entrusted with significant responsibilities in the divine order, further affirming their higher rank relative to humanity.

### ***Priority in Divine Recognition***

The fifth cluster argues for the superiority of angels based on their placement in the hierarchical order within Qur'ānic verses, highlighting their elevated rank over humans (al-Rāzī 2024, 639–641). This is supported by two arguments that interpret the sequence of entities mentioned in the verses as indicative of their respective statuses.

The eighth argument draws from Qur'ān 2:285: “The Messenger has believed in what was revealed to him from his Lord, and so have the believers. All of them have believed in God and His angels and His books and His messengers.” Here, angels are mentioned immediately after God and before His books and messengers. This sequence is understood as reflecting a deliberate ranking, with angels positioned above humans, including God's prophets. The order underscores the angels' spiritual and ontological significance, directly following God in importance.

The ninth argument is based on Qur'ān 3:18: “God bears witness that there is no deity except Him, and [so do] the angels and those of knowledge, maintaining His creation in justice.” In this verse, the angels are explicitly mentioned before the people of knowledge, affirming their superior rank. Given the high regard for scholars in Islamic tradition, the precedence of angels highlights their unique role and elevated status in the divine order.

By examining the order in which entities are mentioned, these arguments suggest the superiority of angels through their proximity to God in the divine schema.

### ***The Superiority of Gabriel over Muḥammad***

The sixth and final cluster addresses the specific case of archangel Gabriel's superiority over the Prophet Muḥammad, based on the former's attributes and his role as an intermediary of divine revelation (al-Rāzī 2024, 641–47).

The tenth argument draws on Q. 81:19–22, where God says: “Indeed, it is a noble messenger's word, [delivered by] one of mighty power, [and] held in honor by the Owner of the Throne, obeyed and trustworthy. And your companion is not [at all] mad.” In this context, the “noble messenger” refers to Gabriel, who is described as possessing immense strength, honor, and reliability, and as being held in high esteem by God Himself. In contrast, the Prophet Muḥammad is referred to as “your companion,” with the verse affirming only that he is free from madness. The elevated language used to describe Gabriel emphasizes his exceptional qualities of power and trustworthiness, which surpass the attributes

explicitly ascribed to the Prophet in this passage. This disparity in description suggests a hierarchy in which Gabriel occupies a higher rank than Muḥammad.

The eleventh argument expands on Gabriel's superior knowledge and proximity to divine matters, asserting that his extensive understanding of both foundational and secondary realms of knowledge solidifies his elevated status. Gabriel's unique position as the first recipient of divine revelation grants him unparalleled access to the mysteries of the heavens and the divine order. As stated in Qur'ān 53:5: "He was taught by one mighty in power," Gabriel served as the teacher to Muḥammad, highlighting the hierarchical relationship between teacher and student (al-Rāzī 2024, 645).

Al-Rāzī elaborates on this epistemic hierarchy by dividing religious knowledge into two broad categories: foundational (*ilm al-uṣūl*) and secondary (*ilm al-furū'*). Foundational knowledge itself consists of two aspects. The first is the knowledge of God's oneness and attributes, which al-Rāzī argues is necessarily perfect for both Gabriel and Muḥammad, as any deficiency in this domain would imply ignorance of God—a theological impossibility. The second aspect, however, pertains to the details of creation, where Gabriel's superiority becomes evident. As a celestial being, Gabriel has directly witnessed the Throne (*al-ʿArsh*), the Footstool (*al-Kursī*), the Preserved Tablet (*al-Lawḥ al-mahfūz*), the Pen (*al-Qalam*), Paradise (*al-Jannah*), Hell (*al-Nār*), and the layers of the heavens.<sup>12</sup> Additionally, his knowledge extends to the intricacies of earthly creation, including the elements, minerals, plants, and animals. Gabriel's role as a leader among celestial beings and his command over the angels entrusted with these domains further highlight his unparalleled comprehension of these realms (al-Rāzī 2024, 645–46).

In the domain of secondary knowledge (*ilm al-furū'*), which concerns the specifics of the jurisprudential laws and prophetic missions, Gabriel's superiority remains evident. Al-Rāzī explains that Prophet Muḥammad's understanding of his jurisprudential framework (*sharīʿa*) was confined to the laws of his own mission, and he did not have knowledge of the divine laws governing (*sharāʿi*) the previous prophets. Furthermore, Prophet Muḥammad was unaware of the divine laws governing celestial realms, whereas Gabriel possessed comprehensive knowledge of these domains. Since this secondary knowledge was acquired exclusively through Gabriel, the teacher–student relationship further underscores Gabriel's epistemic primacy. Gabriel's unique position as the mediator of revelation makes him indispensable for the transmission of this knowledge (al-Rāzī 2024, 646).

This hierarchy of knowledge is encapsulated in the Qur'ānic verse: "Are those who know equal to those who do not know?" (Qur'ān 39:9). Gabriel's direct witnessing of creation's mysteries and his comprehensive knowledge of both foundational and secondary matters firmly establish his superiority within the epistemic order.

To preempt counterarguments based on Qur'ān 2:31—where Adam is taught the names of all things while the angels appear unaware—al-Rāzī interprets the verse in line with the argument discussed in the first section (under “The Argument from Adam’s Prostration and Vicegerency”). He suggests that the ignorance attributed to the angels in this instance pertains specifically to the terrestrial angels and not to Gabriel or the higher celestial beings. This approach reconciles the verse with the broader theological framework that positions Gabriel above all human prophets, including Prophet Muḥammad (al-Rāzī 2024, 646–47).

This cluster emphasizes Gabriel’s pivotal role in the transmission of revelation, his unparalleled access to divine knowledge, and the extraordinary qualities attributed to him in scripture. Together, these arguments establish Gabriel as a figure of supreme status within the hierarchy of creation, surpassing even the greatest of human prophets, i.e., Prophet Muḥammad.<sup>13</sup>

### **Concluding Reflections**

Al-Rāzī’s scriptural arguments construct a comprehensive case for the superiority of angels over humans, addressing their roles, attributes, and proximity to God. First, the constancy of their worship, their precedence in creation, and their unwavering piety establish their elevated spiritual rank, contrasting with human fallibility. Second, angels’ unique role as intermediaries between God and humanity, rooted in their proximity to the divine and their responsibility for transmitting His revelations, underscores their privileged position and spiritual priority over humans. Third, the Qur’ān’s silence on human superiority shifts the burden of proof to proponents of human primacy, while, fourth, the angels’ selfless intercession and stewardship over humanity highlight their moral and functional excellence. Fifth, their precedence in divine hierarchies, as evidenced by their mention in scripture before prophets and other creations, further affirms their divine preference and elevated rank. Finally, the case culminates with Gabriel, whose unparalleled knowledge of divine and created realms, his mediatory role, and his status as a teacher to prophets solidify his rank above all human beings, including the Prophet Muḥammad. Together, these clusters provide a forceful scriptural basis for angelic superiority and set the stage for al-Rāzī’s rational arguments, where the philosophical dimensions of this hierarchy will be further explored.

### **Logical Arguments Favoring Angelic Superiority**

The logical arguments for the superiority of angels over humans, as outlined by al-Khūnajī, are built on three core premises: the difference in essence (first subsection), superior knowledge (second subsection), and superior power (third subsection). Each premise highlights the unique attributes of angels compared to humans. These premises are further contextualized in the fourth subsection.

### ***Difference in Essence***

The first argument centers on the fundamental ontological distinction between angels and humans. Angels are purely spiritual beings, free from the constraints of physicality, such as time, space, and matter. This lack of physical dependency elevates them above humans, who are composite beings made of both body and soul. Humans are inherently tied to their physical nature, which subjects them to decay and imperfection. This reality is starkly captured in the description: “Its origin is a vile drop of fluid, its end a decaying corpse, and, in between these two states, it carries filth” (al-Khūnajī 2021, 494; al-Rāzī 2024, 649). Such a state highlights the transient and impure aspects of human existence.

In contrast, angels are exempt from these deficiencies. Their spiritual essence makes them independent of physical needs, such as food, clothing, or reproduction. This resemblance to God—who is free from physical dependencies—further underscores their superiority. While not equating angels with God, this argument highlights how their transcendence over physicality aligns them more closely with the divine attributes of independence and purity than with human limitations (al-Rāzī 2024, 648–50).

### ***Superior Knowledge***

The second argument focuses on the unparalleled knowledge of angels. Unlike human knowledge, which is prone to error, forgetfulness, and contradiction, angelic knowledge is free from such flaws. Angels possess an innate understanding that is both accurate and comprehensive. Additionally, their access to the Preserved Tablet grants them insight into the unseen, including the divine decree and cosmic order. This access provides them a breadth of knowledge far beyond human capacity, which is limited to sensory perception, reason, and conjecture.

Additionally, angels’ knowledge is actualized rather than developed through learning or reasoning. Their innate understanding is unerring, free from the processes of trial and error, and unaffected by forgetfulness, emotional biases, or conflicting desires. Humans, in contrast, are often hindered by these limitations, which distort their intellectual pursuits. Angels, by virtue of their spiritual essence, grasp divine truths with unparalleled clarity and precision, establishing them as beings of superior intellect and insight (al-Rāzī 2024, 651–52).

### ***Superior Power***

The third argument highlights the unmatched power of angels in their worship and servitude to God. Angels are described as beings who tirelessly glorify and remember God, their sustenance being His praise, their drink His exaltation, and their solace His remembrance. This unbroken devotion is made possible by their exemption from the limitations of fatigue, slumber, or exhaustion. Unlike humans, who are bound by physical needs and distracted by desires and anger, angels remain wholly focused on their divine duties.

This superior power is not limited to devotion but extends to their roles as divine agents. Angels execute God's will with precision and strength, from governing celestial bodies to guiding and protecting humanity. Their capacity to act without hesitation or error, free from the physical and emotional hindrances that constrain humans, makes them unparalleled in their ability to fulfil divine mandates. By embodying perfect obedience and unrelenting strength, angels demonstrate their exalted status within the cosmic hierarchy (al-Rāzī 2024, 652–55).

### **Contextualizing al-Rāzī's Thoughts**

Al-Rāzī's logical arguments are deeply informed by his engagement with the Muslim Peripatetic tradition (*falsafa*), within which angels are conceptualized as pure intellects (*'uqūl mujarrada*), immaterial beings free from physical constraints and perpetually immersed in divine contemplation (Davidson 1992; Avicenna 2005, 358–69). In this framework, angels function as metaphysical principles (*mabādi'*) or causal agents (*'ilāl*) for human souls. Since causes are inherently more complete (*akmal*) and superior to their effects (*ma'lūlāt*), this relationship places angels higher in the cosmic hierarchy. Unlike humans, whose intellects are bound to the constraints of physical bodies (*ajسام*), angels, as pure intellects, possess complete independence from sensory and material faculties. This independence allows them to maintain an unbroken connection to the divine. By contrast, human intellects are hindered by physical needs and emotional distractions, which obstruct their ability to attain the same degree of perfection (*kamāl*) (al-Rāzī 2024, 655–57).

To further illustrate the disparity, al-Rāzī (2024, 659) identifies nineteen opposing forces (*qiwā mu'ārida*)<sup>14</sup> that obstruct human intellect from achieving its full potential. These forces fall into three categories: external senses, internal senses, and vegetative faculties, alongside desires and anger. Together, they highlight the numerous distractions that compromise human intellectual and spiritual clarity. These are summarized in Table 3 for clarity.

Al-Rāzī emphasizes that while these forces are necessary for human survival and sensory engagement, they act as barriers to intellectual perfection. Angels, free from such distractions, operate with uninterrupted focus and clarity, underscoring their superior intellect and spirituality. This distinction reinforces their elevated status in the divine hierarchy and affirms the argument for their inherent superiority over humans.

### **Concluding Remarks**

Al-Rāzī's logical arguments firmly establish the superiority of angels over humans by analyzing their essence, knowledge, and power. Drawing from the Muslim Peripatetic tradition, angels, as pure intellects, are unburdened by the physical and sensory limitations constraining humans, allowing them

Category	Forces	Description
<b>External senses</b> ( <i>al-ḥawāss al-zāhira</i> )	Sight ( <i>al-baṣar</i> ) Hearing ( <i>al-samʿ</i> ) Touch ( <i>al-lams</i> ) Taste ( <i>al-ṭaʿm</i> ) Smell ( <i>al-shamm</i> )	These are the primary sensory inputs through which humans perceive the world. While critical for gathering information, they can distract the intellect from focusing on higher truths or spiritual contemplation.
<b>Internal senses</b> ( <i>al-ḥawāss al-bāṭina</i> )	Imagination ( <i>al-takhayyul</i> ) Memory ( <i>al-ḥifẓ</i> ) Estimation ( <i>al-waḥm</i> ) Retentive imagination ( <i>al-mutakhayyila</i> ) Common sense ( <i>al-ḥiss al-mushtarak</i> )	These faculties process sensory data: imagination constructs mental images, memory retains experiences, estimation assigns meaning, and retentive imagination consolidates insights. While vital, they can lead to errors, such as overreliance on imagination or distortions of memory.
<b>Vegetative faculties</b> ( <i>al-quwā al-nabāṭiyya</i> )	Generation ( <i>al-muwallida</i> ) Nutrition ( <i>al-ghādhīyya</i> ) Growth ( <i>al-nāmīyya</i> ) Attraction ( <i>al-jādhība</i> ) Retention ( <i>al-māsika</i> ) Digestion ( <i>al-ḥāḍima</i> ) Excretion ( <i>al-dāfiʿa</i> )	These biological processes sustain life and are central to human survival. However, they anchor humans to their physical nature, necessitating constant attention and care, which detracts from the intellect’s ability to transcend the material realm.
<b>Desires</b> ( <i>al-shahawāt</i> )	The inclination toward physical and emotional satisfaction	Desires drive human actions but often conflict with rational pursuits. For example, the pursuit of material or sensory pleasures can overshadow moral or intellectual goals.
<b>Anger</b> ( <i>al-ghaḍab</i> )	The emotional response to perceived threats or injustice	While anger can serve protective purposes, it often clouds judgment, leading to irrational or harmful decisions that obstruct intellectual clarity.

**Table 3:** The nineteen opposing forces that can obstruct from achieving perfection.

to maintain an unbroken connection to the divine. Furthermore, angels, as causal foundations of humans, inherently surpass them. Reflecting the initial comment—“Whoever believes that humans are superior to angels does not truly understand the nature of angels but rather imagines them to be birds flying in the sky”—the final statement concludes: “Thus, the notion of equivalence between humans and angels is untenable. God knows best the true realities of His creation” (al-Khūnajī 2021, 495).

### Al-Rāzī’s Framework and the Possibility of ETI

Fakhr al-Dīn al-Rāzī’s theological framework challenges anthropocentric assumptions about human superiority, advocating for a nuanced understanding of humanity’s place within the cosmic order. For al-Rāzī, celestial angels are clearly superior to humans due to their metaphysical and spiritual attributes, as well as scriptural backing. While al-Rāzī’s critiques were not framed in the context of ETI, his insights provide fertile ground for exploring their implications in contemporary Islamic thought. Notably, the questions to ask are: Could there be ETIs? And could they have a higher rank than humans?

Unlike proponents of human superiority, al-Rāzī does not see human vicegerency, earthly dominion, or moral struggle as definitive evidence of universal preeminence. Instead, he emphasizes the localized, contingent, and limited nature of human roles and capacities, though this does not necessarily render them insignificant. Drawing on al-Rāzī's arguments, we can identify four areas of reflection that may have significant implications for Islamic theological anthropology in light of ETI.

### ***Beyond Humanity: A Gradient of Excellence***

A foundational implication of al-Rāzī's theological framework is the possibility of a metaphysical gradient within creation, a spectrum of beings possessing varying degrees of excellence in intellect, spirituality, and proximity to the divine. Rather than presenting a binary between angels and humans, al-Rāzī outlines a hierarchy that is open-ended, structured not by species membership but by qualitative attributes such as knowledge, constancy in worship, freedom from corporeal limitations, and nearness to God.

This gradient, central to al-Rāzī's argument for angelic superiority, subtly shifts the theological conversation away from rigid species-based hierarchies toward an evaluation based on traits. Crucially, al-Rāzī himself distinguishes between celestial and terrestrial angels, acknowledging a hierarchy even within the angelic class. Celestial angels, by virtue of their uninterrupted proximity to God and unceasing worship, occupy a higher rank than terrestrial angels, whose roles are more functional and tied to the earthly realm. This internal differentiation suggests that superiority is not reducible to belonging to a particular ontological kind, i.e., being an "angel" simpliciter, but instead hinges on the manifestation of specific traits such as epistemic clarity, spiritual constancy, and freedom from material limitation. On this model, metaphysical excellence is graded by degree, not by kind. Accordingly, if ETIs were to exhibit these high-ranking traits, even if they were not of the same "kind" as angels, they could, at least in principle, be located above humans within the same gradient.

While al-Rāzī does not speak of ETIs, his metaphysical framework creates conceptual room for their possibility. If such beings exist and embody traits aligned with the higher end of this gradient, such as greater epistemic clarity, uninterrupted devotion, or freedom from bodily impediments, then one could tentatively suggest that they may occupy ranks above humanity. Of course, such claims must remain speculative and cannot be doctrinally asserted. But what al-Rāzī's arguments decisively do is open a theological space: a space in which it is not only possible, but potentially coherent within the tradition, to imagine ETIs whose excellence surpasses that of human beings.

In this light, al-Rāzī's thought challenges static and anthropocentric hierarchies. By foregrounding the metrics that make angels superior, he invites

a more expansive vision of creation—one in which metaphysical excellence is distributed across a spectrum that may well include beings beyond our world.

### ***Earthly Vicegerency: Localized Responsibility, Not Universal Superiority***

As reviewed in this article, one of the central claims for human superiority in Islamic thought is based on humanity's designation as vicegerent on Earth, as mentioned in the Qur'ān (2:30). Proponents argue that this role signifies humanity's preeminence in the cosmic order. Al-Rāzī, however, challenges this interpretation by framing vicegerency as a functional, localized responsibility rather than evidence of universal superiority.

Al-Rāzī argues that the vicegerency pertains specifically to humanity's earthly domain and does not extend beyond it. This is reflected in his critique of the prostration narrative (Qur'ān 2:34), where he contends that the angels commanded to prostrate before Adam were terrestrial, not celestial. For al-Rāzī, the celestial angels occupy a higher metaphysical rank, remaining in uninterrupted proximity to God. In contrast, terrestrial angels serve more localized roles akin to humanity's own responsibilities on Earth.

If humanity's vicegerency is tied to Earth alone, this localization raises thoughtful questions about our responsibilities and boundaries. Does this exclusivity imply that human efforts to colonize other planets, such as Mars, overstep the divinely assigned limits of our stewardship? If vicegerency is tied to Earth, any expansion beyond it might reflect human hubris rather than a divine mandate. Furthermore, ETI might hold analogous or superior roles in their own domains, with responsibilities potentially more aligned with their cosmic environments. This could reframe humanity's theological understanding of stewardship as not universal but rather one piece of a larger, interconnected mosaic of divine representation across the cosmos.

### ***Cosmological Insignificance: Earth as a Speck of Dust***

In al-Rāzī's cosmological framework, the Earth is portrayed as a minuscule entity within the vast expanse of creation. While his perspective reflects the cosmology of his time, it resonates with modern understandings of the universe's immense scale, where Earth is one among billions of planets in countless galaxies. For al-Rāzī, humanity's dominion over this "speck of dust" does not imply cosmic superiority; instead, it highlights the localized and contingent nature of human authority. This perspective challenges anthropocentric assumptions by emphasizing the Earth's relative insignificance in the divine schema.<sup>15</sup>

The recognition of Earth's relative insignificance in the vast cosmos amplifies the possibility of intelligent beings inhabiting realms far grander in scale or significance. If humanity's dominion is confined to a tiny speck in the universe, could beings dwelling in larger, more complex regions possess superior authority or closer proximity to the divine? Moreover, this realization invites reflection on

human aspirations to project dominance beyond Earth. Might the theological lesson be one of humility rather than conquest, encouraging exploration as a means of wonder and understanding rather than as an extension of human sovereignty? Al-Rāzī's perspective encourages a shift from anthropocentrism to a recognition that humanity may hold a small, albeit meaningful, role in a much grander cosmic drama.

### ***Human Biology as a Limitation***

Al-Rāzī contrasts the spiritual and intellectual purity of angels with the physical and biological constraints of humans. Angels, as purely immaterial beings, are free from the needs and distractions imposed by material existence. Humans, by contrast, are tethered to their corporeal nature, which al-Rāzī views as a source of imperfection. He vividly describes humanity's physical state as one marked by dependency, frailty, and impurity, characteristics that limit their spiritual potential.

This critique extends to the cognitive realm. Human intellect, while remarkable, is bound by sensory limitations, emotional biases, and the constant demands of biological survival. These constraints hinder humans from attaining the unbroken clarity and devotion exhibited by angels. For al-Rāzī, these limitations underscore humanity's contingent and imperfect nature within the broader cosmic order.

If human biology is a limitation rather than an advantage, it provokes fascinating possibilities for ETI. Could such beings exist without the physical constraints of hunger, fatigue, or mortality, enabling uninterrupted worship or greater alignment with divine will? This would challenge humanity's assumed superiority and introduce new paradigms of existence that transcend the physical and intellectual struggles intrinsic to human life. Such beings might serve as living examples of the potential for perfection beyond human imagination. Additionally, this prompts ethical questions: Should humanity strive to augment its own biological limitations through technology, genetic engineering, or AI, seeking to emulate these superior forms of being? Or should humanity instead embrace its unique struggles as an intended design of divine wisdom? These possibilities urge a reconsideration of how we view both our limitations and our aspirations in light of divine creativity.

### **Conclusion**

Fakhr al-Dīn al-Rāzī's divergence from the mainstream Ash'arī stance on human superiority spotlights the flexibility and breadth inherent in the Islamic intellectual tradition. While the majority of Ash'arī scholars champion humanity as the crown of creation, al-Rāzī's systematic defense of angelic superiority reminds us that questions of rank and status within the cosmos need not be anthropocentric. If we take al-Rāzī's arguments seriously, including his critiques

of the Adam prostration narrative, his emphasis on angelic purity and knowledge, and his portrayal of the Earth as merely one small part of a boundless creation, then the door opens to broader theological possibilities. This insight becomes especially relevant in modern discourse as we confront scientific provocations like the search for ETI, which challenge static notions of human uniqueness. Al-Rāzī's framework thus supplies an interesting precedent for considering new forms of intelligence that might surpass humanity in spirituality or intellect, encouraging contemporary Muslim theologians and scholars of religion alike to reconfigure the place of humanity within a universe far more expansive and mysterious than ever before imagined.

---

## Acknowledgments

I want to express my deepest gratitude to Ted Peters and the Institute on Religion in an Age of Science for their kind invitation in the summer of 2024. It was during this time, while presenting on Christian–Muslim conceptions of extraterrestrial intelligence, that the foundational ideas for this article began to take shape. I am also grateful for the opportunity to have met Lucas and Andrew at this event, whose engaging philosophical discussions remain cherished memories. Furthermore, I extend my sincere appreciation to David Solomon Jalajel, Jamie Turner, Laura Hassan, Mohammed Gamal Abdelnour, Nazif Muhtaroglu, and Ramon Harvey for their invaluable feedback on the early drafts of this article, which greatly contributed to its refinement.

## Notes

- <sup>1</sup> “Others besides Fakhr have transmitted from al-Qāḍī [al-Bāqillānī] the definitive ruling on the superiority of one over the other due to the consensus (*ijmāʿ*) on this matter. He said: ‘It is not far-fetched to withhold judgment on specifying which is superior.’ This is because such knowledge requires a decisive text (*naṣṣ qāṭiʿ*), while the arguments presented by both sides are speculative (*ẓanniyya*). Determining superiority through reason and analogy depends on: Enumerating the virtues of both sides, knowing their ranks with Allah the Exalted, comparing the quantitative, and qualitative aspects of their virtues. Compensating for any deficiency in one with the merits of the other. Knowledge of this is rare (*ʿazīz*), and what al-Qāḍī [al-Bāqillānī] concluded is likely closer to the truth.” See Sharaf al-Dīn ibn al-Ṭilimsānī al-Fihri (2024, 595).
- <sup>2</sup> “Preferring humans over angels is not a matter that one is obliged to believe, nor is ignorance of it harmful. Safety lies in remaining silent about this issue. Entering into this discussion—comparing these two noble categories of God’s creation without definitive proof—is to enter a great danger and to pronounce judgement in a domain we are not qualified to rule on” (al-Bājūrī 2016, 376).
- <sup>3</sup> “The majority of Muslims hold that angels are subtle beings (*ajsām laṭīfa*) that can appear in various forms and have the strength to perform strenuous tasks. They are honoured servants of Allah who consistently engage in obedience and worship. They are not described as being male or female. There is a well-established disagreement among Muslims regarding their infallibility (*ʿismah*) and their superiority over prophets. There is no definitive evidence for either side in these matters” (al-Taftāzānī 2024, 2810). Also see Ibrāhīm ibn Muḥammad al-Bājūrī (2016, 376).
- <sup>4</sup> This is mentioned in note 1. To be clear, this is what has been mentioned by al-Ṭilimsānī, but I have not been able to find a direct quote of this in al-Bāqillānī’s extant materials.
- <sup>5</sup> Al-Khūnajī was a notable post-Rāzian scholar, renowned for his contributions to philosophy and logic in the Islamic intellectual tradition. Born in Khūnaj, in the region of Fars, al-Khūnajī was deeply influenced by the philosophical and theological currents of his time. His works reflect a commitment to synthesising and refining complex ideas, making them more accessible to subsequent generations of scholars. By distilling al-Rāzī’s extensive deliberations into a concise set of arguments, al-Khūnajī played a crucial role in preserving and disseminating his ideas, ensuring their continued relevance in later theological and philosophical debates. It is this summary, with its systematic organization and clarity, that serves as the foundation for the analysis presented in this article. It currently remains unclear, but it may that al-Khūnajī was a student of al-Rāzī. See Louise Marlow (2010, 285–87, Tony Street (2014), and Frank Griffel (2021, 303).

- <sup>6</sup> For a counterargument, see Abd al-Ḥakīm al-Ssayālkūtī's supercommentary in al-Sayyid al-Sharīf al-Jurjānī (1998, 309).
- <sup>7</sup> He also attributes this opinion to Abū Ḥamīd al-Ghazālī (d. 1111). See al-Rāzī (2012, 105).
- <sup>8</sup> This point becomes even more pronounced when viewed through the lens of contemporary cosmology. Modern science has revealed the vastness of the universe, consisting of billions of galaxies, each containing billions of stars and potentially habitable planets. In this context, Earth's position is astronomically minute, reinforcing al-Rāzī's argument about the relative insignificance of Adam's vicegerency when compared to the scope of the heavens. Such insights align with al-Rāzī's broader theological approach, which emphasizes humility in situating humanity within the cosmic order, challenging anthropocentric assumptions that were already nuanced in his own time.
- <sup>9</sup> This verse is not cited by al-Rāzī or al-Khūnajī but has been included here to provide additional context for the argument.
- <sup>10</sup> Ibid.
- <sup>11</sup> In this section, al-Khūnajī (2021, 489) simply says: "This is also evident." So, to help unpack the arguments, I relied on *The Sublime Objectives* for this section.
- <sup>12</sup> These terms refer to key components of Islamic cosmology: the *al-ʿArsh* as the divine Throne symbolizing God's sovereignty; *al-Kursī* as the Footstool, often seen as a representation of divine knowledge or support; *al-Lawḥ al-Mahfūz* as the Preserved Tablet holding the divine decree; and *al-Qalam* as the Pen that records it.
- <sup>13</sup> The discussion of Gabriel's potential superiority over the Prophet Muḥammad could carry significant implications for later developments in the *kalām* tradition and Sufi thought, particularly regarding possible Neoplatonic influences. In the later Islamic intellectual tradition, particularly among some Sufi circles, the concept of the *Muḥammadan Reality* (*al-Haqīqa al-Muḥammadiyya*) is said to have emerged as a metaphysical principle. This doctrine suggests that the Prophet Muḥammad may represent the first emanation of divine light and serve as the ultimate archetype of creation. Such ideas appear to integrate Neoplatonic hierarchical cosmology, framing the *Muḥammadan Reality* as pre-existent and potentially superior even to angelic beings like Gabriel. Al-Rāzī's arguments, however, could be interpreted as challenging this view, as they rely on scriptural and rational evidence to emphasize Gabriel's elevated attributes over those of Prophet Muḥammad in specific roles and capacities, particularly in the context of revelation. This apparent tension might reflect broader debates within Islamic thought over the relative metaphysical and spiritual rankings of prophets and angels, with differing implications for theology, mysticism, and cosmology. See Alexander Knysh (1999), Caner K. Dagli (2016), and Mukhtar H. Ali (2021).
- <sup>14</sup> Intriguingly, al-Rāzī (2024, 659) aligns the nineteen opposing forces that obstruct human intellect with the Qur'ānic mention of nineteen angels overseeing Hellfire (Qur'ān 74:30).
- <sup>15</sup> Al-Rāzī expands on the possibility of a vast, incomprehensible creation in his exegesis, asserting that evidence supports the existence of an infinite void (*ḵhalāʿ*) beyond the known cosmos. He contends that God's omnipotence could bring into existence "a thousand thousand worlds" far greater in scale and complexity than our own, each featuring counterparts to our throne, heavens, Earth, sun, and moon (Setia 2012, 177). This view directly refutes the Muslim Peripatetic philosophers' Aristotelian-inspired cosmology, which asserts that the cosmos is singular, spatially finite, and bounded by a fixed outermost sphere. By presenting an alternative, al-Rāzī challenges anthropocentric assumptions, emphasizing humanity's constrained role within a boundless and diverse universe, and broadens the theological discourse surrounding the cosmos. Notably, this perspective, coupled with his adoption of angelic concepts from Peripatetic philosophy, exemplifies al-Rāzī's eclectic methodology. He critically engages with, adapts, and occasionally refutes elements of Peripatetic thought, all while remaining rooted in the Ash'arī theological tradition.
-

## References

- al-Bājūrī, Ibrāhīm ibn Muḥammad. 2016. *Tuḥfat al-Murid Sharḥ Jawharat al-Tawḥīd (The Seeker's Gift: A Commentary on the Jewel of Monotheism)*. Edited by Aḥmad al-Shādhilī al-Azharī. ‘Ammān: Dār al-Nūr al-Mubīn li-l-Nashr wa-l-Tawzīf.
- al-Fihrī, Sharaf al-Dīn ibn al-Tilimsānī. 2024. *Sharḥ Ma‘ālim Uṣūl al-Dīn (Commentary on The Landmarks of Theology)*. Kuwait: Dār al-Ḍiyā’.
- al-Jurjānī, al-Sayyid al-Sharīf. 1998. *Sharḥ al-Mawāqif (Commentary on The Stances)* with the two glosses (*ḥashīyatā*) of ‘Abd al-Ḥakīm al-Ssayālkūtī and Aḥmad ibn Muḥammad al-Jiblī. Beirut: Dār al-Kutub al-‘Ilmiyya.
- al-Kātibī, Najm al-Dīn ‘Alī ibn ‘Umar. 2018. *Al-Mufaṣṣal fī Sharḥ al-Muḥaṣṣal (The Detailed Commentary on The Compendium)* along with *al-Muḥaṣṣal (The Compendium)* by Fakhr al-Dīn al-Rāzī. Vol. 2. Edited by ‘Abd al-Jabbār Abū Sunayna. Amman: Dār al-Aṣḥayn.
- al-Khūnājī, Abū ‘Abd Allāh Muḥammad ibn ‘Abd al-Raḥmān. 2021. *Talkhīṣ al-Maṭālib al-‘Āliya (Abridgment of The Sublime Objectives)*. Vol. 2. Edited by ‘Abd Allāh Muḥammad Ismā‘īl and Muḥammad Ḍargām. Cairo: Markaz Iḥyā’ li-l-Buḥūth wa-l-Dirāsāt.
- al-Rāzī, Fakhr al-Dīn Muḥammad ibn ‘Umar. 2012. *Al-Tafsīr al-Kabīr aw Maḥāṣin al-Ghayb (The Grand Exegesis or The Keys to the Unseen)*. Edited by Sayyid ‘Imrān. Vol. 7. Cairo: Dār al-Ḥadīth.
- . 2018. *Kitāb al-Arba‘īn fī Uṣūl al-Dīn (The Book of Forty Discussions on Theology)*. Edited by Aḥmad Ḥijāzī al-Saqqa. Cairo: al-Maktabah al-Azhariyyah li-l-Turāth.
- . 2024. *Al-Maṭālib al-‘Āliya min al-‘Ilm al-Ilāhī (The Sublime Objectives in Metaphysics)*. Edited by ‘Abd Allāh Muḥammad Ismā‘īl and Muḥammad Ḍargām. Vol. 7: *Al-Arwaḥ al-‘Āliya wa-l-Sāfila (The Higher and Lower Souls)*. Kuwait: Dār al-Ḍiyā’.
- al-Taftāzānī, Sa‘d al-Dīn, 2024. *Sharḥ Maqāṣid al-Kalām fī ‘Aqā’id al-Islām (Commentary on the Purposes of Theology in the Beliefs of Islam)* with the supercommentaries (*al-ḥawāshī*) of al-Khayālī, al-Ssīnānī, al-Burūsawī, and al-Fārūqī. Edited by Muṣṭafā al-Nābulusī, Ayyūb ‘Abd al-Fattāḥ Khālid, and Muḥammad Fārūq Hāshim. Vol. 5. Amman: Dār al-Nūr al-Mubīn.
- Alī, Mukhtar H. 2021. *Philosophical Sufism: An Introduction to the School of Ibn al-‘Arabī*. Abingdon: Routledge.
- Avicenna. 2005. *The Metaphysics of The Healing*. Translated by Michael E. Marmura. Provo, UT: Brigham Young University Press.
- Çelik, Yusuf. 2023. “Answering Divine Love: Human Distinctiveness in the Light of Islam and Artificial Superintelligence.” *Sophia* 62 (4): 679–96.
- Cortez, Marc. 2009. *Theological Anthropology: A Guide for the Perplexed*. London: T&T Clark.
- Dagli, Caner K. 2016. *Ibn al-‘Arabī and Islamic Intellectual Culture: From Mysticism to Philosophy*. London: Routledge.
- Davidson, Herbert A. 1992. *Alfarabi, Avicenna, and Averroes on Intellect: Their Cosmologies, Theories of the Active Intellect, and Theories of Human Intellect*. Oxford: Oxford University Press.
- Determann, Jörg Matthias. 2021. *Islam, Science Fiction and Extraterrestrial Life: The Culture of Astrobiology in the Muslim World*. New York: I. B. Tauris.
- Dorobantu, Marius. 2022. “Artificial Intelligence as a Testing Ground for Key Theological Questions.” *Zygon: Journal of Religion and Science* 57 (4): 984–99.
- Feser, Edward. 2024. *Immortal Souls: A Treatise on Human Nature*. Heusenstamm, Germany: Editiones Scholasticae.
- Fisher, Christopher L. 2010. *Human Significance in Theology and the Natural Sciences: An Ecumenical Perspective with Reference to Pannenberg, Rahner, and Zizioulas*. Eugene, OR: Wipf and Stock.
- Ghaly, Mohammed. 2024. “What Makes Work ‘Good’ in the Age of Artificial Intelligence (AI)? Islamic Perspectives on AI-Mediated Work Ethics.” *The Journal of Ethics* 28 (3): 429–53.
- Griffel, Frank. 2021. *The Formation of Post-Classical Philosophy in Islam*. Oxford: Oxford University Press.
- Haider, Shahbaz, Abdullah Ansar, and Syed Ali Asdaq Naqvi. 2023. “Shī‘ī Imāmī Thought on Existence, Life and Extraterrestrials.” *Theology and Science* 21 (2): 261–72.
- Herzfeld, Noreen, and Ted Peters. 2023. *The Artifice of Intelligence: Divine and Human Relationship in a Robotic Age*. Minneapolis, MN: Fortress Press.
- Iqbal, Muzaffar. 2018. “Islamic Theology Meets ETI.” In *Astrotheology: Science and Theology Meet Extraterrestrial Life*, edited by Ted Peters, Martínez Hewlett, Joshua M. Moritz, and Robert John Russell, 216–27. Eugene, OR: Cascade Books.

- Jalajel, David Solomon. 2009. *Islam and Biological Evolution: Exploring Classical Sources and Methodologies*. Cape Town: University of the Western Cape.
- Karamali, Hamza. 2024. "Theological Information on the Existence of Intelligent Life Outside Our Solar System: Metaphysics, Scripture, and Science." In *Islamic Theology and Extraterrestrial Life: New Frontiers in Science and Religion*, edited by Shoaib Ahmed Malik and Jörg Matthias Determann, 1–24. London: I. B. Tauris.
- Knysch, Alexander. 1999. *Ibn 'Arabi in the Later Islamic Tradition: The Making of a Polemical Image in Medieval Islam*. Albany, NY: State University of New York Press.
- Lennox, John C. 2024. *2084 and the AI Revolution, Updated and Expanded Edition: How Artificial Intelligence Informs Our Future*. Grand Rapids, MI: Zondervan.
- Malik, Shoaib Ahmed. 2021. *Islam and Evolution: Al-Ghazālī and the Modern Evolutionary Paradigm*. London: Routledge.
- . 2024a. "Artificial Intelligence and Islamic Thought: Two Distinctive Challenges." *Journal of Islamic and Muslim Studies* 9 (1): 1–20.
- . 2024b. "Extraterrestrial Intelligent Life and Islamic Thought: Examining Potential Conflicts." In *Islamic Theology and Extraterrestrial Life: New Frontiers in Science and Religion*, edited by Shoaib Ahmed Malik and Jörg Matthias Determann, 139–58. London: I. B. Tauris.
- Malik, Shoaib Ahmed, and David Solomon Jalajel, eds. 2024. *New Frontiers in Islam and Evolution: Scriptures, Scholars, and Societies*. London: Routledge.
- Malik, Shoaib Ahmed, and Jörg Matthias Determann, eds. 2024. *Islamic Theology and Extraterrestrial Life: New Frontiers in Science and Religion*. London: I. B. Tauris.
- Marlow, Louise. 2010. "A Thirteenth-Century Scholar in the Eastern Mediterranean: Sirāj al-Dīn Urmavī, Jurist, Logician, Diplomat." *Al-Masāq: Journal of the Medieval Mediterranean* 22 (3): 279–313.
- Parkyn, Joel L. 2021. *Exotheology: Theological Explorations of Intelligent Extraterrestrial Life*. Eugene, OR: Cascade Books.
- Schwarz, Hans. 2013. *The Human Being: A Theological Anthropology*. Grand Rapids, MI: Eerdmans.
- Setia, 'Adī. 2012. "Fakhr al-Dīn al-Rāzī on Physics and the Nature of the Physical World: A Preliminary Survey." In *Contemporary Issues in Islam and Science*, edited by Muzaffar Iqbal, 125–44. London: Routledge.
- Street, Tony. 2014. "Afdal al-Dīn al-Khūnajī (d. 1248) on the Conversion of Modal Propositions." *Oriens* 42 (3–4): 454–513.
- Swamidass, S. Joshua. 2021. *The Genealogical Adam and Eve: The Surprising Science of Universal Ancestry*. Downers Grove, IL: IVP Academic.
- Vainio, Olli-Pekka. 2018. *Cosmology in Theological Perspective: Understanding Our Place in the Universe*. Grand Rapids, MI: Baker Academic.
- van den Brink, Gijsbert. 2020. *Reformed Theology and Evolutionary Theory*. Grand Rapids, MI: Eerdmans.
- Weintraub, David A. 2014. *Religions and Extraterrestrial Life: How Will We Deal with It?* Dordrecht, the Netherlands: Springer.





## Extraterrestrial Metaphysics in Process Perspective: Implications of Our Anthropocosmic Nature

**Andrew M. Davis**, Program Director, Center for Process Studies, Claremont School of Theology, Los Angeles, CA, USA, [worldloyalty@gmail.com](mailto:worldloyalty@gmail.com)

---

This discussion is an exercise in extraterrestrial metaphysics in both theory and practice. In theory, it stresses the nature of the metaphysical endeavor as consisting in the transplanetary exploration of those abiding and indefatigable features of reality that necessarily obtain in any and all possible worlds. In practice, it is a particular expression of extraterrestrial metaphysics on planet Earth. In dialogue with Alfred North Whitehead, Teilhard de Chardin, Charles Hartshorne, and a variety of others, I elaborate process metaphysics as a fruitful, albeit neglected, species of extraterrestrial metaphysics grounded first and foremost in human experience as an anthropocosmic fact of nature. I argue that Life, Mind, and Value are among the ultimate principles and/or categories belonging to the universe and that these principles always find embodiment within a fluid anthropocosmic ontology conceived as living, mind-full, and value-full. I also articulate some of the relevant contours of a process cosmotheology as it relates to process extraterrestrial metaphysics, including some of the metaphysical riddles it addresses and the extraterrestrial plentitude it justifies via divine benevolence. I conclude by extending an invitation to all terrestrial metaphysicians to become more deliberately extraterrestrial in both theory and practice.

---



## Introduction

Metaphysics is extraterrestrial in at least at two important senses. The first concerns the *nature of metaphysics* as an inquiry into the most general principles of reality, that is, those abiding and indefatigable features that necessarily obtain in any and all possible worlds, no matter what galactic neighborhood they inhabit. While our terrestrial philosophical traditions have argued for millennia as to *what* these final notions are, *that they are* remains a longstanding presupposition. The second sense is related to this and concerns the *terrestrial practice of metaphysics* by our admittedly unique species on a small planet located on the Orion arm of the Milky Way galaxy. After all, should there be even one living perspective elsewhere in the cosmos (and there are likely many), then *we are extraterrestrials doing extraterrestrial metaphysics*. The following discussion aims to be a particular expression of extraterrestrial metaphysics in these two senses.

My philosophical launching point will be the robust, albeit neglected, tradition of process metaphysics, which has largely been ignored in recent philosophical and theological discourse concerning other worlds and extraterrestrial life. As I aim to demonstrate, this neglect is unfortunate and unwarranted. Process philosophy and theology are robust traditions of cosmic reflection that have always been implicitly open to all manner of extraterrestrial life and intelligence. What is more, process philosophers and theologians have not been silent on the topic. Explicit statements even extend from Alfred North Whitehead (1861–1947), Teilhard de Chardin (1881–1955), and Charles Hartshorne (1897–2000), who are widely recognized as the founding pioneers of the modern process tradition. Only recently is this coming to light, however.<sup>1</sup>

As an exercise in extraterrestrial metaphysics, this discussion proceeds with the conviction that process metaphysics has much to offer contemporary philosophical and theological considerations and/or justifications of wide-ranging life in the universe. In dialogue with Whitehead, Teilhard, Hartshorne, and a variety of others, I elaborate process metaphysics as a fruitful species of extraterrestrial metaphysics grounded first and foremost in human experience as an anthropocosmic fact of nature. I argue that Life, Mind, and Value are among the ultimate principles and/or categories belonging to the universe and that they always find embodiment within a fluid anthropocosmic ontology conceived as living, mind-full, and value-full. I also articulate some of the relevant contours of a process cosmotheology as it relates to process extraterrestrial metaphysics, including some of the metaphysical riddles it addresses and the extraterrestrial plentitude it justifies via divine benevolence. I conclude by extending an invitation to all terrestrial metaphysicians to become more deliberately *extraterrestrial* in both theory and practice.

## Humanity as Anthropocosmic Fact of Nature

I begin with a fundamental conviction concerning the starting point of any extraterrestrial metaphysics. This conviction can be put in the following way: human existence and experience is an *exemplification* rather than an exception to the nature and character of the universe and what it is ultimately doing. Despite the reality of our Copernican cosmological de-centering, our *metaphysical re-centering* is required if we are to have any place to begin thinking about the fundamental principles that are operative in the cosmos and its evolution.

It belongs to the heart of process extraterrestrial metaphysics to actively counter what Whitehead calls the “abstraction” (Whitehead 1967a) or “bifurcation” (Whitehead 1964a) of human experience from nature as the *modus operandi* of mechanistic materialism with its affirmation of vacuous (dead) matter as the “senseless, valueless, purposeless” substratum of the cosmos itself (Whitehead 1967a, 17). Despite heroic attempts, such a metaphysical description is wholly incapable of rationalizing not only *our evolution* in this universe but also why our evolution (and that of any life whatsoever) should be *ontologically possible* at all. To invert these philosophical vices, however, is to reaffirm our complete weddedness to cosmic evolution in the form of *revelation*. What I mean is that our experience is a *fact* within nature and therefore revelatory as to the metaphysical depths that find multitudes of cosmological expression *beyond us*: “[F]rom nebulae to stars, from stars to planets, from inorganic matter to life, from life to reason and moral responsibility” (Whitehead 1964b, 212). Despite vast ranges involved in this spectrum of cosmological achievement, there is, for process extraterrestrial metaphysics, a *deeper metaphysical continuity* that ties all together. As Hartshorne (1962, 183–84) summarizes: “[It] would be silly to refuse to take advantage of the fact that in ourselves we have the one individual piece of nature which we know in its individuality from two sides: externally, quantitatively . . . and also internally, qualitatively, by immediate intuition . . . Here is our only complete clue . . . to concrete spatio-temporal reality.”

These convictions aim *not* to repeat the kind of naïve anthropocentrism that all are anxious to avoid. Teilhard (1959, 224) rightly insists, “Man is not the centre of the universe as once we thought in our simplicity, but something much more wonderful . . . Man alone constitutes the last-born, the freshest, the most complicated, the most subtle of all the successive layers of life.” This is not an affirmation of the universe as anthropocentric; rather, it is an affirmation of the human phenomenon as *anthropocosmic*. Both Whitehead and Hartshorne would fully agree with Teilhard (1916) in this regard: “[T]he *human monad*, is, like every monad, *essentially cosmic*.” Indeed, Chinese Confucian scholar Tu Weiming (2010, 7307; b. 1940) articulates this view of humans as “not merely creatures, but co-creators of the cosmic process,” insisting that “[w]e must take responsibility for this anthropocosmic interplay.” It is the affirmation of this *anthropocosmic*

*responsibility*, however, that was abnegated by modern thought and replaced by the metaphysical myth that we are truly alienated from the cosmos.

Central to process extraterrestrial metaphysics, therefore, is the recovery of our *response-ability* to see ourselves as *anthropocosmic facts* of the universe and in no way a deviation from it. In order for metaphysics to be *extraterrestrial*, there must be *metaphysical continuity* between ourselves and the wider stretches of the cosmos we inhabit. Moreover, in countering modern nihilistic convictions that we are cosmologically aimless, we find that this anthropocosmic recovery supports not only our *longing to be* at home in the universe but also our *be-longing* to it. What this involves, I submit, is a *fundamental faith* in nature and what it expresses through us. “The faith in the order of nature which has made possible the growth of science is a particular example of a deeper faith,” Whitehead (1967a, 18) reminds us, “It springs from direct inspection of the nature of things as disclosed in our own immediate experience . . . To experience this faith is to know that in being ourselves we are more than ourselves: to know that our experience, dim and fragmentary as it is, yet sounds the utmost depths of reality.” Extraterrestrial metaphysics is based in a *metaphysical faith* that we express the very depths of reality, and it finds its purpose in the tentative identification of these depths and their imaginative extension *beyond Earth*.

### Life and Living Ontology

Extraterrestrial metaphysics does not deal with certainties but with what Whitehead ([1929] 1978, 5) calls “imaginative generalization” from concrete experience. We should admit that there are no immediately clear and obvious answers to what the “utmost depths of reality” are in terms of metaphysical primacy. “Metaphysical categories are not dogmatic statements of the obvious,” Whitehead ([1929] 1978, 8) states, “they are tentative formulations of the ultimate generalities [of nature].” To say that metaphysics is *tentative* is to presuppose its *revisability* in dialogue with incoming data from the best of our terrestrial scientific disciplines. In striving for *consistency* with these disciplines, it must also be *adequate* to human experience. It is a matter of fact, however, that the methodological omission of human experience has been one of the most pervasive “blind spots” in the development of modern science and philosophy (Frank et al. 2024). After all, a dead mechanistic-materialistic universe is precisely the kind of universe that emerges when *living* human experience is taken out of it. A *method* became a *metaphysics*, and our continuity with the cosmos was broken.

The immediate proclamation of our anthropocosmic experience is that we are *living* and not dead. Thus, *Life*—its very concept and possibility—emerges as a candidate as to the “utmost depths” belonging to extraterrestrial metaphysics. This claim will naturally be met with skepticism. It is worth noting, however, that such skepticism remains historically in the minority. Indeed, a vital shift

took place from the *priority of life* to *priority of death* in the transitional march from ancient to modern cosmological conceptions. As emphasized by both Robert Rosen (1934–98) and Hans Jonas (1903–93), this involved a *metaphysical transition* embodied in a march toward *death*. As Rosen (1991, 11) states, “Ironically, the idea that life requires explanation is a relatively new one. To the ancients, life simply was; it was a given; a first principle in terms of which other things had to be explained. Life vanished as an explanatory principle with the rise of mechanics.” The vanishing of life, according to Jonas (1966, 9), occurred by means of its *negation* such that death became the reigning principle: “Modern thought . . . is placed in exactly the opposite theoretic situation [of the ancients]. Death is the natural thing, life the problem . . . Our thinking today is under the ontology of death . . . a universe alien to life and indifferent in its material laws.”<sup>2</sup> The problem, of course, is that a universe that is truly “alien to life” is not one in which you would expect to find *any alien life at all*. It is far from obvious that an “ontology of death” would ever produce even one instance of life; nor can it, in principle, ever harbor its *possibility*. Nevertheless, we find that both life and its possibility are *actual* in us as anthropocosmic expressions of the universe.

It seems plausible to claim that if the *possibility of life* belongs to the universe, then the *actuality of life* must be realized somewhere (otherwise we might question if it is *truly possible*). We might further claim that the possibility of life would not belong to the universe *unless* the universe was in the business of bringing life into being (at least once). We know this has occurred on our planet, and there is nothing in the nature of possibility that restricts such realization to only one planetary occurrence. From the perspective of extraterrestrial metaphysics, the fact that the universe harbors the *very possibility of life* is already a philosophical context from which to speak to what astronomer and former NASA chief historian Steven J. Dick (b. 1949) calls the “biological universe.” “The central assumptions of the biological universe are that planetary systems are common,” Dick states, “that life originates wherever conditions are favorable” (2000, 191).<sup>3</sup> Indeed, if life is a “cosmic imperative,” as Christian de Duve (1917–2013) argued, then we expect it to emerge and re-emerge where it is possible to do so (2011). Extraterrestrial metaphysics pushes *still deeper*, however. Beneath the multitude of real conditions that make life possible on any particular planetary habitat, is the *pure possibility of life itself* which belongs inexorably to the nature of things. This fact is far from insignificant. When taken seriously, it requires the inversion of the “ontology of death” completely. “Life startles us at first; it seems somewhat beyond the law, somewhat contrary to nature, somewhat like a transitory counteraction to the dark eternal fountains [of death],” says the Cretan poet and philosopher Nikos Kazantzakis (1883–1957), “but deeper down we feel that Life is itself without beginning, an indestructible force of the Universe” (1960, 41).<sup>4</sup>

Where Whitehead developed a “philosophy of organism” as a “atomic theory of actuality” (1987, 27), Teilhard developed a “hyper-Physics” or “hyper-Biology” that is “both organic and atomic” in nature (1947). Both men rejected clear divides between living and nonliving entities, with Whitehead stressing that there is “no absolute gap between ‘living’ and ‘non-living’” organic systems (1987, 102) and Teilhard admitting that at atomic depths “all differences seem to become tenuous” so that “we can no more fix an absolute zero in time (as was once supposed) for the advent of life” (1959, 77). For both men, it can be said that prior to the emergence of what we recognize as highly evolved “living” organisms, there are still-more-fundamental organisms that exhibit active evolution, dynamic response, and purposive internal relations to their environment.

Experience seems to demonstrate that organic systems may be “living” or “non-living,” but “non-living” hardly means *dead*. “Non-life” or what Teilhard calls “pre-life” might be said to be the *limit case* of life, but it may be quite wrong to insist it is *lifeless*. “In a coherent perspective of the world,” Teilhard (1959, 57) states, “life inevitably assumes a ‘pre-life’ for as far back before it as the eye can see,” and is present in an elementary form even at the lowest level of nature. Speaking within the context of Whiteheadian ontology, Lewis Ford (1933–2018) stresses life as a *degree concept*: “The decisive difference between living and [non-living] matter . . . is the difference between novel and habitual response. . . This may well be a matter of degree, such that what we designate as living may simply be those instances where novelty dominates over habit” (Davis 2023, 166). Similarly, for Charles Sanders Peirce (1839–1914), “[w]hat we call dead matter is not completely dead” but rather (anticipating the next section of this article) “is merely mind-bound with habits. It still retains the element of diversification; and in that diversification, there is life” (Henning 2024, 253). As for Josiah Royce (1855–1916): “[W]e ought not speak of dead nature. We have a right only to speak of uncommunicative nature” (Royce 1895, 586).

Each of these perspectives resonates with Whitehead’s intuition that “an organism [can be considered] ‘alive’ when in some measure its reactions are inexplicable by any tradition of pure physical inheritance” (Whitehead 1987, 104). This novel reactionary ability however, so highly expressed in human life, is *never wholly absent* even at the far side of his primitive ontology: “Life implies the absolute, individual self-enjoyment arising out of [a] process of appropriation,” he states. Indeed, it is this “individual act of immediate self-enjoyment” which is the active heart of his ontology (Whitehead 1968, 150–51). As he insists, “the root principles of life are, in some lowly form, exemplified in all types of physical existence” (Whitehead 1929, 16–17).

What this entails, I submit, is that for process extraterrestrial metaphysics, the atomic processes of nature are more accurately conceived as *living* rather than dead. The fundamental organisms of Whitehead’s (1968, 150–52) ontology can

be said to be *living events* whose embodiment of life is grounded in the temporal dynamics of their individual and collective becoming, response and relationality to their universal environment. As a hallmark of process metaphysics, dynamic becoming is more fundamental than static being, and it is these spatiotemporal events—what Whitehead terms “actual occasions” or “actual entities”—that are the living ontological sparks of his evolutionary cosmology.

In holding to “a world that is *being born* instead of a world that *is*,” Teilhard (2004, 80) in no way reserves these statements only to higher achievements of evolution; rather, they must retrospectively apply to the very depths of his ontology. *Cosmogogenesis* in this way presupposes a deeper *ontogenesis* such that the universe is always *giving birth*. He offers a similar vision to Whitehead where “duration permeates the essence of every being” so that “[e]very particle of reality, instead of constituting an approximate point in itself, extends from the previous fragment to the next in an invisible thread running back to infinity” (Teilhard 2004). That this process is more accurately conceived as *living* is supported by Teilhard’s (1947) conviction that “Life is not an epi-phenomenon in the material universe, but the central phenomenon of evolution.” Indeed, that life is “a universal function of the cosmos” constitutes one of the original thematic points of his scientific work (Teilhard 1959, 303).

For both Whitehead and Teilhard, therefore, it can be said that *Life* signifies an ultimate principle that is always embodied in a processual ontology. It is this *living ontology* that constitutes the antecedent conditions of all higher life achieved throughout cosmogenesis. For both men, moreover, this is not insignificant when considering what evolution is ultimately about. We might put it in the following way: where life in a primitive processual form belongs inexorably to the universe as such, *there is no meaning to evolution beyond the higher achievement, complexification, and intensification of life*. This has been demonstrated on our planet, and it will necessarily occur on other planets where conditions are ripe. While Teilhard (2002, 232) insists that “we have no idea either of the chemistry or the morphology peculiar to the various extra-terrestrial forms of life,” he nevertheless speculates as to the prevalence of hominized “extra-terrestrial ‘mankinds’” saying, “[a]t an average of (at least) one human race per galaxy, that makes a total of millions of human races dotted all over the heavens.” Whitehead too holds that “the forms of life which might be lived on other stars millions of light-years away and millions hence could be infinite and admit every possibility that the imagination could conceive” (Price 2001, 280). Both men are joined by Hartshorne (1967, 16), who rightly asserts that we have “no right to assume” there are no “other inhabited planets.” He himself was strongly inclined to believe that there were (Miethe 1987, 142). These convictions are home to a process extraterrestrial metaphysics where life does not evolve from lifelessness and where living activity belongs to the ontological depths of a universe that produces life. Still, Life is not the only

metaphysical category belonging to the “utmost depths of reality” for process extraterrestrial metaphysics.

## Mind and Mind-Full Ontology

There is no metaphysical reason to think that mind is a foreign invader into the cosmos any more than life; nor is there any reason to think that mind on planet Earth is somehow ultimately lonesome. Such a conviction is an unjustified nod toward a kind of *cosmological solipsism* that, as Teilhard (2002, 43) states, “reminds us of the philosopher who claims to reduce the whole of the real to his own consciousness, so exclusively as to deny true existence to other men.” In speaking of our planet as “insignificant: a mote in the cathedral of space, barely visible even from our neighboring planets,” Philip Ball (2022; b. 1962) has recently posed the following question: “Is it conceivable that all the mindedness that exists in the universe is concentrated into this infinitesimal volume?” He answers: “Intuitively that makes no sense, although no one can exclude the possibility” (Ball 2002). I would submit, however, that this slim possibility can in fact be excluded based upon the much larger *space of possible minds* to which Ball himself assents. Ball (2022) remains humble: “Might it then be equally true that all we can say about mind based on our experience on Earth is similarly parochial: That the Space of Possible Minds is equally vast and unknown, and we await a Copernican revolution to open our eyes to it?” Alternatively, it may be the case that “the Mindspace” we have already begun to explore on this planet “is more akin to the Periodic Table of the chemical elements, a kind of universal map of what there is and can be?” For Ball (2022, 333), “the concept of a Mindspace” is fruitful in offering a framework for thinking about kinds of mind that might exist beyond the edge of our world.” Indeed, it is *fruitful* because it is *ontologically real*: the space of possible minds is not a fiction. It was there in the nature of things before any particular mind conceived it.

Philosophical cosmologist George F. R. Ellis (b. 1939) has clarified further that *internal* to the space of possible minds is also the infinite possibility space for what highly evolved minds do, namely, *think thoughts*. The possibility space for thoughts “itself was there at the start of the universe before life began,” Ellis insists, “and will be there in the far future when all life has died out” (Davis, forthcoming, 2026). He reminds us: “You can’t think a thought unless it is possible to think it!—and this possibility space embodies that far from trivial fact” (Ellis, forthcoming, 2026). For extraterrestrial metaphysics, this fact is non-trivial because where there is *possibility of mind*, there can be *actuality of mind*. We can again hold the position that the possibility of mind would not belong to the universe *unless* the universe was in the business of bringing about not just minds but *conscious thinking minds* (at least once). A truly bewildering variety of minds have found expression on our planet, and there is again nothing in the space of possible minds that requires cosmological solipsism.

For process extraterrestrial metaphysics, it is one thing to ontologically affirm the very possibility of mind and another to conceive theoretically how mind emerges, advances, and complexifies into consciousness over cosmological evolution. Process philosophy is not alone in this. It belongs to the ideals of science and metaphysics alike to seek *continuity* rather than discontinuity throughout an evolutionary cosmos. Arguably, however, nowhere has the ideal of continuity been so travestied than in the philosophy of mind, especially when caged within a reductive materialist (and thus *mind-less*) metaphysics. It is this metaphysics, we must remember, that *produces* the so-called “hard problem” of how it is that qualitative states of conscious experience can emerge from purely quantitative physical states wholly devoid of experience. Here, we can agree with William James’s (1842–1910) claim that the “demand for continuity has, over large tracts of science, proved itself to possess true prophetic power.” But this prophetic power was not honored with respect to the origin of consciousness. James (1890, 148) continues: “We ought therefore ourselves sincerely to try every possible mode of conceiving the dawn of consciousness so that it may *not* appear equivalent to the irruption into the universe of a new nature, non-existent until then.” A reductive materialist metaphysics, however, admits precisely the kind of *mental interruption* James advises against.

For process extraterrestrial metaphysics, the vital place to start conceiving “the dawn of consciousness” is the critique of that “scientific reasoning,” which, as Whitehead (1968, 156) states, unjustly presupposes “that mental functionings are not properly part of nature.” The consequence of this presupposition is that “all those mental antecedents which mankind habitually presuppose as effective in guiding cosmological functioning” are simply ignored (Whitehead 1968, 156). Put differently, the evolution of mind is rendered wholly mysterious when our anthropocosmic experience is disregarded. As Whitehead (1968, 156) puts it, “this sharp division between mentality and nature has no ground in our fundamental observation. We find ourselves living within nature . . . I conclude that we should conceive mental operations as among the factors which make up the constituents of nature.”

With reference to Ball’s comment above, it is here that process extraterrestrial metaphysics can indeed point to a *post-materialistic Copernican revolution* with respect to the extent of mind in nature. This revolution is now in full swing. Although once ridiculed, varieties of panpsychism are now included as mainstream options for accounting for the origin and advent of consciousness in the universe.<sup>5</sup> It is significant that a general consensus is now emerging as to the depth of consciousness in nature. On April 19, 2024, for example, thirty-eight researchers from a variety of life science fields, among them several philosophers and historians of science, signed “The New York Declaration on Animal Consciousness,” which affirmed “strong scientific support for attributions of conscious experience” and a “realistic possibility” of such

experience in insects, octopuses, crustaceans, fish, and other creatures (Falk 2024). Such a position, however, was already pre-figured at a far lower level, with evidence showing that even bacteria make decisions and have memory.<sup>6</sup> Just how far down does mind extend? Based upon our anthropocosmic continuity with nature, process philosophers and theologians have long anticipated the current revival in panpsychism.<sup>7</sup>

It is worth recalling that Whitehead's "philosophy of organism" emerged in light of the fact that "matter" as inert and vacuous in nature had essentially melted into something far more fluid and active in nature. As he stresses, Newtonian physics was based upon "the individuality of each bit of matter," but "bit by bit" this concept was "given away, or dissolved, by the advance of modern physics" (Whitehead 1967b, 156–57). It was clear for Whitehead (1967a, 36): once you get rid of matter and the illusion of its "undifferentiated endurance," there is no good reason "to provide another more subtle stuff" to take its place. Matter had liquified into energetic activity, and he found this deeply suggestive. For Whitehead, however, even the physicist's concept of "energy" was an abstraction from a more fundamental ontological activity.

We saw earlier that Whitehead conceives this activity in terms of the living becoming of events. These events he more fully describes as "actual occasions of experience." "Actual entities"—also termed 'actual occasions'—are the final real things of which the world is made up," he states (Whitehead [1929] 1978, 18). "There is no going behind actual entities to find something more real . . . [T]he final facts are, all alike, actual entities: and these actual entities are *drops of experience, complex and interdependent*" (Whitehead [1929] 1978, 18; emphasis added). Indeed, Whitehead holds to what David Ray Griffin (1939–2022) calls a "panexperientialist" ontology where mind in the form of becoming experience descends all the way down to the lowest level of nature (Griffin 1998, 2002). The uniqueness of Whitehead's panexperientialism in particular consists in its *psycho-physical dipolarity*, wherein every event emerges from the past to the future through the receptive and anticipatory functions of both a *physical* and *mental* pole. With the physical pole, the event receives the past (via efficient causation) and with the mental pole, the event anticipates the future and "decides" (via final causation) among available possibilities for its own becoming. For Whitehead, therefore, both the physical and the mental *belong together* in what he terms the "concrecence" (becoming concrete) of each occasion of experience. As he stresses, it is *mind in nature* that constitutes the very basis of *novelty* such that if nature were finally mind-less, nothing truly novel could occur in evolution. "[M]ental experience is the organ of novelty," he states, "the urge beyond" in all finite events as they "vivify the massive physical fact, which is repetitive, with the novelties which become" (Whitehead 1929, 26–27). For Whitehead, it is mind that *releases* nature from its determination by an antecedent past.

According to Teilhard (1959, 56), co-extensive with the *without* of nature is also a *within* so that nature shows “a double aspect to its structure” where exteriority and interiority ascend the evolutionary scale together. Against materialist and idealists alike, he affirms with Whitehead a form of *dual aspect monism* where mind and matter are “the two aspects or connected parts of one and the same phenomenon” (Teilhard 1959, 61).<sup>8</sup> While Teilhard (1959, 57) will often use the language of “consciousness” for the domain of psyche at very low levels of reality, he clarifies that this term “is taken in its widest sense to indicate every kind of psychism, from the most rudimentary forms of interior perception imaginable to the human phenomenon of reflective thought.” In making this important distinction, Teilhard guards himself against common (although often shortsighted) critiques of panpsychism as the incredulous position that everything is simply conscious. Using the notion of “experience” rather than “consciousness,” Whitehead ([1929] 1978, 53) is better positioned to avoid this critique for, as he stresses, “consciousness presupposes experience and not experience consciousness.” Thus, *experience* goes all the way down in nature, but consciousness does *not*. For both men, “consciousness” is a late emergent phase in the evolution of wildly complex “living” organisms involving incredibly layered synchronizations of mental activity that blossom into what Teilhard (1959, 57) calls “reflective thought” and Whitehead (1967a, 144) the “function of *knowing*.” The evolutionary lateness of consciousness notwithstanding, in the primitive form of experiential activity, the place of mind in nature remains *irreducible*.

As discussion and acceptance of various forms of panpsychism and panexperientialism continue to expand, it is noteworthy that the implications beyond Earth have yet to be adequately explored. Here again the process philosophical tradition has already anticipated the importance of mind-full ontology for extraterrestrial metaphysics. Charles Hartshorne (2017, 256) recognized that a panpsychist view—what he called “psychicalism”—“implies the eternal existence of finite minds of some kind in the universe,” adding that one of the many ways this might be verified is “by the discovery of other inhabited planets.” Indeed, forty years before Thomas Nagel (1979; b. 1937) famously asked what it is like to be a bat, Hartshorne not only raised the same question of all organisms on Earth but also pointed to the viability of this question *beyond Earth*.<sup>9</sup> What is it *like* to be an extraterrestrial?

Similarly, for Teilhard (1974, 231), cosmogenesis presupposes a deeper ontogenesis, which is *noogenesis*, and he recognizes the transplanetary implications: “[O]ur minds cannot resist the inevitable conclusion that were we, by chance, to possess plates that were sensitive to the specific radiation of the ‘noospheres’ scatted throughout space, it would be *practically certain* that what we saw registered on them would be a cloud of thinking stars.” Whitehead too recognizes that a living and mind-full ontology carries the imagination far beyond Earth:

I see no reason to suppose that the air about us and the heavenly spaces over us may not be peopled by intelligences, or entities, or forms of life, as unintelligible to us as we are to the insects. In the scale of size, the difference between the insects and us is nothing to that between us and the heavenly bodies; and—who knows?—perhaps the nebulae are sentient entities and what we can see of them are their bodies. That is not more inconceivable than that there may be insects who have acute minds, though . . . their outlook would be narrower than ours. (Price 2001, 233–34)

For Whitehead, this vast spectrum runs from the heavenly magnitudes above us to the insects below us and the air that we breathe. “[W]e are part of an infinite series,” he insists, “and since the series is infinite, we had better take account of that fact, and admit into our thinking these infinite possibilities” (Price 2001, 233–34).

As with Life, then, for process extraterrestrial metaphysics, it can be said that *Mind* signifies an ultimate principle that is always embodied in a mind-full ontology. It is this mind-full ontology that constitutes the antecedent conditions of all higher mind achieved throughout cosmogenesis, including the remarkable advent of conscious thought and reflection at high levels of evolutionary complexity. Here again it is worth noting the importance of this when considering the nature and workings of evolution. Where mind belongs inexorably to nature, there is no meaning to evolution beyond the higher achievement, complexification, and intensification of mental experience and, thus, the novel achievement of conscious thought throughout the universe. Along with life, process extraterrestrial metaphysics insists that mind does not evolve from mindlessness; rather, mental activity belongs to the ontological depths of a universe that produces mind. Both life and mind are ontologically related and rise together in the drama of cosmological evolution. It is in this sense that not merely “panpsychism” or “panexperientialism” can be affirmed by process extraterrestrial metaphysics but also “biopsychism,” wherein life and mind are tangled concomitants that are never wholly absent from the deepest level of reality.<sup>10</sup> Still, Life and Mind do not exhaust the “utmost depths” embodied in process extraterrestrial ontology.

### **Value and Value-Full Ontology**

Virtually every debate concerning value on Earth can also be extended *beyond Earth*. The fact that these debates *exist* is evidence enough that it belongs to life and mind to *respond to value*—its possibility, nature, and character—and its many rational, ethical, and aesthetic forms. That we experience the domain of value as anthropocosmic expressions of the universe must be an essential focal point for any extraterrestrial metaphysics. In recent years, various proposals have emerged offering different considerations of value for the space age, whether

“astroethics,” “cosmocentric ethics,” “astropolicy,” or the wider endeavors I have termed “exo-axiology.”<sup>11</sup> As shown in fresh calls for the transplanetary exploration of value, the question of axiology and its relationship to life and mind remain an important part of current discussions. It is significant that these “calls” are also indebted to process metaphysics.<sup>12</sup>

From the perspective of process extraterrestrial metaphysics, there is no escape from real domains of value in the universe. Truth, Goodness, and Beauty, whether presupposed in the *rational* endeavors of science, the *ethical* endeavors of morality, or the *aesthetic* endeavors of art and creativity, are not clever inventions on our planet alone but dis-coverings in our anthropocosmic experience of deeper qualitative realms of possibility that hibernate in the nature of things. For example, in saying that “scientific interest is merely a variant form of religious interest,” Whitehead ([1929] 1978, 16) points to “the scientific devotion to ‘truth,’ as an ideal” as confirming this statement. While he certainly agrees that, in principle, “[j]udgments of worth are no part of the texture of physical science,” he does insist that they “are part of the motive of its production” (Whitehead 1967c, 151). Indeed, “without judgments of value there would have been no science” (Whitehead 1967c, 151). Truth in this regard is an utmost value presupposed by scientific efforts to understand.

One of Whitehead’s most adamant critiques of the “senseless, valueless, purposeless” metaphysics of mechanistic materialism is its divorcing of fact from value. “We shall never elaborate an explanatory metaphysics unless we abolish this notion of valueless, vacuous existence,” he states (Whitehead 1929, 24). He instead praises the poetic response offered by nature poets like Wordsworth, Shelley, and Coleridge to “lifeless” nature as portrayed by “scientific naturalism.” “Remembering the poetic rendering of our concrete experience, we see at once that the element of value, of being valuable, of having value, of being an end in itself, of being something which is for its own sake, must not be omitted in any account of an event as the most concrete actual something,” he states (Whitehead 1967a, 93). “‘Value’ is the word I use for the intrinsic reality of an event. Value is an element which permeates through and through the poetic view of nature” (Whitehead 1967a, 93).

Whitehead shares this poetic view. The most fundamental sparks of life and mind at the base of reality (actual occasions) are not valueless but valuable *in and for themselves*. They are permeated with *intrinsic value* in their very reality of becoming. The world bears witness to “the becomingness of real values” (Whitehead 2021, 52) such that “[e]xistence, in its own nature, is the upholding of value-intensity” (Whitehead 1968, 111). The evolutionary rise of the world process is conceived as a *value process* presupposing real *standards of value* and also *possibilities of achievable value* resident in the womb of nature. Just as life and mind go all the way down in nature, so also does *value* for process extraterrestrial ontology. It is in this sense that one can speak not

only of “panexperientialism” but also of what Victor Lowe (1990, 168, 270; 1907–1988) calls “pan-valuism.” As Nathaniel Barrett (2023, 345) has recently argued, Whitehead’s panexperientialism is also a “pan-axiological view of nature.” Indeed, where the very becoming into being (concrecence) of every occasion is a *living valuational process*, where possibilities of value are experientially felt (prehended), actualized, and then transferred on to the birth of subsequent occasions, Philip Rose (2001, 3) is right to say that “to be” for Whitehead “is to be the source of values given and the centre of values felt.” Far from maintaining the modern divorce of fact from value, Whitehead (1968, 111) actively mends it: “Everything has some value for itself, for others, and for the whole. This characterizes the meaning of actuality.” The rise of the evolutionary process shows definitively that value is inherent in the *making of fact*, and fact is the *attainment of value*.

It belongs to process extraterrestrial metaphysics in the tradition of Whitehead and Hartshorne to affirm *aesthetic value* as the widest and most inclusive form of value applicable to the universe at all scales. All order is *aesthetic order*, even the order exhibited in the “laws” of nature and the presupposed formational capacities of our world. Hartshorne (1991, 590) states: “The most general principles of harmony and intensity are more ultimate than the laws of physics and are the reasons for there being natural laws.” Put differently, the laws of nature are *already* an expression of deeper aesthetic principles of harmony, intensity, and coherence. These statements by Hartshorne echo Whitehead’s (1926, 91–92) own conviction that “the foundations of the world” are grounded in the “aesthetic order” and that the world itself “is the outcome of aesthetic order.” As Whitehead (1926, 104) underscores, this order is *prior* to the world itself: “It is not the case that there is an actual world which accidentally happens to exhibit an order of nature. There is an actual world because there is an order in nature. If there were no order, there would be no world. Also since there is a world, we know that there is an order.” For both Whitehead and Hartshorne, the nature of this order—of any order—is *aesthetic*.

Just as consciousness dawns through compounding synchronizations of highly evolved occasions of experience, so too does moral value dawn in the context of highly evolved forms of aesthetic value (namely conscious life). “[T]he moral order is merely certain aspects of the aesthetic order,” Whitehead (1926, 91) states. That aesthetic value is *deeper* than moral value is not a subordination of morality to aesthetics; rather, it is a statement expressing the *evolutionary origins and roots* of morality. While there are primitive stages of the universe where moral value is simply not applicable for both Whitehead and Hartshorne, there is *no* stage of the universe where aesthetic value is not applicable. Whitehead (1929, 19), for example, speaks of some early epoch of the universe “in which the dominant trend was the formation of protons, electrons, molecules and stars.” While ethical or moral activity makes little sense at this level, aesthetic

activity and achievement are replete, for protons, electrons, molecules, and stars are themselves *achievements* of harmony, intensity, and coherence in the universe.

Thus, for process extraterrestrial metaphysics, moral order *presupposes* aesthetic order. All levels of life and experience exhibit hierarchies of aesthetic value attainment, and it is only within this context that morality can genuinely arise. Put differently, the high-grade “ethical” and “moral” concerns of conscious experience are awakened evolutionary expressions of the primordially of aesthetic value experience as it pervades the universe. “With the emergence of conscious alternatives of action ethics becomes possible” Lewis Ford states, “for now, some alternatives may be experienced as better and others as worse” (Davis 2023, 168). According to Whitehead (1968, 1), persistent intuitions like better, worse, “importance,” and ideals are in fact “ultimate notions” that haunt life and mind in the cosmos. We have awoken to these ultimate ideals on our planet, and so too will on any other planet where life meets or exceeds our conscious capacities. David Ray Griffin (2014, 88) thus rightly comments, “On other planets with the conditions for life to emerge and to evolve for many billions of years, we should expect there to be some with creatures that, no matter how different in physical constitution and appearance, would share some of our capacities, such as those for mathematics, music and morality, or, more generally, truth, beauty and goodness.”

To hold that morality can and will arise on other planets for process extraterrestrial metaphysics is *not* to insist that morality or ethics can be rigidly codified in ways that are universally applicable to all beings in the cosmos. Whitehead, in fact, strongly rejects this, saying “the notion that there are certain regulative notions, sufficiently precise to prescribe details of conduct, for all reasonable beings on Earth, in every planet, and in every star-system, is at once to be put aside.” Such an idea is based in the conviction that there is “one type of perfection at which the Universe aims.” In denying this, Whitehead (1967b, 291) insists that “[a]ll realization of the Good is finite, and necessarily excludes certain other types.” We can agree with Ford in this regard: “What goodness means for other intelligent beings may well be beyond the bounds of our imagination, but it might be just possible to define a general criterion underlying all concrete embodiments” (Davis 2023, 168). For Whitehead, Hartshorne, and Ford alike, this “general criterion” has to do with the expansion of freedom and intensity toward beautiful ends.

In the context of recent philosophy of cosmology and astrobiology,<sup>13</sup> talk of the “anthropic cosmological principle” can be misleading if thought to indicate that the fundamental constants of the universe—with their truly striking limitations—are such as to produce *human* life and intelligence. This does risk a kind of anthropocentrism that is inappropriate in the context of the current discussion. For process extraterrestrial metaphysics, it is more appropriate to speak of what John F. Haught (2000, 128; b. 1942) has called the “aesthetic

cosmological principle.” This principle insists upon the universal tendency toward the creation of value and beauty, of which human life and mind on this planet are but one possible expression alongside a myriad of others in the universe. Haught (2017, 140) puts it succinctly: “The aim toward aesthetic intensity is the central theme of the cosmic story, and subjectivity is the most intense concentration of the cosmic aim toward beauty.” In saying this, Haught has merely restated Whitehead’s (1967b, 265) own fundamental refrain: “The teleology of the Universe is directed to the production of beauty.”

For process extraterrestrial metaphysics, therefore, it can be said that *Value* too signifies an ultimate principle belonging to the “utmost depths of reality,” one that is always expressed in a living and mind-full process ontology. Where there is life and mind, there is also value as experienced and value as achieved. As with primordial possibilities of Life and Mind, so too are there primordial possibilities of Value associated with them. This haunting fact should again alter our understanding of the means and meanings of cosmological evolution. Where value belongs to an evolutionary ontology of life and mind, there is no meaning to evolution beyond the higher achievement and intensification of value. Such value has been achieved in human beings and the myriad other forms of life and intelligence on this planet, and it will be also achieved on other planets in ways unimaginable. As Thomas Nagel (2012, 119–20) has queried: “[W]ho knows what unimaginable forms of life and their associated value exist elsewhere in the universe, unrelated to us by common descent?” While the imagination runs wild, for process extraterrestrial metaphysics, Truth, Goodness, and Beauty are hardly confined to a small planet on the Orion arm of the Milky Way galaxy.

### Contours of Process–Relational Cosmotheology

In broaching the kind of theological vision engendered by process extraterrestrial metaphysics, it serves us to remember just how tangled metaphysics, cosmology, and theology have been in the Western intellectual tradition. Augustine (354–430) imbibed and transformed the metaphysics of Plato (428–348 BCE) and Plotinus (204–70) to formulate his own theological insights in resonance with fourth-century cosmology. Similarly, Thomas Aquinas (1225–74) mined the metaphysics of Aristotle (384–22) to form the foundations of the scholastic theological tradition in resonance with thirteenth-century cosmology. It is noteworthy today that Aristotelian, Platonic, Thomistic, and other metaphysical framings continue to undergird a variety of astro-, exo-, and comotheological proposals exploring the relation of God to a vast and unfolding cosmology, unknown to the ancients.<sup>14</sup>

For process philosophers and theologians, it remains an ongoing debate as to *which* metaphysical vision best situates cosmological evolution as the grand metanarrative of the universe and, concomitantly, what both require as to our

understanding of divine existence and activity. Underscoring the paradigm shift of the new cosmology, Whitehead (1964, 211) stresses, “[O]n a grand scale, our cosmology discloses a process of overpowering change . . . We can no longer conceive of existence under the metaphor of a permanent depth of ocean with its surface faintly troubled by transient waves. There is an urge in things which carries the world far beyond its ancient conditions.” Similarly, Teilhard (2004, 261) is adamant that we “must of necessity proceed from the fundamental change of view which since the sixteenth century has been steadily exploding and rendering fluid what had seemed to be the ultimate stability—our concept of the world itself. To our clearer vision the universe is no longer an Order but a Process. The cosmos has become a Cosmogogenesis.”

For process cosmotheology, theology cannot remain unchanged by these new revelations of cosmological evolution. Following Whitehead, process philosophers and theologians have stressed God’s relationship to the cosmic process as *complementary* rather than contradictory. “In the first place,” Whitehead ([1929] 1978, 343) famously states, “God is not to be treated as an exception to all metaphysical principles, invoked to save their collapse. He is their chief exemplification.” The radicalism of this statement for extraterrestrial metaphysics is that God too is to be understood in terms of embodying *the same metaphysical depths* as the cosmos, albeit *preeminently*. Rather than supernaturally establishing them (and thereby standing exterior to them), God is their *embodied context and culmination*. It is this move for Whitehead that categorically bars so-called “supernatural action” from “outside” the world and makes divine activity part and parcel of the world’s normal, natural processes and never their competition or interruption. “God’s role is not the combat of productive force with productive force, or destructive force with destructive force,” Whitehead ([1929] 1978, 346) states; rather, following Plato, who made “one of greatest intellectual discovery in the history of religion,” the “divine element” in the universe is to be understood “as a persuasive agency and not as a coercive agency” (Whitehead 1967b, 167). For Whitehead (1967b, 130), the world does not submit to “the imposed will of a transcendent God”; rather, “the existents in nature are sharing in the nature of the immanent God.” Competitive and coercive power is thus *metaphysically denied* in Whitehead’s cosmotheology.

This is not insignificant for extraterrestrial metaphysics. As David Ray Griffin has rightly argued, any philosophical theology must explain why our world—and the vast plurality of worlds—have come about through an inconceivably long evolutionary process: “This question is difficult for traditional theism, given its doctrine of omnipotence based on creation *ex nihilo*, according to which there was no necessity for our world to have come about through a long, slow evolutionary process.” Griffin (2001, 212–13) also stresses that this question is equally “difficult for atheism given its view that there is no purpose behind the evolutionary process, which makes the upward trend wholly mysterious.”

Process cosmotheology responds to both quandaries: the cosmic evolutionary trend has been *upward* because the divine impetus always seeks *richer* achievement of what is ontologically implicit, namely, life, mind, and value; and this process has taken so inconceivably long because divine power is *always persuasive* and never coercive in nature.<sup>15</sup>

Teilhard (1974) recognized clearly that “the organic vastness of the universe obliges us to rethink the notion of divine omni-sufficiency” and “make a further adjustment in our thought as affects the idea of *omnipotence*.” Underscoring Griffin’s point, Teilhard stresses that in traditional theological conception, God was able to create (1) instantaneously, (2) isolated beings, (3) as often as he pleased. Yet, he stresses the dubiousness of these convictions in light of a truly evolutionary cosmos: “We are now beginning to see that creation can have only one object: *a universe*; that (observed *ab intra*) creation can be effected only by an *evolutive process*” (Teilhard 1974). What is more, for Teilhard (1974, 178–79), this “recognition that ‘God cannot create except evolutively provides a radical solution . . . to the problem of evil,” which he conceives (with both Whitehead and Hartshorne) as “a direct ‘effect’ of evolution.”

Whitehead shows remarkable similarity to Teilhard on these points. He further emphasizes the incoherence of traditional affirmations of omniscience and omnipotence in light of evil and imperfection, and the collaborative nature of the God–world relationship toward the achievement of risky, but worthwhile, ends. “It was a mistake . . . to conceive of God as creating the world from the outside, at one go,” he states. “An all-foreseeing Creator, who could have made the world as we find it . . . Foreseeing everything and yet putting into it all sorts of imperfections.” Rejecting this, Whitehead stresses: “There is a general tendency in the universe to produce worth-while things, and moments come when we can work with it and it can work through us. But that tendency in the universe to produce worth-while things is by no means omnipotent” (Price 2001, 370). As Hartshorne (1984) provocatively put it: omnipotence is a “theological mistake.”

For process cosmotheology, therefore, divine power and knowledge are re-thought based upon the *general revelation* inherent in the new cosmology. God’s power, in particular, can be conceived as God’s indefatigable patience that persuades the cosmos to reach its highest possibilities. In omnisciently knowing these possibilities *as possibilities* (not actualities), God offers the world the means for their achievement; yet, as befits a truly creative and relational cosmos, God must *await* the world’s choice. It is in this sense that Lewis Ford speaks of “God’s cosmological function” as consisting in the provision of that “impetus toward greater complexification we discover operative throughout the natural order.” Ford rightly clarifies however that “[t]his does not mean that God acts efficiently as one of the causal antecedent conditions out of which the present

event emerges. We do not wish to repeat the fundamental error of those who portray God as the maker or mechanic, or artisan of the world, for all these images imply that God forms the world through force or coercion. Rather he serves as a lure for actualization, providing novel possibilities of achievement, thereby persuading each creature to create itself” (Davis 2023, 162–63). That creation is always *co-creation* is an abiding theme for process cosmotheology. God, as Teilhard (1966, 25) states, “does not so much ‘make’ things as ‘make them make themselves.’” Hartshorne too quotes Charles Kingsley (1984, 73) approvingly: God “makes things make themselves.”

What else can be said of God’s description and function for process cosmotheology? I’ve stressed both that process extraterrestrial metaphysics is affirmative of Life, Mind, and Value as among the ultimate “metaphysical categories” belonging to the universe and that these categories always find embodiment in a fluid anthropocosmic ontology conceived as living, mind-full, and value-full. Nevertheless, fundamental riddles arise for process extraterrestrial metaphysics: What finally renders a universe of this nature and character possible at all? What accounts for its metaphysical stability? Where do standards of value and pure possibilities of Life, Mind, and Value come from? What, indeed, explains the emergence of each event among such possibilities and values? Fundamental questions of meaning also confront us: What finally comes of the values achieved throughout cosmological evolution? Do they simply pass into nothingness and dissolve as if they never were? Process cosmotheology does not shy away from such questions; rather, it situates them within a portrait of God as the chief exemplification of Life, the all-inclusive Mind, and the everlasting preservation of Value.

John Cobb and Charles Birch (1990, 195, 197) argue that “[t]he Whiteheadian idea of God is appropriately called Life not only because the immanence of God in the world is the life-giving principle, but also because the life-giving principle is itself alive.” For them, this follows inexorably because a “lifeless principle could not ground or explain the urge to aliveness that permeates the universe.” As they stress, God as “Life” does not “aim specifically at the creation of human beings . . . on our planet” but rather achieves “rich value in dolphins as well as human beings. We cannot guess the forms it may have achieved on other worlds” (Cobb and Birch 1990, 195, 197). Indeed, for Whitehead, it is God’s “initial aim” that ultimately *gives life* to each occasion so that it can *become into being* as living, experiencing, and valuing. It is the divine *lure* that persuasively coaxes the evolutionary process toward higher life. Process cosmotheology thus affirms God as *the Life* without which there is no life—not even its *possibility*. As Kazantzakis (1960, 41) expresses: “[D]eeper down we feel that Life is itself without beginning, an indestructible force of the Universe.” For process cosmotheology, there is no such thing as a metaphysical void; coherence requires

that all ultimate principles require embodiment within actuality, the utmost expression of which is God (Whitehead 1987, 19, 40). Thus, God is conceived as the primordial embodiment of Life that *gives life* to each occasion.

Analogous to the mental poles of finite actual occasions, which navigate a limited set of possibilities and values relevant to their own becoming, what Whitehead calls the “primordial nature of God” is the divine mental pole that encompasses infinite possibility and value with urge for their realization in the world. A cosmos of creative evolutionary becoming *presupposes* the indispensability of possibility, but process philosophers and theologians have not been unaware of the metaphysical riddles posed by such possibility. Thomas Hosinski (2017, 77) states, “possibility is not self-explanatory. Where do possibilities come from? Must we simply say, as we do for energy, that possibilities just are? Must we simply assume them without being able to explain where they come from and how they function?” Similarly, James Lindsay (1922, 322) insists, we “cannot evade the question of the origin of possibilities . . . The philosophy of possibility can hardly be satisfied to accept these possibilities as accounting for themselves.”

Whitehead shares these sentiments. Possibilities cannot be *nowhere*; nor are they *nothing*. Rather, they have to be *somewhere* in actuality. A fundamental metaphysical correlation thus emerges for process extraterrestrial metaphysics: where there is possibility, there is mentality; and where possibilities transcend finite mentality (as they certainly do), there is infinite and necessary Mentality. In this way, Whitehead’s ([1929] 1978, 40, 46, 19) cosmotheology affirms a “doctrine of conceptualism” which, when viewed from its highest metaphysical altitude, coincides with “the primordial mind of God” as an all-inclusive actuality. It is out of this timeless depth of permanent mentality that God offers *God’s self* to the evolutionary process in the form of achievable possibilities of life, mind, and value. God is thereby conceived to be the *all-inclusive Mind*, without which there are no possibilities whatsoever. Indeed, it is God’s offering of novel possibilities that breaks the power of the past with an ever-arriving future so that higher life, mind, and value can be achieved in the universe.

Analogous to the physical poles of actual occasions that inherent and receive the objective past in the formation of themselves, so too does Whitehead’s God have a “consequent nature” that truly experiences, receives, and evolves through incorporating the cosmic process in every moment. This is not to be conceived as a passive process but as an active process of *receptive transformation* based in divine wisdom and sympathy. “The consequent nature of God is the realization of the world in the unity of his nature, and through the transformation of his wisdom,” Whitehead ([1929] 1978, 345) states. God as consequent is the *preservation* of the past and therefore the very ground of truth: “The truth itself is nothing else than how the composite natures of the organic actualities of the world obtain adequate representation in the divine nature. Such representations

compose the ‘consequent nature’ of God, which evolves in its relationship to the evolving world” (Whitehead [1929] 1978, 12–13). This *divine evolution* Whitehead conceives as God’s *everlasting growth* due to God’s abiding relationship to (and incorporation of) the infinite cosmic process. God’s growth in this regard is also *God’s temporality* (or historicity) such that—contrary to traditional theology—time is *internal to God* in the consequent nature. Thus, just as there would be no possibility (and thus no novel future) without the primordial nature of God, for Whitehead, there would be also no preserved past (and thus no historical truth) without the all-receptive evolution of divine experience in the consequent nature. Another metaphysical correlation emerges for process cosmotheology: where there is historical truth of any kind, there is impartial divine reception of that truth as distinguished from what might have otherwise been.

Whitehead knows well that a cosmos of becoming and perishing weighs upon its many inhabitants through existential angst, longing, and inevitable loss. “The ultimate evil of the temporal world is deeper than any specific evil,” he states, “It lies in the fact that the past fades, that time is a ‘perpetual perishing.’ . . . In the temporal world, it is the empirical fact that process entails loss” (Whitehead [1929] 1978, 340). What indeed comes of our terrestrial experience and of all extraterrestrial experience in the universe? Is there any resolution to the conflicting and discordant dimensions of striving, anxiety, and turmoil in an evolutionary universe? Can any ultimate significance be assigned to our life—to any life—if we all inevitably perish into nothingness?

For process cosmotheology, all that is achieved in and among the plurality of worlds does *not* perish into nothingness; rather, it perishes into the consequent nature of God where it is imprinted, remembered, and judged against the ideals of the divine nature. “The consequent nature of God is his judgment on the world. He saves the world as it passes into the immediacy of his own life. It is the judgment of a tenderness which loses nothing that can be saved. It is also the judgment of a wisdom which uses what in the temporal world is mere wreckage” (Whitehead [1929] 1978, 346). In this function, the consequent nature is also the *ground of meaning*—the memory and preservation of accomplished value in the cosmos. As Daniel A. Dombrowski (2016, 248) states, divine memory in this sense “is the paradigm case of experiencing and provides the avenue by which to best understand why perpetual perishing is not the last word. God is not a mere spectator, but a participant in the process of the world with ideal memory.” Indeed, to speak of God’s “ideal memory,” as Hartshorne (1984, 110) insists, is to affirm that “God forgets nothing, loses no value once acquired,” so that “our worth is imperishable in the divine life.” The *divine memory*, therefore, is that without which there is no truth or meaning at all.

Before drawing this discussion to a close, a final point needs to be emphasized as essential to extraterrestrial metaphysics in general, and process extraterrestrial metaphysics in particular. At the heart of process cosmotheology is the

conviction that God is *good*. Whitehead ([1929] 1978, 346) famously speaks of God as “the poet of the world, with tender patience leading it by his vision of truth, beauty, and goodness.” God’s persuasion of the plurality of worlds toward these objective values extends from the divine nature that *is* their ultimate contextual ground as they are realized in and through cosmological evolution. The claim that God is *good* is not an arbitrary supposition. God does not happen to be good when God might have been evil. Rather, Whitehead ([1929] 1978, 345) stresses that “necessary goodness” belongs to the divine nature and is ultimately justifying in ways that evil simply is not.<sup>16</sup>

This final claim of divine omnibenevolence, I submit, is essential to any extraterrestrial metaphysics, and indeed to any cosmotheological justification of a plurality of worlds and extraterrestrial life. As the theological tradition has long held, it belongs to divine goodness to be necessarily self-diffusive, that is, *to give of itself endlessly to benevolent and worthwhile ends*. Process cosmotheology upholds this conviction. The divine desire is for the cosmos to be *all that it can be on behalf of truth, beauty, and goodness*. Moreover, in the context of process extraterrestrial metaphysics, the abiding affirmation of divine goodness intimately unites two fundamental facts of our anthropocosmic experience, namely, continuous creation (*creatio continua*) and sheer cosmological plenitude. These facts are expressed in and through us and the billions of planets, stars, and forms of life, mind, and value that pervade the universe. In the final analysis, process extraterrestrial metaphysics is a metaphysics of multiplicity and plenitude *because* of the endless self-diffusion of divine goodness. We need only conclude by revisiting Whitehead’s plenitudinous wonder: “[T]he forms of life which might be lived on other stars millions of light-years away and millions hence could be infinite and admit every possibility that the imagination could conceive” (Price 2001, 280).

## Conclusion

This discussion has been an exercise in extraterrestrial metaphysics in both theory and practice. In *theory*, it has stressed the nature of the metaphysical endeavor as consisting in the transplanetary pursuit of those abiding and indefatigable features of reality that necessarily obtain in any and all possible worlds. In *practice*, it has been a particular expression of extraterrestrial metaphysics on planet Earth. Inspired by Whitehead, Teilhard, Hartshorne, and a variety of others, process metaphysics is a fruitful, albeit still neglected, species of extraterrestrial metaphysics. I’ve argued that Life, Mind, and Value are among the ultimate principles and/or categories belonging to the “utmost depths of reality” and that these principles always find embodiment within a fluid anthropocosmic ontology conceived as living, mind-full, and value-full. I have also articulated some of the relevant contours of process cosmotheology as they relate to process extraterrestrial metaphysics, including some of the

metaphysical riddles it addresses and the extraterrestrial plentitude it justifies through divine benevolence. Let it be emphasized, however, that this discussion is but one expression of the potential of process metaphysics as *extraterrestrial*. Other process philosophers and theologians will no doubt include other features and figures of a tradition that is diverse and still unfolding. What is more, process metaphysics is itself one of a variety of metaphysical traditions home to planet Earth. I extend an invitation to all terrestrial metaphysicians to become more deliberately *extraterrestrial* in both theory and practice. I finally submit that the metaphysical traditions unique to Earth are themselves examples of billions of others unfolding around other thinking stars. I need not invite them to become extraterrestrial.

---

## Notes

- <sup>1</sup> My recent work has been actively addressing this neglect of process philosophy and theology from different, but interrelated, angles. See especially Andrew M. Davis (2023) and Davis and Roland Faber (2024), which is the first collaborative exploration of astrobiology and extraterrestrial life from a variety of perspectives internal to process philosophy and theology. For other relevant treatments, see Andrew M. Davis (2022, 2024a, 2024b, 2025a, 2025b, 2026).
- <sup>2</sup> For Jonas's significance as a process philosopher and theologian, refer to Sandra B. Lubarsky and David Ray Griffin (1996).
- <sup>3</sup> See also Steven J. Dick (1996).
- <sup>4</sup> For a consideration of Kazantzakis as a neoclassical process thinker, see Daniel A. Dombrowski (1997) and Darren Middleton (2000).
- <sup>5</sup> Refer, for example, to Godehard Brüntrup and Ludwig Jaskolla (2016).
- <sup>6</sup> See, for example, Julius Adler and Wung-Wai Tso (1974), Kim McDonald (2009), and Matthew Russell (2014).
- <sup>7</sup> See, for example, John B. Cobb Jr. and David Ray Griffin (1977) and David Ray Griffin (1998, 2008).
- <sup>8</sup> For a comparative look at the intricacies of Whitehead and Teilhard's thought, see Davis (2025b, forthcoming).
- <sup>9</sup> Refer to Daniel A. Dombrowski and Donald W. Viney (2026, forthcoming).
- <sup>10</sup> For a recent exploration of the viability of biopsychism, see Evan Thompson (2022). For his more robust (albeit also more conservative) treatment, see Thompson (2010).
- <sup>11</sup> See, for example, Davis (2026, forthcoming), Octavio A. Chon Torres et al. (2021), Steven J. Dick (2020), Kelly C. Smith and Carlos Mariscal (2020), Mark Lupisella (2020), Charles C. Cockell (2015), James S. J. Schwartz and Tony Milligan (2016), William Sims Bainbridge (2015), and John Traphagan (2014).
- <sup>12</sup> See, for example, Brian G. Henning (2023), Donald A. Crosby (2023), Iain McGilchrist (2021), and Thomas Nagel (2012).
- <sup>13</sup> See, for example, Khalil Chamcham et al. (2017), John Leslie (1989, 1999), and Milan M. Cirkovic (2012).
- <sup>14</sup> See, for example, Alexei V. Nesteruk (2023), Andrew Davison (2023), Paul Thigpen (2022), Joel L. Parkyn (2021), Ted Peters (2018), and Olli-Pekka Vainio (2018).
- <sup>15</sup> Refer to Andrew M. Davis (2024a).
- <sup>16</sup> For a more substantial discussion, see Andrew M. Davis (2024).

---

## References

- Adler, Julius, and Wung-Wai Tso. 1974. "Decision Making in Bacteria." *Science* 184:1292–94.
- Bainbridge, William Sims. 2015. *The Meaning and Value of Spaceflight: Public Perceptions*. Cham, Switzerland: Springer Nature.
- Ball, Philip. 2022. *The Book of Minds: Understanding Ourselves and Other Beings, from Animals to Aliens*. London: Picador.
- Barrett, Nathaniel F. 2023. *Enjoyment as Enriched Experience: A Theory of Affect and Its Relation to Consciousness*. Cham, Switzerland: Palgrave.
- Brüntrup, Godehard, and Ludwig Jaskolla. 2016. *Panpsychism: Contemporary Perspectives*. Oxford: Oxford University Press.
- Chamcham, Khalil, Joseph Silk, John D. Barrow, and Simon Saunders. 2017. *The Philosophy of Cosmology*. Cambridge: Cambridge University Press.
- Cirkovic, Milan M. 2012. *The Astrobiological Landscape: Philosophical Foundations of the Study of Cosmic Life*. Cambridge: Cambridge University Press.
- Cobb, John B. Jr., and Charles Birch. 1990. *The Liberation of Life*. Denton, TX: Environmental Ethics.
- Cobb, John B. Jr., and David Ray Griffin. 1977. *Mind in Nature: Essays on the Interface of Science and Philosophy*. Lanham, MD: University Press of America.
- Cockell, Charles C. 2015. *The Meaning of Liberty beyond Earth*. Cham, Switzerland: Springer Nature.

- Crosby, Donald A. 2023. *Evolutionary Emergence of Purposive Goals and Values: A Naturalistic Teleology*. Albany, NY: SUNY Press.
- Davis, Andrew M. 2022. "Whiteheadian Cosmotheology: Platonic Entities, Divine Realities, and Shared Extraterrestrial Values." In *Process Cosmology: New Integrations in Science and Philosophy*, edited by Andrew M. Davis et al., 423–52. Cham, Switzerland: Palgrave.
- . 2023. *Metaphysics of Exo-Life: Toward a Constructive Whiteheadian Cosmotheology*. Grasmere, ID: SacraSage.
- . 2024. "On the Goodness of Whitehead's God: A Defense and Metaphysical Interpretation." *Process Studies* 53 (2): 192–212.
- , ed. 2024a. *From Force to Persuasion: Process Relational Perspectives on Power and the God of Love*. Eugene, OR: Cascade.
- . 2024b. "Inverting Naturalistic Cosmotheology: The Meeting of Steven J. Dick and Alfred N. Whitehead." *Theology and Science* 22 (1): 80–94.
- . 2025a. "Whitehead's Living Ontology: Five Principles of Process Philosophical Astrotheology." In *Space, Philosophy, and Ethics*, edited by Bill Anderson. Wilmington, DE: Vernon Press, forthcoming.
- . 2025b. "Metaphysics beyond Earth: Whitehead, Teilhard, and the Emergence of Process Philosophical Exotheology." In *Whitehead and Teilhard: From Organism to Omega*, edited by Andrew M. Davis and Ilia Delio. Maryknoll, NY: Orbis.
- . 2026. *Value Beyond Earth: Explorations in Exo-Axiology*. London: Palgrave Macmillan, forthcoming.
- Davis, Andrew M., and Roland Faber, eds. 2024. *Astrophilosophy, Exotheology, and Cosmic Religion: Extraterrestrial Life in a Process Universe*. Lanham, MD: Lexington.
- Davison, Andrew. 2023. *Astrobiology and Christian Doctrine: Exploring the Implications of Life in the Universe*. Cambridge: Cambridge University Press.
- de Duve, Christian. 2011. "Life as a Cosmic Imperative." *Philosophical Transactions of the Royal Society* 369 (1936): 620–23.
- Dick, Steven J. 1996. *The Biological Universe: The Twentieth Century Extraterrestrial Life Debate and the Limits of Science*. Cambridge: Cambridge University Press.
- . 2000. "Cosmotheology: Theological Implications of the New Universe." In *Many Worlds: The New Universe, Extraterrestrial Life, and the Theological Implications*, edited by Steven J. Dick, 191–210. West Conshohocken, PA: Templeton.
- . 2020. *Astrobiology, Discovery, and Societal Impact*. Cambridge: Cambridge University Press.
- Dombrowski, Daniel A. 1997. *Kazantzakis and God*. Albany, NY: SUNY Press.
- Dombrowski, Daniel A., and Donald W. Viney. 2026. "Out of This World: A Hartshornean Exo-Axiology." In *Value beyond Earth: Explorations in Exo-Axiology*, edited by Andrew M. Davis. London: Palgrave Macmillan, forthcoming.
- Ellis, George F. R. 2026. "Possibility Spaces and Values: The Deep Structure of the Cosmos." In *Value beyond Earth: Explorations in Exo-Axiology*, edited by Andrew M. Davis. London: Palgrave Macmillan, forthcoming.
- Falk, Dan. 2024. "Insects and Other Animals Have Consciousness, Experts Declare." *Quantum Magazine*, April 19. <https://www.quantomagazine.org/insects-and-other-animals-have-consciousness-experts-declare-20240419/>.
- Frank, Adam, Marcelo Gleiser, and Evan Thompson. 2024. *The Blind Spot: Why Science Cannot Ignore Human Experience*. Cambridge, MA: MIT Press.
- Griffin, David Ray. 1998. *Unsnarling the World-Knot: Consciousness, Freedom, and the Mind-Body Problem*. Eugene, OR: Wipf & Stock.
- . 2001. *Reenchantment without Supernaturalism: A Process Philosophy of Religion*. Ithaca, NY: Cornell University Press.
- . 2014. *Panentheism and Scientific Naturalism: Rethinking Evil, Morality, Religious Experience, Religious Pluralism, and the Academic Study of Religion*. Claremont, CA: Process Century Press.

- Hartshorne, Charles. 1962. *The Logic of Perfection and Other Essays in Neoclassical Metaphysics*. La Salle, IL: Open Court.
- . 1967. *A Natural Theology for Our Time*. Chicago: Open Court.
- . 1991. "A Reply to My Critics." In *The Philosophy of Charles Hartshorne, Library of Living Philosophers*, edited by L. E. Hahn. LaSalle, IL: Open Court.
- . 2017. *Beyond Humanism: Essays in the Philosophy of Nature*. Eugene, OR: Pickwick.
- Haight, John F. 2000. *God after Darwin: A Theology of Evolution*. Boulder, CO: Westview Press.
- . 2017. *The New Cosmic Story: Inside Our Awakening Universe*. New Haven, CT: Yale University Press.
- Henning, Brian G. 2024. *Value, Beauty, and Nature: The Philosophy of Organism and the Metaphysical Foundations of Environmental Ethics*. Albany, NY: SUNY Press.
- Hosinski, Thomas. 2017. *The Image of the Unseen God: Catholicity, Science and Our Evolving Understanding of God*. Maryknoll, NY: Orbis.
- James, William. 1890. *The Principles of Psychology*. New York: Henry Holt and Co.
- Jonas, Hans. 1966. *The Phenomenon of Life: Toward a Philosophical Biology*. Evanston, IL: Northwestern University.
- Kazantzakis, Nikos. 1960. *The Saviors of God: Spiritual Exercises*. New York: Simon and Schuster.
- Leslie, John. 1989. *Universes*. New York: Routledge.
- Leslie, John, ed. 1999. *Modern Cosmology and Philosophy*. Buffalo, NY: Prometheus.
- Lindsay, James. 1922. "The Philosophy of Possibility." *The Monist* 32 (3): 321–38.
- Lowe, Victor. 1990. *Alfred North Whitehead: The Man and His Work. Vol. I: 1910–1947*. Edited by J. B. Schneewind. Baltimore: Johns Hopkins University Press.
- Lubarsky, Sandra B., and David Ray Griffin. 1996. *Jewish Theology and Process Thought*. Albany, NY: SUNY Press.
- Lupisella, Mark. 2020. *Cosmological Theories of Value: Science, Philosophy, and Meaning in Cosmic Evolution*. Cham, Switzerland: Springer Nature.
- McDonald, Kim. 2009. "Bacteria Provide New Insights into Human Decision Making." San Diego: UC San Diego. [https://library.ucsd.edu/dc/object/bb18841110/\\_1.pdf](https://library.ucsd.edu/dc/object/bb18841110/_1.pdf).
- McGilchrist, Iain. 2021. *The Matter with Things: Our Brains, Our Delusions, and the Unmaking of the World*. London: Perspectiva.
- Middleton, Darren. 2000. *Novel Theology: Nikos Kazantzakis's Encounter with Whiteheadian Process Theism*. Macon, GA: Mercer University Press.
- Miethe, Terry L., ed. 1987. *Did Jesus Rise from the Dead: The Resurrection Debate, Gary Habermas and Antony Flew*. San Francisco: Harper & Row.
- Nagel, Thomas. 1979. *Mortal Questions*. London: Cambridge University Press.
- . 2012. *Mind and Cosmos: Why the Neo-Darwinian Conception of Nature Is Almost Certainly False*. Oxford: Oxford University Press.
- Nesteruk, Alexei V. 2023. *God, Humanity, and the Universe: At the Crossroads of Christian Theology, Modern Cosmology, and Astrobiology*. Eugene, OR: Pickwick.
- Parkyn, Joel L. 2021. *Exotheology: Theological Explorations of Intelligent Extraterrestrial Life*. Eugene, OR: Pickwick.
- Peters, Ted. 2018. *Astrotheology: Science and Theology Meet Extraterrestrial Life*. Eugene, OR: Cascade.
- Price, Lucien. 2001. *Dialogues of Alfred North Whitehead*. Jaffrey, NH: David R. Godine.
- Rose, Philip. 2001. *On Whitehead*. Andover, UK: Cengage Learning.
- Rosen, Robert. 1991. *Life Itself: A Comprehensive Inquiry into the Nature, Origin, and Fabrication of Life*. New York: Columbia University Press.
- Royce, Josiah. 1895. "Self-Consciousness, Social Consciousness and Nature (II)." *Philosophical Review* 4:577–602.
- Russell, Matthew. 2014. "How Do Bacteria Make Decisions?" *Frontiers*, January 23.
- Schwartz, James S. J., and Tony Milligan, eds. 2016. *The Ethics of Space Exploration*. Cham, Switzerland: Springer Nature.
- Smith, Kelly C., and Carlos Mariscal, eds. 2020. *Social and Conceptual Issues in Astrobiology*. Oxford: Oxford University Press.

- Teilhard de Chardin, Pierre. 1916. "Cosmic Life." *The Library of Consciousness*. <https://www.organism.earth/library/document/cosmic-life>.
- . 1947. "The Position of Man in Nature and the Significance of Human Socialization." *The Library of Consciousness*. <https://www.organism.earth/library/document/position-of-man-in-nature>.
- . 1959. *The Phenomenon of Man*. London: Harper & Row.
- . 1966. *The Vision of the Past*. Translated by J. M. Cohen. New York: Harper and Row.
- . 1974. *Christianity and Evolution*. Orlando: Harvest/Harcourt.
- . 2004. *The Future of Man*. New York: Doubleday.
- Thigpen, Paul. 2022. *Extraterrestrial Intelligence and the Catholic Faith: Are We Alone in the Universe with God and the Angels?* Gastonia, NC: Tan Books.
- Thompson, Evan. 2010. *Mind in Life: Biology, Phenomenology, and the Sciences of Mind*. Cambridge, MA: Belknap Press.
- . 2022. "Could All Life Be Sentient?" *Journal of Consciousness Studies* 29 (3–4): 229–65.
- Torres, Octavio A. Chon, Ted Peters, Joseph Seckbach, and Richard Gordon, eds. 2021. *Astrobiology: Science, Ethics, and Public Policy*. Beverly, MA: Scrivener.
- Traphagan, John. 2014. *Extraterrestrial Intelligence and Human Imagination: SETI at the Intersection of Science, Religion, and Culture*. Cham, Switzerland: Springer Nature.
- Vainio, Olli-Pekka. 2018. *Cosmology in Theological Perspective: Understanding Our Place in the Universe*. Grand Rapids, MI: Baker Academic.
- Weiming, Tu. 2010. "An 'Anthropocosmic' Perspective on Creativity." *Procedia Social and Behavioral Sciences* 2 (2010): 7305–311.
- Whitehead, Alfred North. 1926. *Religion in the Making*. Cambridge: Cambridge University Press.
- . 1929. *The Function of Reason*. Princeton, NJ: Princeton University Press.
- . 1964a. *The Concept of Nature*. Cambridge: Cambridge University Press.
- . 1964b. *Science and Philosophy*. Paterson, NJ: Littlefield, Adams & Co.
- . 1967a. *Science and the Modern World*. New York: Free Press.
- . 1967b. *Adventures of Ideas*. New York: Free Press.
- . 1967c. *Aims of Education*. New York: Free Press.
- . 1968. *Modes of Thought*. New York: Free Press.
- . (1929) 1978. *Process and Reality*. Corrected edition. Edited by D. R. Griffin and D. Sherburne. New York: The Free Press.
- . 2021. "First Lecture: September, 1924." In *Whitehead at Harvard, 1924–1925*. Edited by Brian G. Henning and Joseph Petek. Edinburgh: Edinburgh University.





## **We See in a Glass Darkly: Exploring the Hermeneutics of Virtue and Vice beyond the Species Boundary**

**Celia Deane-Drummond**, Director, Laudato Si' Research Institute; Senior Research Fellow, Campion Hall, University of Oxford, Oxford, UK, [celia.deane-drummond@theology.ox.ac.uk](mailto:celia.deane-drummond@theology.ox.ac.uk)

---

This article argues that a close analysis of animal ethology enables a richer understanding of humanity's basic tendencies for good or ill, expressed in the twin concepts of virtues and vices. Human morality is not added on to an otherwise brutish nature, rather, it has co-evolved with other animal species, many of whom have sophisticated social lives and associated rules for that behavior. By way of illustration, fairness/justice and deception/lying are considered as just two key examples of virtue and vice, which illuminate the distinctiveness yet commonality between humans and other animal species. The article also discusses both the risks and benefits of anthropomorphizing to try to understand animal behavior alongside the philosophical issues that arise when doing so.

---



As far back as the historical debates between Charles Darwin and Alfred Wallace, the prevailing idea is that our morality is the distinctive aspect of who we are as human beings, thereby elevated above other animals in all their brutish and, as characteristically understood, negative instincts towards violence. Those who consider themselves evolutionarily minded will assume, drawing on the analogous idea of nature “red in tooth and claw,” that humanity is at root selfish, violent, and competitive, and so no different from other animals. We might admit that we have evolved from other animals and share in their bodily nature, but somehow morality understood as a collective inclination towards the good is bracketed out as too challenging to consider in evolutionary terms. Even Darwin (1870) supposed that one of his most knotty problems was “the difficulties of the Moral sense,” which “caused [him] much labour.” On the other hand, primatologist Frans de Waal’s (2006, 1–80) “tower of morality” approach rejects what he calls the layered “vener” hypothesis, that is, that rational human moral agency is added to a core, more basic, animalistic, and “brutish” nature. Of course, de Waal’s definition also depends on what it means to be a moral agent.

If, as in Kantian philosophy, morality is defined as a uniquely human capacity for abstract reasoning, then this form of morality will necessarily be confined to humans. However, if morality is defined instead as that which includes some active choice by individuals according to agreed social norms, then the sharp boundary between humans and other animals over the question of morality becomes much more blurred. Once the boundary becomes blurred, this then has consequences for any normative claims of morality as representing truth. Philosopher Richard Joyce (2006), for example, debunks the validity of all moral systems based on the ability to see an evolutionary lineage in human moral capabilities. In this model, morality becomes one of the evolutionary methods through which difficult evolutionary problems such as cooperation in large groups are solved. Doubt is thereby cast on its normative status as truth. It is not always sufficient, however, to try to trace a direct evolutionary line between latent capacities in other animals and moral agency in humans—it is more complicated than this because of cognitive differences between humans and other animals, sometimes described as theory of mind.

Definitions of morality therefore differ for philosophers and those working in evolutionary biology. But that does not mean there is no relationship at all between these different versions of what morality means, and it is probing lines of continuity and distinctiveness in particular areas of morality that this article seeks to clarify. Further, just isolating cognitive aspect of morality in accordance with Kantian reasoning misses the importance of affect and emotion in the moral life, which will also have a distinct evolutionary trajectory.

Further, the contextual situation of how morality has evolved is particularly important. So, rather than necessarily thinking of an isolated valuer and what is

valued in a single encounter, in the way often characteristic of modern ethical analysis, what has become clear from evolutionary anthropology is that human valuation is part of a relational meshwork in a dynamic multispecies ecological system, one that includes other animals in so far as what is valued from their perspective connects or conflicts with our own (Deane-Drummond 2019).

For animal ethologists, specific tendencies for justice, empathy, compassion, and practical wisdom in evolutionary terms become translated into inequity aversion, other regard, and symbolic thinking. I cannot possibly cover all areas of morality here, so I focus here on a particular virtue that is important and prominent in philosophical and theological literature, namely, justice (Deane-Drummond 2019, 45–70, 144–68). I also explore the opposite tendency for ill, a vice, through a detailed exploration of deception in other animals and its relationship to lying in humans (Deane-Drummond 2021, 158–85). I hope these two illustrations will give some idea of the dynamic relationship between the virtues and vices and how they play out in the moral life.

### **Justice-Making and Fairness**

Many primatologists speak less about fairness and more about what they believe is a prelude to that sense: *inequity aversion*, that is, a behavioral reaction to unequal distribution of goods (Brosnan 2011a, 1–10).

In work with human subjects, in a counterintuitive game called the impunity game, money is given to someone named as the proposer who then decides how to split the reward with a partner called a responder who knows how much the proposer has received. If the proposer offers an unequal amount, the responder regularly refuses, even though in this case the responder can gain nothing, and so inequity is thereby increased.

Similar types of behaviors exist for other primate species. Most of the experiments involve a pair of monkeys in adjoining open mesh cages where they can see their partners easily; in the case of apes, they sometimes are allowed to be together in the same enclosure. Most such experiments also require the completion of a task before being given a reward. The inequity comparison is inevitably social in nature.

A plausible biological explanation is that reacting to inequity has evolutionary advantages by encouraging individuals to switch partners when that relationship is not to their advantage. Hence, while the impunity game may be disadvantageous in the short term, it would encourage longer-term cooperation with others who are prepared to be “fair.” Such reactions are not necessarily self-conscious; all that seems to be required is recognition of an individual as a potential social partner, which seems very widespread within the animal kingdom, including in invertebrates (Steiger et al. 2008).

Psychologist and neuroscientist Sarah Brosnan—who originally was based in primatologist Frans de Waal’s laboratory—has proposed that there is an evolutionary

link between cooperation and inequity aversion. Based on her hypothesis, one would predict first that inequity outcomes affect cooperation, second that negative responses to inequity are situated in the context of cooperation, and third that cooperative species are more sensitive to inequity (Brosnan 2011a).

The first point (inequity outcomes affect cooperation) was tested in an experiment with capuchin monkeys where the monkeys were not in adjoining cages but were able to work out who would operate which part of the apparatus to receive a reward. If, on average, each partner received the same kind of reward, cooperation was sustained. If instead one of the monkeys consistently dominated to get better rewards, cooperation with the partner subsequently dropped to a third of the rate.

The second point (negative responses to inequity are situated in the context of cooperation) reflects on awareness of the actors' intention. Humans will react more negatively to inequity when they know that inequity has arisen from a deliberate choice rather than from a random chance event. Primates will also respond negatively to an experimenter who deliberately drops a reward compared with when it appears to be an accident. For example, chimpanzees reacted more negatively to inequity in relation to another individual who had previously stolen their food. Chimpanzees in experiments that allowed one chimpanzee to prevent a partner gaining access to food would do so more frequently where that partner had previously taken away their access to the food. What is particularly interesting is that in all cases some kind of task was needed to trigger a sense of inequity. One possible explanation is that a task mimics joint activity, so they expect a more equitable outcome. As well as sex, rank, and group identity, the experimental design of the tasks and individual differences may also play a role.

The evidential basis of the third point (cooperative species are more sensitive to inequity) rests on information about the extent of inequity aversion across different primate species, including, importantly, differences between field and laboratory studies. Tamarins are cooperative breeders, that is, both males and females collaborate in rearing their young. Tamarins were insensitive to inequity when the partners in each of the pairs were always males and females (Neiwirth et al. 2009). Brosnan believes inequity aversion in this case, where the partnership is in a close interdependence for the sake of rearing their young, would be an evolutionary disadvantage.

Perhaps the most interesting case of all is that in which chimpanzees react to their partner who is nonkin when that nonkin partner receives a lesser award (Brosnan et al. 2010), also known as second-order inequity aversion. Here, a chimpanzee is sensitive to having too much relative to a partner (Brosnan and de Waal 2014). In this situation, chimpanzees are prepared to refuse a higher-level reward (grape) when their partner has received a less preferred one (carrot). Brosnan et al. (2010, 1236) suggest that the “results cannot ascertain

the underlying motivations for this behaviour; chimpanzees' responses may have been due to prosocial motivations, but may also have resulted from concern over accepting a higher-value reward in the presence of a conspecific (e.g., potential retaliation)." Capuchin monkeys are even more prosocial and are prepared to bring rewards to partners that have received less (de Waal et al. 2008; Lakshminarayanan and Santos 2008).

One question worth asking is whether examples of inequity aversion across a wide range of species can be conflated with a general sense of "fairness" or not. Those working with primates generally resist equating the term "fairness" with inequity aversion, especially first-level inequity aversion—that is, reacting to an inner sense of unfairness in relation to oneself. An objective sense of fairness is based on a second-order reflection on what would be reasonable to expect, whereas a first-order inequity response is a simpler comparative measure—you receive more, and then I react. Second-order inequity aversion is explained in evolutionary terms as being based on the need for long-term cooperation and not just short-term gain. Fairness implies contributions are balanced according to an agreed principle of fairness violated during inequity relationships.<sup>1</sup>

It is easy to see why such results point towards a well-developed continuity thesis showing analogous behavior in evolutionary terms between primates and human beings, so, as Brosnan and de Waal (2014, 1) suggest, "[t]he pressure for increased cooperation combined with advanced cognitive abilities allowed humans to evolve a complete sense of fairness."<sup>2</sup>

Inequity aversion could be thought of as the behavioral prerequisite to fairness in that without inequity aversion, it would be hard to believe fairness could emerge. The relationship between inequity aversion and fairness may be like that between empathy (which is widespread) and compassion (which is only found as short term and fleeting in primates other than humans). According to this interpretation, inequity aversion is not sufficient to account for fairness, as in the latter case an objective judgment is also involved. Similarly, empathy alone is not sufficient for compassion, and may even be associated with the opposite (Deane-Drummond 2017).

The closest one might get to appraising the cognitive ability of other beings to make judgments about what another is thinking arises from investigations of shared intention, which at one time was presumed to be entirely unique to humans. While primates do display some limited capacity to share intentions, humans are able to look at more subtle cues and find shared intentionality in many more situations.<sup>3</sup>

Is it ever reasonable to call hints about the inequity aversion behavior of animals "fairness" or "justice" or not, in so far as it is relevant to the specific perspective of those animal societies? Based on the aforementioned research on inequity aversion, Brosnan (2011b) is prepared to use the language of morality, but she hesitates to use the term fairness.

Brosnan and de Waal (2014, 1) suggest that

[t]he hallmark of a human sense of fairness is the idea of impartiality, that is, human fairness or justice is based on the idea of appropriate outcomes applied to everyone within the community, not just a few individuals, and, in particular, not just oneself. Thus, outcomes are judged according to a standard or ideal.

Here, fairness and justice seem to be conflated, though I would have described their definition as more appropriately one of justice rather than necessarily a much more general sense of fairness, which is usually more intuitive. Children, for example, recognize immediately when they find themselves in situations they perceive as unfair, mostly in relation to what they consider is owed to them (related to first-order inequity aversion), but they have not yet reached a mature sense of justice orientated towards others, and their “rules” for what might be owed to them are based on self-interest.

Ethologist Marc Bekoff and philosopher Jessica Pierce discuss social rules of animal societies in their book *Wild Justice* (Bekoff and Pierce 2009). “Fair play” complicates theological and philosophical assertions about justice being about the good of others rather than oneself in that the good of the playing agent routinely matches the good of all the others; so, it is good for all parties, including the most vulnerable. Wild “justice” seems to lack a reflective and deliberative concern for the other that is integral to human justice. Bekoff and Pierce (2009, 113) define what they term a “justice cluster” as those observable behaviors found in social animals in relation to a generalized sense of fairness, including “a desire for equity and a desire for and capacity to share reciprocally,” reactions to equity in expressions of “pleasure, gratitude and trust,” and reactions to inequity, including “retribution, indignation, and forgiveness.”

The more anthropomorphic language of “wild justice” along with associated terms such as retribution and forgiveness, for example, used by Bekoff (Horowitz and Bekoff 2007) arises from a different methodology when compared with primatologists Brosnan and de Waal. Rather than close laboratory investigations, Bekoff uses observations based on the methodology of cognitive ethology, that is, studying animal behavior in their natural settings.<sup>4</sup>

Bekoff and Pierce are accordingly prepared to use the term “wild justice” based on the following evidence: (a) a keen sense of justice as fairness is universal in humans; (b) even very young babies have a strong sense of fairness, which is a form of social evaluation even without symbolic language; and (c) indicators from direct observation of animal behavior. While they press for the idea of evolutionary continuity between fairness and justice, that does not mean justice is necessarily the same in different species.

Bekoff’s close study of play behavior shows that it depends on fairness, cooperation, and trust; accordingly, “[d]uring social play individuals can learn

a sense of what's right and wrong—what's acceptable to others—the results of which is the development and maintenance of a social group (a game) that operates efficiently” (Bekoff and Pierce 2009, 116).

Animals learn to take turns and set up “handicaps” to make play fair between different ages or sizes. The rules of engagement include ways of agreeing to play, how hard to bite, avoiding mating attempts, minimizing assertion of dominance, and what to do in the event of a mistake. Play teaches its participants social skills and cements social bonds. Play, by definition, cannot be unfair (Bekoff and Pierce 2009, 118–9). It is therefore a more positive way of looking at the evolution of fairness compared with a study of inequity aversion, which is the reaction to what is perceived as unfair. Psychologist Gordon Burghardt (2005) finds evidence of play behavior very deep in evolutionary history, even one million years ago, among placental mammals, birds, and even crustaceans. Bekoff recognizes that play behavior is distinct in tolerating capability differences. Bekoff believes this makes play a form of wild justice in that it is “a set of social rules and expectations that neutralize differences among individuals in an effort to maintain group harmony” (Bekoff and Pierce 2009, 121).

Is the language of justice in relation to fair play behavior justified? It seems to me that the very different methods used by experimental researchers like Brosnan in comparison with Bekoff reflect the relative degree of comfort in using anthropomorphic language. Both Brosnan and Bekoff are prepared to speak of moral agency in primates and other social animals. Bekoff, based on his close affiliation with and observation of canids during play behavior, is prepared to see that behavior as a form of justice. He also, by implication, views this as being on a similar evolutionary trajectory as human justice. Bekoff is also quite happy to use anthropomorphic terms, which he argues are a heuristic tool to enable a better understanding of the social world of other animals. de Waal and Bekoff's respective social and political commitments to animal welfare and animal rights may also play a role in how far they are prepared to use anthropomorphic language.<sup>5</sup> It is clear to me that however far we are prepared to go in using such language, we are only ever grasping for insights into the minds of animals and the evolution of human morality, which can never be complete. We see through a glass darkly, but if we observe other animals with an eye of love and compassion, then we are more likely to credit them with capacities analogous to our own.

A theological understanding of what justice requires could be perceived as simply given by fiat, by divine command. I prefer to argue instead that such expressions of what justice means build on natural tendencies found in other animals, even if there are variations across different human and animal cultures. So, theological justice does not collapse into wild justice, nor is it shorn from it. I want to go further and say that wild justice and inequity aversion illuminate the way social communities work out their own social requirements for just

living. While Thomas Aquinas recognized the possibility of a degree of volition in other animals, the freedom of the will in human beings permits deliberative acts of justice on behalf of a neighbor. Recognition of a distinctive human will therefore clarifies the theoretical precondition for just acts in so far as they are played out in human societies.

Accounting for the inner motivation that encourages alignment of the will to the good of others is more complicated, since it could be viewed as depending, at least in part, on the evolutionary drive towards cooperation more generally. However, in as much as cooperation can be directed at good or evil ends, evolutionary explanations do not sufficiently account for why good for others in acts of justice might be preferred, especially as justice considers not just benefits for kin but explicitly for nonkin and the most vulnerable. Aquinas (2012, 2a2ae, Qu. 57.3) believes that other animals are quite capable of sensate fairness but not a deliberative, reasoning kind, so “[n]ow it belongs not only to man but also to other animals to apprehend a thing absolutely: wherefore the right which we call natural, is common to us and other animals according to the first kind of commensuration. But the right of nations falls short of natural rights in this sense, as the jurist says, because the latter is common to all animals, while the former is common to men only.” Aquinas’s way of perceiving how animals act responsively according to basic notions of “natural right” or, in modern parlance, inequity aversion is remarkably contemporary, considering how eventually other animals came to be perceived as more like machines.<sup>6</sup>

Whatever approach is taken to this topic, that is, theological, experimental, or field ethology, a missing aspect of this discussion so far is the recognition that human morality and a sense of justice has evolved within multispecies communities. For millions of years, humanity coevolved with other animals and mutually impacted one another’s evolutionary pathways. Modern societies have forgotten this long lineage of coevolution. Inequity aversion/justice comparisons are still comparative projects, even if they show the futility of maintaining a sharp boundary between humans and other animals. A communitarian approach uses different anthropological tools to study both humans and other animals in their social interactions and reactions. Hence, it is possible to create an ethnoprimateology, ethnoelephantology, etc. Moral rules, and what is fair or just, in each case become worked out in this multispecies context. Although there are still examples of close interactions with other species in some cultural communities, the modern Western world has forgotten the interspecies memory of deep time. The latter therefore reinforces the challenge to dogmatic assertions about human uniqueness. Indeed, I would go as far as to suggest that our distinctiveness is honed through interrelationships with other beings, each of which has their own distinctive way of being in the world.

How “fairness” and “justice” might be worked out in such cross-species relationships in evolutionary terms will be via struggle and negotiation across

the specific forms of inequity aversion and justice-making characteristic of the single species but now melded and reshaped by close contact with others in that community.

## Deception and Lying

What could be called the shadow side of human morality is also worth considering as a counter to any implication that human moral behaviors are inevitably bound up with the lives of other animals in positive ways. A particularly interesting example that illustrates lines of commonality and distinctiveness is that of deception, common to all animals, and its relationship with lying, uniquely characteristic of humans. According to Jennifer Saul (2012), lying in the first place requires a type of saying, something false needs to be said in order to lie. However, it is not just about saying something false (as in jokes, for example) but more commonly saying something false with an intention for another to believe that what is said is true (Saul 2012, 6–7). It is a type of warranting (Saul 2012, 11).

Biologist Robert Mitchell proposes different levels of deception, beginning with basic mimicry through to behavioral deceptions. Snakes will sometimes feign death, and predatory fireflies mimic the reproductive displays of other species to capture them (Mitchell 1993, 68). In Mitchell's definition, something like camouflage would not count as deception.

Part of the difficulty of understanding deception biologically is that if deception is common, then it is not obvious why there would be a response. It therefore must be part of a more general system in which "honest" signaling is the norm, as well as means of detecting those who give incorrect information to their own advantage or who "cheat."

A good example of a common biological deception is false predator alarm calls between birds when feeding: the cost of not responding to a predator is death, while the cost of responding to a false alarm is the temporary loss of food.

Anthropologist Donna Kean and her colleagues have observed important physiological changes among tufted capuchin monkeys, *Sapajus nigritus*, when making false alarm calls (Kean et al. 2017, 37–46). Vocal production in terrestrial mammals is linked with affective states, and specific calls arise spontaneously, rather like human laughter. However, Kean and associates report behavioral and neurobiological evidence to suggest there is voluntary control over whether to produce an alarm call in each emotional state. So, the emotional state may be necessary but not sufficient on its own to account for such calls. Their results showed that for tufted capuchins observed both in the wild and in captivity, anxiety was a necessary precondition for producing false alarm calls.

In a manner akin to morality and justice, psychologists and evolutionary biologists generally treat different forms of human deception in social communities as natural phenomena to be explained rather than a matter of

ethical judgment of right or wrong. The basic ability to deceive others is viewed as a psychological adaptation to learning the demands of living with others in a community (Lewis and Saarni 1993). Deception may be used either for socially approved goals or for reasons that provoke subsequent condemnation or distrust.

There are usually strong psychological motivations behind human deception, so there may be: (a) a fear of being found out because of misdeeds, (b) a sense of threat at another's dominance, or emotions of envy or greed, or (c) in some cases, a protective or caring desire for vulnerable others (Lewis and Saarni 1993, 7).

As well as these mixed motivations, deception may have different degrees of self-awareness, including self-deception. Lying that is self-aware can take the form of first covering up a misdeed to avoid punishment, interpreted as part of an adaptive strategy in children as young as two years of age (Lewis and Saarni 1993, 9–17). Second, it can be an attempt to gain advantages, such as cheating in school, common from elementary level. Third, it can be a deliberate exaggeration to gain attention, also known as emotional dissemblance, found in children as young as three years of age. Even by five years of age, children can use deception in manipulative ways in order to attract attention or gain other advantages.

Self-illusory deception, where the individual is not aware of that deception, is harder to identify in young children, but there is some evidence that children are capable of it from about seven years. An example would be believing a dead animal will suffocate if it is buried in the ground. Lies are socially binding in the sense that they can bring people together under a common lie. Yet, when directed against others, lies can break into violence. Hannah Arendt's (1972) analysis of the ineffectiveness of outrage about lying in politics is true to the extent that moral outrage against the racism and misogyny in the case of Trump seems to make very little difference to his popularity.<sup>7</sup>

## The Language of Lies

What are the relationships between biologically driven deception and lies? Are lies just exaggerated forms of deception?

Theologian Jesse Couenhoven claims predispositions that seem to be based on deep psychologically driven tendencies amount to social sciences' support for the idea of original sin. His main point is that even if we cannot help involuntary forms of sin, we are still responsible, and "we should not be too ready to excuse ourselves" (Couenhoven 2013, 3). He argues that the doctrine of original sin, in the light of psychological tendencies towards self-deception, brings empirical plausibility to the doctrine of original sin (Couenhoven 2013, 220).

Couenhoven's argument is interesting but only adequate if the natural tendency for self-deception is in direct continuity with the basic ground for lying. Augustinian thinking, by prioritizing grace as over against natural tendencies to sin, is ambiguous in so far as it is only "realist" in the manner suggested by Couenhoven in so far as it acknowledges the biological depth of the capacity for sin. Further, even if we agree with the moral importance of truth telling, Augustine's own absolutist analysis of the evils of lying leads to some troubling ethical conclusions.

Rowan Williams (2014, 1–34) resists the view that the natural sciences are sufficient to capture the meaning of language. He develops the transcendental dimension of language, including the place of silence as part of making meaning (Williams 2014, 156–85). It follows, therefore, that his understanding of language renders a discussion of lying rather different from deception, since it highlights the fact that lying is not simply a matter of lack of correspondence to a given fact but rather subtler: a falsity whereby an active agent bears false witness (Williams 2014, 45).

Could lying also therefore be language free, that is, through a specific and deliberate use of silence? This is theoretically possible in Williams's scheme, though he does not discuss it; further, the philosophy of language tends to focus on the explicit use of language to deceive as part of the definition of a lie.

There are two different philosophical traditions on lying (MacIntyre 1994). One is broadly based on intention to deceive; here, some lying is permissible depending on motivations or consequences. Aristotle followed this view. While he is generally negative about the permissibility of lying, especially that related to boasting and false humility, he allows for some lies to be morally permissible when they harm no one and when they stem from an excellence rather than a deficiency in character (Zembaty 1993).

The other tradition, followed by Immanuel Kant, is narrower; in this case, lying is never permissible. According to this tradition, the distinction between lying and misleading is significant, and deliberately giving misleading information that is technically not a lie is morally better than acts that tell lies.

A well-known narrative tells of St. Athanasius in disguise being asked by would-be persecutors, "Is Athanasius close at hand?" He replied, "He is not far from here." He technically did not lie but was deliberately misleading (MacIntyre 1994, 336). Of course, if Athanasius adhered to the first broader tradition on lying, then saying a deliberate lie to save his life would be permissible anyway. The point is that the second tradition goes to extreme lengths not to tell a lie.

Augustine and Aquinas are interesting as they each follow the two different traditions named earlier: Augustine supporting a more absolute stance against lying, and Aquinas modifying that approach and leaning more towards a broader

one that countenances some lies are permissible, or, in his case, count as venial rather than mortal sins.

Augustine believes the lie to be a deliberate act of duplicity. So

that man lies, who has one thing in his mind and utters another in words, or by signs of whatever kind. Whence also the heart of him who lies is said to be double; that is, there is a double thought: the one, of that thing which he either knows or thinks to be true and does not produce; the other, of that thing which he produces instead thereof, knowing or thinking it to be false. (Augustine 1887, §3)

Aquinas supports a more flexible approach and extends the broader category of lying as a sin against the truth that applies to communities as well as individuals who act in ways that disguise the truth. So,

just as it is contrary to truth to signify something with words differently than what one has in mind, it is also contrary to truth to use signs of deeds or things to signify the opposite of what is in oneself, and this is properly called dissimulation. Thus dissimulation is properly a lie told through the signification of outward deeds. (Aquinas 2012, 2a2ae, Qu. 3.1)

Aquinas, like Augustine, defines the lie, *mendacium*, as both saying something false and deceiving someone. He defines the lie as a sin against truthfulness, *veritas*, so it is always associated with *fasitas* (Aquinas 2012, 2a2ae, Qu. 110.1).

How far is deceiving related to human lying when considered from a biological perspective? It is worth commenting that biologists still call accurate signaling by animals honest signaling in a way that captures something of what is true about biological relationships. Of course, their own use of language to describe animal behavior is replete with human metaphors. It is often difficult to capture meaning without some resort to human metaphors, that is, anthropomorphic terms. The difference, in the case of human speech, is that humans alone can abstract ideas from situations and in a way that reflects veracity or falsehood. In Aquinas, the ability of the lie to deceive another is not so much intrinsic to the lie but rather its perfection, so a lie that deceives is successful but a lie that does not deceive is still lying. At the lower levels of deception in the biological world, it would not make sense to talk about deception that did not work; it simply would not be registered as deception.

Aquinas's allowance for moderate lying depends on his categorization of lies into mortal and venial sins. When a lie is about what refers to God, or about the human good in a way opposed to love, then it is a mortal sin. It is also a mortal sin when it intends to harm someone else, either directly or indirectly, as

in inciting scandal, for example. Aquinas defines the difference between mortal and venial sin as follows. Mortal sin arises “when the soul is so disordered by sin as to turn away from its last end, viz., God, to Whom it is united by charity, there is mortal sin; but when it is disordered without turning away from God, there is venial sin” (Aquinas 2012, 1a2ae, Qu. 72.5). All other lies are classified as venial sins, that is, they are not classified as against humanity’s end in God.

Aquinas’s more moderate position allows for some lies in some circumstances if the intent behind the lie is that of love rather than harm, such as to protect a child or vulnerable person. In naming lies as sins against God, against the virtue of truth, he also refuses to accept a purely reductionistic explanation for their existence. As with many aspects of the moral life, Aquinas intends to be faithful to Augustine while moderating or qualifying his position. In this respect, it depends on how far venial sins are considered serious in the moral life. By naming such lies sins, of a qualified sort, Aquinas refuses to declare any lie a good. However, distinguishing mortal and venial sins permits a more flexible approach to the moral life that avoids rigidity. Such an approach is also more compatible with what is known about moral psychology. At the same time, given his elevation of the importance of truth, Aquinas refuses to reduce ethics to that psychology. In so far as a lie is always against the sin of truthfulness, it can never be classified as a good. At the same time, by softening the condemnatory approach to all lying characteristic of Augustine’s position, Aquinas’s position takes account the complexity of moral decision-making in difficult or challenging circumstances where to tell a lie would lead to significant harm.

## Conclusions

I entitled this article “We See in a Glass Darkly: Exploring the Hermeneutics of Virtue and Vice beyond the Species Boundary.” The premise for this title is that there are always limitations to our understanding but exploring the boundary between humans and other animals in the explicit area of morality, and specific virtues and vices in particular, is illuminating not just for enabling a deeper understanding of both animals and humans but also for the engagement between science and religion. I have tried to illustrate this by reference to what is arguably one of the universal moral norms across cultures—justice—and a universal immoral norm—lying. Of course, I could have discussed contemporary trends towards post-truth, which work against both science and morality, but that would be another article. Justice and lying, I suggest, draw on tendencies found in other animals and go deep into our evolutionary history, especially if we associate justice with fair play. At the same time, human morality becomes considerably more complex, and explicit abilities such as self-deception or lying are unique to humankind. Rather than seeing such negative

tendencies as support for the idea of original sin, I prefer to understand this as part of helping explain the origin of sin. Drawing together both scientific and classical Christian thinking means that self-conscious decisions need to be made about what morality means—it is partially illuminated by psychology and evolutionary science but never reduced to it—otherwise, we arrive at a debunking of morality on the basis that moral truth or even justice-making are convenient social norms simply to aid cooperation.

---

## Acknowledgments

After the kind invitation of Dr. Finley Lawson and the organizing committee, a slightly modified version of this article was first delivered as a keynote lecture at the Science and Religion Forum 2023 conference entitled “Humans and Other Animals: Multifaith Responses to the Significance and Symbolism of Animals in Science and Religion Dialogue” held in Cambridge, UK, August 30–31, 2023.

## Notes

- <sup>1</sup> Other examples include by-product mutualism, where the action of one party benefits another, or pseudo-reciprocity, where the actions of both parties benefit their partners as well as themselves, such as provision of food by one species in exchange for defense against threats, a situation where both parties benefit.
- <sup>2</sup> Primatologists are aware that the hominin lineage split from that which led to other primates six million years ago. However, that does not preclude the fact that primates are our nearest living relatives, so some common behavioral pathways in evolutionary terms are likely.
- <sup>3</sup> For further discussion of this point, see Celia Deane-Drummond (2019, 56 n.48).
- <sup>4</sup> Just as biologists are hesitant to use the term “freedom” for other animals, preferring the more generic term “agency,” so, until comparatively recently, most biologists studying social animals, even in their natural settings, hesitated to use the term “justice.”
- <sup>5</sup> I am grateful to Aaron Gross for this observation, made during a workshop entitled Faith, Scepticism, and Human–Animal Boundaries in Jewish and Christian Religious Cultures held in Hamburg, Germany, at the Maimonides Centre for Advanced Studies/Jewish Scepticism, August 9–10, 2023, where I presented a paper entitled *Moral Evolution beyond the Species Boundary: Facets of a Christian Theological Anthropology*.
- <sup>6</sup> At the same time, Aquinas flagged reasoning as a distinctly human way of expressing the rights of nations, and it was the capacity for reason that eventually became a marker separating humans and other animals.
- <sup>7</sup> In the lead up to the 2024 presidential campaign in the United States, media observers noted that Donald Trump can now no longer recognize the distinction between truth and falsehood.

---

## References

- Aquinas, Thomas. 2012. *Summa Theologiae, Prima Secundae 71–114, Vol. 16*. Translated by Laurence Shapcote. Edited by John Mortensen and Enrique Alarcón. Lander, WY: Aquinas Institute.
- . 2012. *Summa Theologiae, Secunda Secundae 1–91, Vol. 17*. Translated by Laurence Shapcote. Green Bay, WI: Aquinas Institute.
- . 2012. *Summa Theologiae, Secunda Secundae 92–189, Vol. 18*. Translated by Laurence Shapcote. Edited by John Mortensen and Enrique Alarcón. Lander, WY: Aquinas Institute.
- Arendt, Hannah. (1971) 1972. “Lying in Politics: Reflections on the Pentagon Papers.” In *Crises of the Republic*. San Diego: Harcourt/Bruce.
- Augustine. 1887. *De Mendacio* §3 (*On Lying*). Translated by H. Browne. In *Nicene and Post-Nicene Fathers, First Series, Vol. 3*, edited by Philip Schaff. Buffalo, NY: Christian Literature Publishing Co.
- Bekoff, Marc, and Jessica Peirce. 2009. *Wild Justice: The Moral Lives of Animals*. Chicago: University of Chicago Press.
- Brosnan, Sarah, and Frans de Waal. 2014. “Evolution of Responses to (Un)Fairness.” *Science* 346:1251776.
- Brosnan Sarah F. 2011a. “A Hypothesis of the Co-Evolution of Cooperation and Responses to Inequity.” *Frontiers in Neuroscience* 5:43.

- . 2011b. “An Evolutionary Perspective on Morality.” *Journal of Economic Behavior and Organization* 77:23–30.
- Brosnan, Sarah F., C. Talbot, M. Ahlgren, S. P. Lambeth and S. J. Schapiro. 2010. “Mechanisms Underlying Responses to Inequitable Outcomes in Chimpanzees, *Pan troglodytes*.” *Animal Behavior* 79:1229–37.
- Burghardt, Gordan M. 2005. *The Genesis of Animal Play: Testing the Limits*. Cambridge, MA: MIT Press.
- Couenhoven, Jesse. 2013. *Stricken by Sin, Cured by Christ: Agency, Necessity and Culpability in Augustinian Theology*. Oxford: Oxford University Press.
- Darwin, Charles. (1870) 1985. “Charles Darwin to Asa Gray 15 March 1870.” In *The Correspondence of Charles Darwin*, edited by F. Burkhardt et al., 18:68. Cambridge: Cambridge University Press.
- de Waal, Frans. 2006. “Morally Evolved: Primate Social Instincts, Human Morality, and the Rise and Fall of ‘Veneer Theory.’” In *Primates and Philosophers: How Morality Evolved*, edited by Stephen Macedo and Josiah Ober, 1–80. Princeton, NJ: Princeton University Press.
- de Waal, Frans B. M., Kristin Leimgruber, and Amanda R. Greenberg. 2008. “Giving Is Self-Rewarding for Monkeys.” *Proceedings of the National Academy of Sciences USA* 105:13685–89.
- Deane-Drummond, Celia. 2017. “Empathy and the Evolution of Compassion: From Deep History to Infused Virtue.” *Zygon: Journal of Religion and Science* 52 (1): 258–78.
- . 2021. *Shadow Sophia: The Evolution of Wisdom, Vol. II*. Oxford: Oxford University Press.
- . 2019. *Theological Ethics Through a Multispecies Lens: The Evolution of Wisdom, Vol. I*. Oxford: Oxford University Press.
- Horowitz, Alexandra, and Marc Bekoff. 2007. “Naturalizing Anthropomorphism: Behavioral Prompts to Our Humanizing of Animals.” *Anthrozoos* 20:23–35.
- Joyce, Richard. 2006. *The Evolution of Morality*. Cambridge, MA: MIT Press.
- Kean, Donna, Barbara Tiddi, Martin Fahy, Michael Heistermann, Gabriele Schino, and Brandon C. Wheeler. 2017. “Feeling Anxious? The Mechanisms of Vocal Deception in Tufted Capuchin Monkeys.” *Animal Behaviour* 130:37–46.
- Lakshminarayanan, V., and L. R. Santos. 2008. “Capuchin Monkeys Are Sensitive to Others’ Welfare.” *Current Biology* 18:R999–R1000.
- Lewis, Michael, and Carolyn Saarni, eds. 1993. *Lying and Deception in Everyday Life*. New York: The Guildford Press.
- MacIntyre, Alasdair. 1994. *Truthfulness, Lies and Moral Philosophers: What Can We Learn from Mill and Kant?* Tanner Lectures on Human Values 1994, delivered at Princeton University. [https://tannerlectures.utah.edu/\\_documents/a-to-z/m/macintyre\\_1994.pdf](https://tannerlectures.utah.edu/_documents/a-to-z/m/macintyre_1994.pdf).
- Mitchell, Robert. 1993. “Animals as Liars: The Human Face of Non-human Duplicity.” In *Lying and Deception in Everyday Life*, edited by Michael Lewis and Carolyn Saarni, 59–89. New York: The Guildford Press.
- Neiworth, J. J., E. T. Johnson, K. Whillock, J. Greenberg, and V. Brown. 2009. “Is a Sense of Inequity an Ancestral Primate Trait? Testing Social Inequity in Cotton Top Tamarins (*Saguinus Oedipus*).” *Journal of Comparative Psychology* 123:10–17.
- Saul, Jennifer Mather. 2012. *Lying, Misleading and What Is Said: An Exploration in Philosophy of Language and in Ethics*. Oxford: Oxford University Press.
- Steiger, S., F. Ragna, A. K. Eggert, and J. Müller. 2008. “The Coolidge Effect, Individual Recognition and Selection for Distinctive Cuticular Signatures in a Burying Beetle.” *Proceedings of the Royal Society of London. Series B, Biological Sciences* 275:1831–38.
- Williams, Rowan. 2014. *The Edge of Words: God and the Habits of Language*. London: Bloomsbury.
- Zembaty, Jane. 1993. “Aristotle on Lying.” *Journal of the History of Philosophy* 31 (1): 7–29.





## The Spiritual Value of Biodiversity: Retrieving the Structural Theory of the *Imago Dei* for the Sake of Ecological Wisdom

**Eva van Urk-Coster**, PhD graduate, School of Religion and Theology, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, [eva\\_vanurk@outlook.com](mailto:eva_vanurk@outlook.com)

---

Nonhuman nature is commonly experienced as a rich source of spirituality. Religious traditions, therefore, can be especially helpful in addressing the current human-caused extinction crisis. This article asks what a more accurate understanding and retrieval of (parts of) the “structural” theory of the Jewish-Christian notion of *imago Dei* has to offer. The main argument is that because of humanity’s calling as creatures in God’s image, humans have been “graced” with the capacity to contemplate God in creation. In this respect, historical approaches ranging from Athanasius of Alexandria and Thomas Aquinas via John Calvin to Herman Bavinck and Emil Brunner direct our attention not so much to an alleged unique human rationality but to an apprehension of the divine wisdom uniquely granted to human beings. Therefore, we need to interpret the *imago Dei* as, among other things, the ability to affirm the worth of all life. Humanity is not singled out to be complacent but to serve the integrity of creation, as creation exists for God’s glory.

---



## Introduction

In a pastoral letter on ecology dating back to the late 1980s, the Catholic bishops of the Philippines asked what was happening to their beautiful land. The last strands of forest being logged and burned, they asked: “What about the birds? They used to greet us each morning and lift our spirits beyond the horizons of this world. Now they are silenced” (Catholic Bishops’ Conference of the Philippines 1988). Apparently, the daily arrival of the birds who “greeted” them was significant to their spiritual wellbeing. Indeed, apart from the fact that nonhuman species have an independent and inherent value, which already by itself makes them worthy of our protection, the world’s biodiversity also carries a spiritual value for many humans (see, e.g., Irvine et al. 2019, 213–47). Spiritual and religious traditions, therefore, should play a vital role in affirming the value of all life and providing arguments for nature conservation as part of a broad approach to counter today’s human-caused biodiversity loss (see, e.g., Irvine et al. 2019, 239). Now that a sixth mass extinction of species is starting to develop, this need is increasingly urgent, as human beings and other life forms are dependent on a healthy biodiversity for their own wellbeing and future existence (see, e.g., Cowie, Bouchet, and Fontaine 2022).

Unfortunately, however, Christian ecological theology has not yet sufficiently addressed the problem of the current human-caused mass extinction, unlike the more common theme of global climate change. Somehow, species extinction is much less on the theological radar (see, e.g., van Urk-Coster 2023, 121–23). Taking its cue from the need to change this situation, this article addresses the way a particular traditional religious view on the *imago Dei* (the biblical notion that human beings have been created in the image of God (e.g., Genesis 1:26–28) should be retrieved in order to develop a stimulating, contemporary theological perspective on the spiritual value of biodiversity.

In many ways, the so-called “structural” (or “substantial”) view of the *imago Dei* that was dominant in much of the Christian tradition up until the twentieth century has been discarded in recent theological anthropology. Whereas this structural approach sought to equate the *imago Dei* with some allegedly unique human quality or capacity so as to highlight humanity’s superiority over other creatures, the natural sciences have convincingly pointed out the biological commonalities between human and nonhuman animals. Thus, whereas human intelligence was always believed to be superior in that only human beings were supposed to be truly rational, nonhuman species turned out to be quite clever as well, navigating the world in their own specific and complex ways (see, e.g., Clough 2012, 26–30). However, I argue that where it concerns human intelligence, the classical structural view of the *imago Dei* is frequently being misunderstood by (eco-)theologians and, as a result, presented in a quite selective and limited manner. Instead of simply getting rid of the traditional historical connection between human intelligence and humanity’s having been created in God’s image,

we need to better understand how this particular rationality was perceived. That is to say, significant theologians like Athanasius of Alexandria and Thomas Aquinas did not so much argue for a special human rational capacity in order to set human beings apart from the rest of creation but were much more interested in humanity's spiritual capacity to contemplate God in the works of creation. In other words, the current mistake is to think of rationality in a bare modern way of "being able to think in a sophisticated manner" instead of putting it in the historical perspective of being able to receive and respond to God's revelation in the world.

Considering (1) a classical Christian theological perspective on God's (general) revelation, (2) the evolutionary development of religion in humanity, and (3) the role and importance of the *imago Dei* in this regard, I propose a retrieved understanding of using our special human intellect to keep creation's biodiversity intact.

### **The World as God's Theater: God's Revelation in Creation**

Nonhuman nature and biodiversity are commonly experienced as rich sources of psychological wellbeing and spirituality, leading, for example, to feelings of wonder, timelessness, and interrelatedness with nature. Empirical environmental psychology insightfully has mapped some of these experiences (taking place in locations ranging from the jungle to city parks) as they occur in various traditions and cultures, even among people who self-identify as secular (see, e.g., Irvine et al. 2019, 213–47).

From a classical Christian theological perspective on God's so-called "general" revelation, which is God's revelation in the created world, and on the life-giving presence of the Spirit, this is no surprise. Christianity classically espouses the view that "creation," with its magnificent variety, is a source of spiritual insight. That is to say, within major strands of the tradition, there has been the shared vision that the natural world is not closed in on itself but shows forth "signs" of the Creator, particularly God's eternal power, wisdom, and goodness (see, e.g., Schaefer 2022, 253). In this regard, John Calvin (1845, 64) famously described the world as it is displayed before our eyes as the theater of God's glory.

In the Calvinian tradition, the twentieth-century theologian Herman Bavinck (2004, 109), for example, writes that "[b]ecause the universe is God's creation, it is also his revelation and self-manifestation." In his view, "[t]here is not an atom of the world that does not reflect his deity" (Bavinck 2004, 109). Bavinck continued, in this regard, the neo-Platonic metaphysics of participation, which he considered a natural part of the undivided Christian doctrinal heritage (Huttinga 2014, 81–125). To be sure, Bavinck (2004, 555) was also of the opinion that "[w]hile all creatures display vestiges of God, only a human being is the image of God." This is indeed the traditional Christian view, which has

only recently come under criticism (see, e.g., van Urk-Coster 2021). Importantly, however, this “restriction” concerning the image of God only strengthens the notion of God’s vestiges, for the capacity to render the world intelligible and to be open to God’s revelation in it has classically been attributed to the human being as the *imago Dei*. As Alister McGrath (2008, 190) notes:

One of the central themes of the Christian tradition is that humanity is made “in the image of God” (Genesis 1:26–7). During the course of its extended engagement with this seminal text, the Christian church has come to see this as indicating that there is something intrinsic to human nature which enables it to discern, however dimly, the character of God in the created order . . . Part of the Christian understanding of human nature is its innate capacity, in consequence of its created status, of being able to recognize traces of the creator within the creation.

Significantly, as will come further to the fore, this view on the image of God is mainly related to its traditional structural or substantial explanation, which has been particularly influential in church history. As will be argued, this view still has advantages in light of ecological theological reflection on the value of nonhuman nature and biodiversity, as it speaks of human intelligence as ultimately aimed at apprehending God’s wisdom in the world (see, e.g., McGrath 2008, 190).

Indeed, despite the noetic effects of sin that have diminished and distorted humanity’s knowledge of God, the general idea in classical theology was that, even after the fall, no one can “pause” with the world’s splendor and not be moved by a deeper divine reality. Hence, what may be discovered about God in creation is not primarily a function of aesthetic appreciation but underlines the necessity of giving thanks and praise to God for God’s wonderful works that reflect the divine glory (Psalm 19:1) and giving God due recognition. Thus, the traces of God as they are present in the natural world are traditionally considered in the context of worship and apologetics—no one is “without excuse” when it comes to true worship of the one Creator (Romans 1:18–32). In this way, the human capacity to contemplatively recognize God’s presence in the natural world is accompanied by a moral duty, which is accountability to God—and both of these, in tandem, are essential aspects of the *imago Dei*. Since we did not live up to this duty, however, we need God’s “special” revelation through scripture in order to come to a fuller and “saving” knowledge of God (see, e.g., Haines 2021, 16, 35–37, 188).

On the one hand, these noetic effects of sin and the necessity of scripture for a full spiritual understanding have, of course, stimulated ongoing critical theological debates over the precise extent to which creation still reveals something of God and on the (distorting) influence of our historical, political, and personal contexts on our perception (see, e.g., McGrath 2016, 128–53). On

the other hand, however, scripture itself, from its own particular authority, keeps referring believers “back” to creation as they should closely observe and study the world’s wonders so as to mature spiritually. The biblical genre of Hebrew “wisdom literature” (e.g., Proverbs, Job, and Ecclesiastes) is especially rich in the valuable lessons nonhuman creation may provide to humans (see, e.g., Schaefer 2022, 253). This is found in the New Testament as well. For example, Jesus refers to our dealings with sparrows in order to teach about trust in God’s provisional care (Matthew 10:29–31). This demonstrates that there is a close dynamic between God’s “two books” of revelation (nature and scripture). Even without fully resolving valid questions about natural theology, nature’s wide diversity is a means through which God communicates Godself to humans in multiple and surprising ways. Moreover, the notion that humans have fallen into sin so that their capacity to sense God in nature has been damaged cannot serve as an excuse, for according to the New Testament, we are to be transformed and renewed in the wisdom of Christ, the true image of God (e.g., Colossians 3:10).

But can we, by any means, conceive of this human capacity to “sense” the divine through creation from a contemporary scientific perspective? In the following section, I discuss how theological anthropology reflects on the notion of *imago Dei* from the view that “religion” (and, thus, an openness to the divine) has evolutionarily developed in the human species, suggesting that at some point in history, “modern” humans emerged that could be addressed by God.

### **Being Addressed by God: The Evolutionary Development of Religion in Humanity**

Critically relevant to our examination (and retrieval) of the structural view of the *imago Dei* as a uniquely human spiritual capacity and the corresponding accountability to God, scholars like Joshua Moritz have rightly pointed out that any biological comparison between modern humans (i.e., *Homo sapiens*) and other now-extinct hominins like Neanderthals does not need to guide or tire us concerning the creaturely “inclusivity” of the theological category of the *imago Dei*. Since the *imago Dei* should, first of all, be located in God’s calling and election, we need not create fixed boundary lines demarcating who is in from who is out. As Moritz (2015, 57) aptly points out, “it is not human uniqueness that makes *homo sapiens* the image of God, but rather it is the image of God [understood in terms of God’s calling and election] that makes humans unique.” Yet, this is not to suggest that any mental capacities, for example, like mirroring and mental simulation, are irrelevant to how humans came to bear God’s image on the basis of God’s address. On the contrary, it is a legitimate and also vital question to ask, as I do in this section, how humans may have become evolutionarily “prepared” for God’s address and invitation to enter into communion and fulfill a moral responsibility. After all, humanity’s spiritual and graced capacity to discern something of God in creation depends on this trajectory.

In what follows, therefore, I describe the connections made in theological anthropology between scientific perspectives on the development of religion in humans and the notion of *imago Dei*. In this respect, I follow the suggestion of Celia Deane-Drummond (2014a, 70) that “[i]f . . . human image-bearing is about the religious as much as it is about the rational capacity, then one might expect that a focus on the particular ways in which human beings have evolved would shed some light on that image-bearing.” In particular, of course, it is relevant here how, in the course of their evolutionary development, humans eventually became religious.

Indeed, in present-day perspectives on the image of God, which draw on evolutionary anthropology and paleontology, the bestowal of the divine image is commonly attached to the first signs of religious awareness in the human species (see, e.g., Burdett 2018, 27–31). Gijsbert van den Brink, for example, draws on J. Wentzel van Huyssteen and situates the modern first humans (exemplified by the biblical figures of Adam and Eve) around the time of the Upper Paleolithic revolution, which saw an “explosive growth of human creativity” some 45,000 years ago (van den Brink 2020, 189; see also van Huyssteen 2006, 66). As van den Brink (2020, 175–76) indicates, referring to interpretations of Paleolithic cave art in French and Spanish regions, it is at this stage “that an artistic and religious awareness can be demonstrated that corresponds to people experiencing themselves as being addressed by God, or the transcendent.” Hence, he suggests that it was such “*Homo sapiens* who came to bear the image of God . . . [and] became *personally addressable and accountable*” (van den Brink 2020, 189). In such a theistic-evolutionist scenario, Adam and Eve are the “representatives of this first group of human beings that could be addressed by God in personal communication” (van den Brink 2020, 189–90). On the basis of their enlarged consciousness and more strongly developed relational and moral capacities, the Fall became a possibility, as humans were then free and capable of either responding to God in obedient ways or deliberately continuing on the track of their inherited aggressive inclinations. Unfortunately, “they took the wrong track” (van den Brink 2020, 192–93; see also Ward 1998, 133; Polkinghorne 2009, 166; Smith 2017, 63).

Notably, van den Brink reflects on the development and deep-seated presence of religion in humanity by discussing the burgeoning field of the cognitive science of religion (CSR) in light of a theological notion of God’s self-revelation. Pushing back against the widespread perception that scientific enterprises like CSR have “explained religion away,” he argues that there is no real conflict between a theological doctrine of revelation and cognitive theories like a “hyperactive agency detection device,” which causes humans to postulate “actors” behind sudden sensory experiences like hearing a cracking branch (van den Brink 2020, 241–64). Pointing to Romans 1:19–20—“God has shown his eternal power and divine majesty through the things he has made in creation”—and the theology

of John Calvin, who spoke of a “universal awareness of God (*sensus divinitatis*) implanted in the human mind,” van den Brink (2020, 257–58) suggests that “[w]e may actually feel inclined to thank God for them [i.e., such cognitive and evolutionary mechanisms] since God sovereignly used them to serve as channels of his revelation.” In other words, God may be seen to have prepared the human species through evolutionary processes for a conscious and “open” response to God’s transcendent reality and calling. It is precisely in this respect that we may refer to the *imago Dei* as starting with God’s calling of humans to fulfill a special role and responsibility in creation (nonhuman creatures being valued by God as well, having their own occupations in evolutionary development and the flourishing of creation). As van den Brink (2020, 157) tellingly indicates: “It is God who endowed us with a stunningly unique assemblage of personal, aesthetic, moral, and religious characteristics. God, as it were, evoked them in us in order to call us into his image.”

Others, like Niels Henrik Gregersen, have pointed in the same direction. Drawing on cognitive anthropologist and evolutionary psychologist Pascal Boyer, Gregersen (2006, 323) postulates that “[t]here are . . . a spontaneity and effortlessness about religious imagination [that are] fully in accordance with the Judeo-Christian assumption that human beings are created in the image and likeness of God, and thus designated to engage in communication with God.” Although the biological sciences have pointed out the commonalities between humans and other animals, and (as mentioned earlier) much theological talk on human uniqueness has thus vanished or become unreliable, there is still ground to posit a way humans are significantly “different” from other creatures. That is to say, whereas other species have their own relations to God—think, for example, of biblical language about nonhuman worship of God—Deane-Drummond (2014a, 66) is correct to observe: “Among animals, only humans are capable of worrying about their own animality and its significance in relation to human self-identity; only humans discuss the fine points of what it means to express freedom; only humans are knowingly religious beings.” Regarding the presence of religion in nonhuman animals, she states that “[s]cientists do not seem to be suggesting that other animals are religious, although some ethologists do seem to permit the idea that this cannot be ruled out of court” (Deane-Drummond 2014a, 70).

Without wishing to define the *imago Dei* as humanity’s religious capacity, which would amount to a narrowing of its meaning, it does refer to the unfathomable way in which God continuously addresses human beings with the intention of “opening them up” to God’s presence in creation. As indicated, even when the *imago Dei*—and human uniqueness—is “located” in God’s calling and election of the human species, there is no need to deny the insights from the natural sciences into our developmental history, which can even lend depth and credibility to it. From a theistic-evolutionary perspective, the human species went through a

“graced” trajectory as it (through interspecies processes) developed its religious endowments. This is by no means a downplaying of God’s sovereign initiative towards humans to state that these natural “structures” needed to be in place.

### **A Graced Capacity to Recognize Traces of God in Creation**

In the previous section, I explored how the development of religion in humanity has been formative in humans’ consciously relating to God and becoming a morally responsible species with the possibility of “sin.” How does insight into this trajectory, also given the ecological havoc humans cause, make it relevant to retrieve the strand of the traditional structural theory of the *imago Dei* that postulates the graced capacity of humans to contemplate God in the works of creation?

In this section, I argue, by drawing on Emil Brunner and Alister McGrath, that God’s revelation to humans indeed presupposes a certain preparation or “tailored” reflective human perception. This preparedness for divine disclosure gives credit to our retrieval of the classical structural view of human intelligence. The way Athanasius of Alexandria and Aquinas, for example, understood this quality as ultimately aimed at apprehending God’s wisdom in the world is capable of speaking to the contemporary need for ecological wisdom.

According to Brunner (1946, 31), humanity received the unique possibility and capacity to both be addressed by God (*Ansprechbarkeit*) and to respond to God’s address (*Verantwortlichkeit*). Given this (creaturely) specialness of humanity, which aligns closely with what I argued for earlier, Brunner—in his famous exchange about natural theology with Karl Barth in 1934—was right to point out that “any approach to natural theology ultimately rests upon a prior *theological* understanding of human nature” (McGrath 2016, 39). As McGrath (2016, 39; see also 2014, 90–148) argues:

It is not enough to suggest that God is disclosed through nature; human beings must have the capacity to recognize this disclosure as such, whether through their natural capacities, or through the healing of those capacities through grace. The doctrine of the *imago Dei* represents a theological formulation of the “preparedness” of humanity for divine disclosure.

Leaving aside the valid concerns of Barth regarding any political and societal misuses of such a natural theological perspective, as he theologized in the context of the rise of Nazi ideology, it is important to accept that God’s revelation to humans presupposes a “tailored” human perception. Present-day biodiversity destruction asks for this acceptance, as we need to make better sense of the value of nonhuman creation in displaying the traces of God. As McGrath (2008, 161) points out: “One of Brunner’s most fundamental criticisms of Barth is that he allows no conceptual space for the active involvement of humanity in the process of the interpretation of nature.”

It is here that we are instructively reminded of the *imago Dei's* traditional connotation of allowing humans, through their unique form of intelligence, to comprehend creation as referring to God. For indeed, this connotation of the *imago Dei* (i.e., as the capacity to recognize traces of God in creation) resonates with the “long-standing view that the *imago Dei* designates the human capacity to reason—or, more accurately, to conform mentally to the patterns established by the divine *Logos* within creation—and hence to discern God, albeit partially and imperfectly” (McGrath 2008, 190). In this connection, Deane-Drummond (2014a, 70) explains that Aquinas did not so much connect the *imago Dei* to our “intellectual capacity” but to “the intelligence of human beings as directed toward the capacity for revealed knowledge.” Formulating what Aquinas had in mind, she speaks of humanity’s “graced nature” in the context of God’s nearness to all creatures. According to Deane-Drummond, Aquinas was especially concerned with the “higher” human abilities to know and love God. In this regard, one should also think of recognizing how all of creation reflects something of God the Trinity (see, e.g., Deane-Drummond 2014b, 307).

Another characteristic example of the *imago Dei* as related to humanity’s gift of spiritual discernment is brought forward by Denis Edwards as he draws on Athanasius of Alexandria. In Athanasius, he finds an ecologically relevant perspective in which humans are enabled through God’s Wisdom (i.e., Christ) to contemplate God’s presence to all creatures. As Edwards (2016, 19; see also Athanasius 1891, 981–82) sets out:

[F]or Athanasius, all creatures are in their own way made according to the Image of Wisdom. Each of them is a creaturely reflection of uncreated Wisdom . . . In human beings, according to Athanasius, the imprint and reflection of divine Wisdom is found in their human wisdom . . . Because humans possess this gift of wisdom, they have the capacity to recognize the image of Wisdom in other creatures . . . The imprint of divine Wisdom in humans enables them, in their encounters with other creatures, to come to know the Wisdom who made them. And in knowing this Wisdom, they can also know the Source of All, the Father. They can come to know the triune God through the imprint of Wisdom found in the creatures around them.

What this vision of Athanasius signifies to Edwards in light of contemporary ecological theological reflection is that our human experiences of nature may genuinely testify to God. However, what about our experiences of and confrontation with creaturely suffering, that of ourselves and other species? In this regard, Edwards suggests that an element of ambiguity remains as we are struck by “pain, loss, death, and extinction” as part of evolution. Considering whether we can experience God in all our different encounters with nonhuman creation, Edwards (2016, 14) stresses that “we need to think

of God as radically present, even in the loss and pain evident in biological life and in the costs of evolutionary emergence.” Crucial here is the larger perspective of “the good news of Jesus,” as Athanasius also presented us with a God who is revealed (more fully through “special” revelation in the scriptures) as love and promises liberation and fulfillment. Hence, Edwards (2016, 22–23) states, “the glimpses we have of the presence of the God of love in the natural world can be trusted.”

In the movement of the contemporary field of theology away from structural towards relational approaches of the *imago Dei*, it seems to have overlooked this very specific way in which theologians like Athanasius and Aquinas spoke about the role of human intelligence and wisdom. As Aku Visala (2018, 65; a rare exception to this general movement) rightly points out, the structural theory of the *imago Dei*, in its traditional form, is concerned with the presence of intellectual capacities (that were thought to be located in the soul) that “not only make rational action possible but also make it possible for humans to . . . respond to the revelation of God . . . [and] relate to God in a special way.”

In his well-received theological anthropology, Marc Cortez, for example, does not refer to these particularities. He only engages the bare notion that the structural approach of the *imago Dei* (with its considerable “historical influence”) focuses on “some capacity or a set of capacities constitutive of being human that reflects the divine being in some way” (Cortez 2010, 18). Although this is, of course, not mistaken, he thus glances over the revelatory element of the *imago Dei* (which is, in itself, deeply relational) to critically consider the structural view’s arguments from human uniqueness and the assumed “parallels in the divine being,” like that God also “clearly has the capacity for rational thought” (Cortez 2010, 18). Next to its lack of exegetical support, Cortez (2010, 19–20)—like many critics—finds the structural approach unsatisfactory because of “the growing [scientific] realization that many of the things we once thought distinguished humans from the rest of creation are, in fact, shared with other creatures as well.”

However, because, as I have argued, we need a theological account of the “preparedness” of humans for divine disclosure, and the notion of *imago Dei* historically relates to such a graced capacity for revelation and spiritual discernment, we cannot just discard the age-old relation between intelligence and the *imago Dei* because evolutionary science has now proved that we are not unique in being intelligent (other creatures being surprisingly smart as well). From a more careful theological perspective, we can still say that humans are specially gifted with a keen eye to see nonhuman creation’s great sophistication. Thus, it is presumably only humans who can learn to joyfully contemplate God’s mysterious ways with creation, for example, to go to the ants, consider their ways, and be wise (Proverbs 6:6). From this attitude, humans are to fulfill their God-given calling to care responsibly for the world.

Unfortunately, of course, traditional structural perspectives on the image of God have been embedded in overtly hierarchical and anthropocentric worldviews. Think, for example, of the influential ancient worldview of the Great Chain of Being (the *scala naturæ*) that was dominant from Greco-Roman antiquity until well into the nineteenth century. This view presented a fixed hierarchy of being in which God was at the top of the ladder, followed by angels, humans, animals, plants, and, all the way at the bottom, stones and minerals. Humanity was located somewhere in the middle, below the angels, with whom it shared mental capacities of ratio and intellect, but above the animals, with whom it shared corporeality and mortality. In this regard, the human was a “microcosm” that uniquely united spiritual and material assets. The full “macrocosm” (i.e., the universe) was reflected in the human being. Not surprisingly, in relation to the notion of *imago Dei*, the worldview of the ladder reflected the idea that humans—with their immortal and rational souls—were more spiritual and therefore closer to the being of God than other animals, which were irrational and governed by instinct. From this perspective, animals were often denied a place in salvation and eternal life (see, e.g., Lovejoy 1936; cf. for this paragraph van Urk-Coster 2020, 80–81).

However, while such “outdated” perspectives should rightfully be criticized, as they deny other creatures an independent status and place before God and are out of touch with both scientific and biblical notions of humanity’s more “horizontal” embeddedness in creation, there still is a need to posit the value of the human capacities for intellectual wisdom and spiritual discernment. Precisely because the world reflects God’s glory, this glory needs to be recognized and responded to by humans in light of keeping and cherishing its diversity and integrity. The notion of God’s revelation in nonhuman creation becomes distorted if it is suggested that nonhuman creation merely exists for humans’ material and spiritual needs. Augustine (2002, book 1, chapter 16, §26), for example, believed God created ferocious animals to punish wayward people and instill fear in them so that they would not become attached to earthly life but focus on God’s promises. But criticizing such anthropocentric views is not to deny that humanity possesses a unique intellectual and practical power capable of influencing every sphere of the created world—for better or worse (think also of the concept of the Anthropocene).

In recent cognitive psychology research, the concept of “spiritual intelligence” has been coined—and this exactly pinpoints what I have in mind here. Fraser Watts and Marius Dorobantu (2023b, 1–2; cf. Dorobantu and Watts 2023a) insightfully posit that this is not a special type of intelligence but the way our “normal” human intelligence functions within the spiritual life in various and related ways. They distinguish six main characteristics that play a role here. The first is “ineffability,” which they describe as “a powerful sense of reaching a deeper understanding of things, but one . . . not able to articulate” (Watts and

Dorobantu 2023b, 6). The second characteristic is “embodiment,” understood as “religious cognition . . . mediated through the particular way in which human persons are embodied” (Watts and Dorobantu 2023b, 8). The third is “open-minded attention,” as in “[being] open to unexpected experiences of spiritual significance” (Watts and Dorobantu 2023b, 8). The fourth is “pattern-seeking meaning-making,” which they understand as “making sense of things, . . . in ways that characteristically make use of intuitive and conceptual intelligence” (Watts and Dorobantu 2023b, 8). The fifth is “participation,” having in mind “participating in the spiritual world rather than studying it in a detached way” (Watts and Dorobantu 2023b, 9). The sixth and last is “relationality,” because “spiritual experiences always arise in the context of a cultural tradition” (Watts and Dorobantu 2023b, 9). Clearly, spiritual intelligence is complex and multifaceted. From this broad understanding, highlighting the importance of humanity’s “intelligent” religious endowment—as key to the *imago Dei*—might be seen as a recognition of what God desires from humans as they contemplate reality in all its facets. The natural sciences, as we have seen, only reinforce the intuition that there is a way in which humans are religious that other animals are not (at least, not as sophisticatedly).<sup>1</sup> We do not need to posit a “rational soul” or, in a detailed way, engage in describing human faculties or dispositions that would render us unique or even analogical to God in order to do justice to that point. Rather, more holistically, we need to recognize that we are called to serve God and cherish God’s creation with our entire existence.

But does not such a view imply that mentally disabled people, for example, are excluded from the *imago Dei*? That is by no means the case. As Visala (2018, 68) argues through a common response to such a critique as it relates to structural elements, “people lacking fully developed intellects are images of God because they have the potential to develop such capacities . . . and belong to a community of humans.” In this fashion, also a sweet and tiny baby praises God when it crows with delight in response to the playful jumps of the house cat. In other words, the message nonhuman creation delivers to human beings is manifold and diverse—the notion of divine accommodation, according to which God adapts God-self in revelation to our level and limitations, applies. In Calvin, “[c]reation itself, the cosmological order, is one impressive way by which God, in his majesty, adapts himself to the measure of human beings” (van der Kooi 2016, 49). Thus, God’s revelation in the world already refers to an adaptation to the human measure. God is “skillful” and loving in reaching all creatures, and as the world is full of God’s wisdom, we need to urgently better protect it in the face of rampant biodiversity loss. Indeed, the notion of *imago Dei* has been firmly connected to ecological views on humanity’s role and responsibility as, for example, stewards, co-redeemers, and priests of creation. Causing a sixth mass extinction comes down to destroying God’s wisdom in the world, with detrimental consequences to the integrity of creation in its praise of God.

## Conclusion

In this article, I have addressed the question of what a more accurate understanding and retrieval of (part of) the “structural” theory of the *imago Dei* has to contribute to valuing biodiversity. The main argument is that because of humanity’s calling as creatures in God’s image, we have been “graced” with the capacity to contemplate God in the works of creation. In this respect, the historical examples ranging from Athanasius and Aquinas via Calvin to Bavinck and Brunner direct our attention not so much to an allegedly unique human rationality but towards an apprehension of the divine wisdom as displayed in creation that is uniquely granted to human beings. Therefore, we need to interpret the *imago Dei* as, among other things, the relational ability to affirm the deep worth of all forms of life as reflecting their Creator. Humanity is not singled out to be complacent but to serve the integrity of creation as it exists for God’s glory.

---

## Acknowledgments

This publication is part of the (completed) project “The *Imago Dei* in a Time of Mass Extinction: Rediscovering the Spiritual Value of Biodiversity,” with file number PGW.18.007, of the program PhDs in the Humanities, financed by the Dutch Research Council (NWO).

## Note

- <sup>1</sup> In answering his question of whether the structural theory of the image of God will survive evolution, Visala (2018, 77–78; see also Jenson 1999, 60–63) indicates that “there might be ways in which one could preserve the commitment to the uniqueness of the God–human relationship as reflected in the *imago Dei*. One could, for instance, emphasize that in STIG [the structural theory of the image of God] the image of God is not simply identical to having some measure of mental life (which we now know many species have) but is instead to have the intellectual, moral, and social capacity for religious thinking and behavior—that is, to use theologian Robert Jenson’s terminology, to be able to be addressed by God and to respond to him.” In relation to Jenson, Visala (2018, 78) comments: “Although Jenson rejects STIG, the point he makes is compatible with it.”

## References

- Athanasius. 1891. “Against the Arians (Apologia Contra Arianos IV).” In *Athanasius: Select Works and Letters*, edited by Philip Schaff, 800–1101. Grand Rapids, MI: Christian Classics Ethereal Library. <https://ccel.org/ccel/s/schaff/npnf204/cache/npnf204.pdf>.
- Augustine. 2002. “On Genesis: A Refutation of the Manichees.” In *On Genesis*, edited by John E. Rotelle, 39–102. Translated by Edmund Hill. New York: New York City Press.
- Bavinck, Herman. 2004. *Reformed Dogmatics. Vol. 2: God and Creation*. Edited by John Bolt. Translated by John Vriend. Grand Rapids, MI: Baker Academic.
- Brunner, Emil. 1946. “Nature and Grace.” In *Natural Theology, Comprising “Nature and Grace” by Professor Emil Brunner and the Reply “No!” by Dr. Karl Barth*, translated by Peter Fraenkel, 15–64. London: Geoffrey Bles.
- Burdett, Michael. 2018. “The Image of God and Evolution.” In *Finding Ourselves after Darwin: Conversations on the Image of God, Original Sin, and the Problem of Evil*, edited by Stanley P. Rosenberg, Michael Burdett, Michael Lloyd, and Benno van den Toren, 27–31. Grand Rapids, MI: Baker Academic.
- Calvin, John. 1845. *Institutes of the Christian Religion*. Translated by Henry Beveridge. Grand Rapids, MI: Christian Classics Ethereal Library. <https://ccel.org/ccel/c/calvin/institutes/cache/institutes.pdf>.
- Catholic Bishops’ Conference of the Philippines. 1988. “What Is Happening to Our Beautiful Land.” <https://cbcponline.net/what-is-happening-to-our-beautiful-land/>.
- Clough, David L. 2012. *On Animals. Vol. 1: Systematic Theology*. London: Bloomsbury T & T Clark.
- Cortez, Marc. 2010. *Theological Anthropology: A Guide for the Perplexed*. London: T & T Clark.
- Cowie, Robert H., Philippe Bouchet, and Benoît Fontaine. 2022. “The Sixth Mass Extinction: Fact, Fiction or Speculation?” *Biological Reviews* 97 (2): 640–63.
- Deane-Drummond, Celia. 2014a. “In God’s Image and Likeness: From Reason to Revelation in Humans and Other Animals.” In *Questioning the Human: Toward a Theological Anthropology for the Twenty-First Century*, edited by Lieven Boeve, Yves De Maeseneer, and Ellen Van Stichel, 60–75. New York: Fordham University Press.
- . 2014b. *The Wisdom of the Liminal: Evolution and Other Animals in Human Becoming*. Grand Rapids, MI: Eerdmans.
- Dorobantu, Marius, and Fraser Watts. 2023a. “Spiritual Intelligence: Processing Different Information or Processing Information Differently?” *Zygon: Journal of Religion and Science* 58 (3): 732–48.

- Edwards, Denis. 2016. "Experience of Word and Spirit in the Natural World." In *The Nature of Things: Rediscovering the Spiritual in God's Creation*, edited by Graham Buxton and Norman Habel, 13–26. Eugene, OR: Pickwick Publications.
- Gregersen, Niels Henrik. 2006. "What Theology Might Learn (and Not Learn) from Evolutionary Psychology: A Postfoundationalist Theologian in Conversation with Pascal Boyer." In *The Evolution of Rationality: Interdisciplinary Essays in Honor of J. Wentzel Van Huyssteen*, edited by F. LeRon Shults, 306–26. Grand Rapids, MI: Eerdmans.
- Haines, David. 2021. *Natural Theology: A Biblical and Historical Introduction and Defense*. Moscow, ID: Davenant Press.
- Huttinga, Wolter. 2014. *Participation and Communicability: Herman Bavinck and John Milbank on the Relation between God and the World*. Amsterdam: Buijten & Schipperheijn.
- Irvine, Katherine N., Dusty Hoesly, Rebecca Bell-Williams, and Sara L. Warber. 2019. "Biodiversity and Spiritual Well-being." In *Biodiversity and Health in the Face of Climate Change*, edited by Melissa R. Marselle, Jutta Stadler, Horst Korn, Katherine N. Irvine, and Aletta Bonn, 213–47. Cham, Switzerland: Springer.
- Jenson, Robert. 1999. *Systematic Theology. Vol. 2: The Works of God*. New York: Oxford University Press.
- Lovejoy, Arthur O. 1936. *The Great Chain of Being: A Study in the History of an Idea*. Cambridge, MA: Harvard University Press.
- McGrath, Alister. 2008. *The Open Secret: A New Vision for Natural Theology*. Oxford: Blackwell.
- . 2014. *Emil Brunner: A Reappraisal*. Oxford: Wiley-Blackwell.
- . 2016. *Re-Imagining Nature: The Promise of a Christian Natural Theology*. Hoboken, NJ: Wiley-Blackwell.
- Moritz, Joshua M. 2015. "Does Jesus Save the Neanderthals? Theological Perspectives on the Evolutionary Origins and Boundaries of Human Nature." *Dialog* 54:51–60.
- Polkinghorne, John. 2009. "Scripture and an Evolving Creation." *Science and Christian Belief* 21 (2): 163–73.
- Schaefer, Jame. 2022. "Venerating Earth: Three Sacramental Perspectives." In *The Cambridge Companion to Christianity and the Environment*, edited by Alexander J. B. Hampton and Douglas Hedley, 247–62. Cambridge: Cambridge University Press.
- Smith, James K. A. 2017. "What Stands on the Fall? A Philosophical Exploration." In *Evolution and the Fall*, edited by William T. Cavanaugh and James K. A. Smith, 48–64. Grand Rapids, MI: Eerdmans.
- van den Brink, Gijsbert. 2020. *Reformed Theology and Evolutionary Theory*. Grand Rapids, MI: Eerdmans.
- van der Kooi, Cornelis. 2016. "Calvin's Theology of Creation and Providence: God's Care and Human Fragility." *International Journal of Systematic Theology* 18 (1): 47–65.
- van Huyssteen, J. Wentzel. 2006. *Alone in the World? Human Uniqueness in Science and Theology*. Grand Rapids, MI: Eerdmans.
- van Urk-Coster, Eva. 2021. "Created in the Image of God: Both Human and Non-Human Animals?" *Theology and Science* 19 (4): 343–62.
- . 2020. "Een treetje lager? Antropocentrisme in christelijke theologie." In *Leven dat leven wil: Over dieren en mensen in filosofie, religie en kunst*, edited by Johan Goud and Frank G. Bosman, 77–87. Almere: Uitgeverij Parthenon.
- . 2023. "Introduction: Why (Reformed) Theology Needs Reflection on Biodiversity Loss and Extinction." *Journal of Reformed Theology* 17 (2): 121–23.
- Visala, Aku. 2018. "Will the Structural Theory of the Image of God Survive Evolution?" In *Finding Ourselves after Darwin: Conversations on the Image of God, Original Sin, and the Problem of Evil*, edited by Stanley P. Rosenberg, Michael Burdett, Michael Lloyd, and Benno van den Toren, 64–78. Grand Rapids, MI: Baker Academic.
- Ward, Keith. 1998. *God, Faith, and the New Millennium*. Oxford: Oneworld.
- Watts, Fraser, and Marius Dorobantu. 2023b. "Is There 'Spiritual Intelligence'? An Evaluation of Strong and Weak Proposals." *Religions* 14 (2): 265.





## Humanimals of Earth: Interconnectedness as an Ethical Imperative in the Dialogue between Quantum Mechanics and Buddhism

Allan Furic, PhD candidate, School of Divinity, University of Edinburgh, Edinburgh, UK,  
[afuric29900@gmail.com](mailto:afuric29900@gmail.com)

---

This article investigates the interconnectedness of reality in the dialogue between quantum mechanics and Buddhist philosophy, from which is extracted an ethical stance on humanimal relationship. More precisely, physicist David Bohm's ontological implicate order and *Huayan* Chinese Buddhism share a commonality of the preponderance of the whole, respectively expressed through the underlying unbroken wholeness of the nonlocal implicate order in Bohm and interpenetration in *Huayan* philosophy. Although caution is exerted in establishing such convergence of holistic thinking, a recurring and pervasive "principle of wholeness" can be inferred from this dialogue. In turn, this principle of wholeness is interpreted in an ethical way, providing a much-needed heuristic rearmament to encourage a revision of humanimal relationship, nurtured by a revived moral dedication. In a fundamentally interconnected universe, animals no longer represent an unfathomable and controllable "other" but become an instance of a reciprocal togetherness, an echo of the undifferentiated whole.

---



## Introduction

The relationship between humans and animals is at present significantly imbalanced and unhealthy, essentially (but not entirely) characterized by a stark human attitude of dominance over what are considered “resources” of planet Earth. At the heart of this relationship is a profound human estrangement from nature that inappropriately fosters a dualistic mode of existence between us and the world, and even among ourselves. But what if nature was in fact much more interconnected than is apparent? This article is situated precisely on this issue and endeavors to unveil the latent interconnectedness of the universe and its usefulness for humanimal relationship.<sup>1</sup> Hither, the dialogue between science and religion, as represented in this instance by a conversation between quantum mechanics and Buddhist philosophy, is particularly germane.

The idea that reality is described as fundamentally interconnected in both quantum mechanics and Buddhism has been one of the recurring topoi of New Age enthusiasts, perhaps paradigmatically represented by Fritjof Capra’s ([1975] 2010, 130–31) *The Tao of Physics*:

The most important characteristic of the Eastern world view—one could almost say the essence of it—is the awareness of the unity and mutual interrelation of all things and events, the experience of all phenomena in the world as manifestations of a basic oneness . . . As we study the various models of subatomic physics we shall see that they express again and again, in different ways, the same insight—that the constituents of matter and the basic phenomena involving them are all interconnected, interrelated and interdependent; that they cannot be understood as isolated entities, but only as parts of the whole.

Understandably, such claims received considerable critique from scholars, notably for misrepresenting Asian religions as a syncretistic entity (the equivocal “Eastern mysticism”; Esbenshade 1982, 225) and asserting that ancient mysticism merely anticipated the discoveries of modern physics (Crease and Mann 1990, 310). To an extent, these well-founded critiques and the literature they deconstructed perhaps had too much of a negative impact on the scholarly world. This had the unfortunate effect of limiting the scope of theories purporting to relate physics and Buddhism as a genuine subdomain of inquiry within science and religion. While no overarching limitation is systematically observed, the scholarship has heretofore tended to analyze this particular dialogue along the questionable and ambivalent rhetoric of “parallelism” characteristic of Capra’s (and his followers’) work.<sup>2</sup> Undoubtedly, this is not the only reason for the limited development of the field, nor has it annihilated any serious attempt at bridging science and Buddhism.<sup>3</sup> For instance, the limited development of the field is to be contrasted with the discussions of mainstream science and

religion, which remain predominantly focused on the intersection of science with Christianity (with a notable rise of Islam as a conversation partner). The level of complexity and breadth of themes of interest—both in terms of theoretical content and methodological approaches—is unmatched in science and Christianity/Islam compared to science and Buddhism. Comprehensibly so, the latter conversation is of late arrival in the science and religion narrative (Jinpa 2010, 871), which historically represents an enterprise of the Western cultural background from the time of the Scientific Revolution onwards, with precedents during the medieval Islamic Golden Age. But the fact is that thus far, the subfield of physics and Buddhism remains relatively marginal in scope, with insufficient attention to Buddhist lineages outside the Indian context and other interpretative frameworks of quantum theory.

In this context, and *contra* the general tendency, this article argues that there is a bona fide representation of interconnectedness in both quantum mechanics and Buddhist philosophy, one that is nonidentical to the assertions of equivalence of worldview made by New Agers like Capra but nonetheless showcasing a ubiquitous “principle of wholeness” in nature. More specifically, the interconnected state that animates the universe at its most fundamental level is therein introduced through the dialogue between physicist David Bohm’s ontological model of the “implicate order” and Huayan Chinese Buddhism (Chinese: 華嚴). While there are other interpretative theories of quantum mechanics, and philosophical schools of Buddhism that adduce interconnectedness in multiple ways, the dyad Bohm/Huayan exemplifies one of the most penetrative and illustrative accounts of large-scale interconnectedness. Because interconnectedness is deemed fundamental in the universe, it ought to question not simply our perception and understanding of reality but also (and perchance more importantly) our sense of an ethically responsible relationship with everything that exists, including animals. Indeed, in a world where the whole is primary, animals should no longer represent a controllable and unfathomable “other” free for us to exploit but an instance of a reciprocal togetherness.

As such, the argument is expressed in two parts: first, by carefully presenting and engaging with Bohm and Huayan’s respective reading of the wholeness of reality; and second, by explaining the ethical viewpoint emerging out of this dialogue. In both parts, potential drawbacks are considered to provide a nuanced and relative reading of interconnectedness. But first, in order for the reader to understand the theories advanced by Bohm and Huayan Buddhism, some brief elements of context are provided.

Huayan Buddhism is considered one of the highest philosophical developments of Chinese Buddhism, and more generally a milestone of Mahāyāna Buddhism (Williams [1989] 2009, 132–40). Born in the seventh century CE under the T’ang dynasty (618–907 CE), the school focused exclusively on the study of the *Avataṃsaka Sūtra* (Chinese: *Huayan jing*, 華嚴經), a later Mahāyāna sūtra of a

predominantly idealistic character (i.e., centered on consciousness as the source of reality) (Hamar 2014, 145; Cook 1977, 20). The five patriarchs who acted as masters of the school endeavored to develop a profoundly holistic explanation of the universe characterized by the “interpenetration” of all things, wherein the one contains the many, and the many dynamically reflect the one. Their metaphysical and complex analytical writings demonstrate a substantial move from earlier Indian Mahāyāna, especially of the kind by Nāgārjuna (ca. second to third century CE), as Huayan philosophy was infused with a distinctively realist and positive Chinese spirit (Khalil 2009, 59). The practical holistically oriented ethos of Taoism that imbued Chinese society indeed influenced the Huayan patriarchs to give more ontological substance to Buddhist doctrines, foremost among which was the interpenetration of all things.<sup>4</sup>

At the other end of the spectrum, Bohm’s implicate order is based on the pilot-wave interpretation of quantum mechanics proposed in his seminal 1952 paper. In stark contrast with the standard formulation of quantum mechanics, which sees the wave function as a mathematical tool from which can be obtained probabilities for particular physical outcomes in experiments, Bohm posited the wave function to be a real physical phenomenon separate from particles but guiding them along determined trajectories. The specificity of this wave function in Bohm’s model is that it is inherently nonlocal, i.e., interconnected through entangled relations irrespective of spatial distance, due to a new term Bohm introduced in the mathematical formalism: the “quantum potential” (Bohm and Hiley 1975, 1–4). The centrality of nonlocality in Bohm’s interpretation later led him to propose the implicate order as an ontological model of reality emphasizing the preponderance of the whole, in which the particular implicates everything and is itself contained within each segment of the whole.

### **On the Principle of Wholeness in Nature**

Bohm and Huayan Buddhism each developed a type of “holistic” thinking of reality (i.e., the whole is more than the sum of its parts) that was in many ways innovative and counterintuitive in their time. Both indeed promoted a radical worldview in which they substituted the particular for the whole, thereby instigating a sharp discrepancy from our ordinarily localized and fragmented apprehension of reality. They understandably came from very different horizons. Bohm was a theoretical physicist puzzled by the prevailing attitude of the physics community to only see quantum physics as a remarkably accurate tool to correctly predict results of experiments, bereft of any tangible metaphysical rhetoric. From the 1950s onwards, this view would be epitomized by the dismissive and rather daunting “shut up and calculate” motto, although the forefathers of quantum theory would certainly not have approved of such an instrumentalist definition (Kaiser 2011, 3). The Huayan patriarchs were primarily concerned with matters of causality to explicate the

interdependent nature of reality. All phenomena arise in dependence upon causes and conditions so that none can exist independently from the whole, a concept known as “dependent-origination” in Buddhist philosophy (Sanskrit: *pratītyasamutpāda*, Chinese equivalent: *yuánqǐ*, 緣起). As was enunciated by the Buddha, human beings tend to cling to transitory objects and phenomena in an endless search for completeness through external things. But since everything within the universe is by nature impermanent, this inclination to attachment invariably leads to suffering. The first of the Four Noble Truths substantiates suffering as a principle pervasive in nature, originating in craving for permanence, but from which we can free ourselves by following the Noble Eightfold Path towards *nirvāṇa* (i.e., full contemplation of the end of suffering) (Gethin 1998, 59).

The objectives of Bohm and Huayan could not have been more different then. But as is shown throughout this article, they in fact ended up closer in their exposition of reality through attention to interconnectedness. What they had in common from the outset was a desire to push beyond the frontier of what was conventionally established and undisputed, infused by a mindset of discovery characteristic of the human spirit in times of breakthroughs.

An important point to understand first is that this particular relationship between Bohm and Huayan does not reveal the phenomenon of wholeness per se. The notion of wholeness is already applicable to either of the two fields, independent of their relationship, as is expounded later. The purpose of putting them in conversation lies in emphasizing how a given idea recurs in two contrasted spheres of human knowledge. Therefrom, it may be argued that observing several occurrences of interconnectedness effectively, though inductively, uncovers a principle of wholeness in nature common to various cultures throughout the history of humankind. Let us proceed.

Huayan constitutes a distinct development in the history of Buddhism marked by a clever rewriting of the philosophy of “emptiness” from early Mahāyāna as a state of “interpenetration” of all things (Anālayo 2020, 1099–100; Cook 1977, 14). Emptiness (Sanskrit: *śūnyatā*, Chinese: *kōng*, 空) is the idea that all things are interdependent because they lack intrinsic existence and properties; they cannot exist as reified entities but must necessarily be interconnected and interdependent by virtue of their causal relations. The Huayan patriarchs made a direct association of emptiness with interdependence, identifying it as the ultimate nature of reality. In the process, they also reinterpreted and furthered interdependence as interpenetration. This dialectic movement is, however, relatively abstruse within the philosophical writings offered by the patriarchs, and in a sense is quite comparable to Western analytic philosophy and its emphasis on mathematical reasoning applied to philosophy. Therefore, the following presentation of the philosophical underpinnings of interpenetration will be slightly complex to fathom for the unfamiliar reader, although caution

will be taken to simplify as much as possible without losing the substance of the argument.

Within Huayan metaphysics, interpenetration is expounded in a fourfold framework. In Buddhist terminology, this is referred to as the Realm of Dharmas (Sanskrit: *dharmadhātu*, Chinese: *fajie*, 法界), which can be broadly equated with the universe (Fox 2009, 73; Cook 1977, 3). Although *Dharmadhātu* is fundamentally unified, it is also represented in four parts to allow the categorizing and unenlightened analytical mind to elucidate its meaning. Simply stated, the four parts of the *Dharmadhātu* comprise the Chinese version of the doctrine of Two Truths central to Buddhist philosophy—Principle/noumenon (Chinese: *li*, 理) and Phenomena (Chinese: *shi* 事)—and their mutual entailment (Fox 2009, 74).<sup>5</sup> While *li* represents the ultimate principle of emptiness and interpenetration per se, *shi* is the direct translation of the phenomenal world in all its multifariousness. Far from being disconnected, *li* and *shi* form a dyad of complementary concepts, an approximate characterization of a fluctuation between two incessantly interpenetrating levels of reality. The key to this interpenetrative account of the world resides in the mutual entailment of both concepts, as the dynamic relationship between the ultimate reality and the conventional phenomenal world exemplifies how phenomena intermingle to simultaneously partake of the undifferentiated wholeness of *li* because of their mutual identity, while being plural and dissimilar in *shi*. Both levels of reality are fully identical with each other, making it possible for the one (=Principle) to contain the many (=Phenomena) and the many to evince the one. By way of analogy, one could think here of the perichoretic union of the Trinity in Christian theology. The three persons composing the Trinity—the Father, the Son, and the Holy Spirit—are consubstantial hypostases of God, in the sense that each dynamically partakes of the divine and the others while being individualized as a person. Naturally, there is no direct correspondence here between *perichoresis* and the *Dharmadhātu*, for the *Dharmadhātu* is solely concerned with the universe humans (and other dharmas) indwell, while *perichoresis* describes the interplay between the simultaneous transcendence and immanence of Godself. The *Dharmadhātu* is a perspectival, fractal apprehension of the nature of reality, where *perichoresis* exceeds the universe itself through God as the extraneous force of creation.

A suitable illustration of this whole/part mereological relationship between *li* and *shi* can be seen in the metaphor of the ocean used by the first Huayan patriarch, master Dushun (557–640 CE) in his *Meditations on the Huayan Dharmadhātu* (Chinese: *Huayan Fajie Guan Men*, 華嚴法界觀門). In this metaphor, the ocean is the epitome of the universal and unbounded *li*, whereas the individual wave is a representation of *shi*, and their natures dynamically intertwine and reflect one another:

The meditation observes:

This all-embracing principle is beyond [the comprehension of the] ordinary mind and is difficult to understand. It cannot be depicted [properly] by means of any metaphor of this world. [But being compelled now to illustrate the subject, the following metaphor is used.]

The entire ocean is [embodied] in one wave, yet the ocean does not shrink. A small wave includes the great ocean, and yet the wave does not expand. Though the ocean simultaneously extends itself to all waves, it does not by this fact diversify itself; and though all waves simultaneously include the great ocean, they are not one. When the great ocean embraces one wave, nothing hinders it from embracing all other waves with its whole body. When one wave includes the great ocean, all other waves also include the ocean in its entirety. There is no obstruction whatsoever between them. Contemplate this. (Translated in Chang [1971] 2008, 146)<sup>6</sup>

One can see here how Dushun renders the complex interwovenness of *li* and *shi* by showing how each part is simultaneously different from and identical to the whole. According to this metaphorical description of reality, one phenomenon includes the whole without omission or need for expansion. The whole of reality is completely contained within each of its individual phenomenal expressions. This is only possible because phenomena are mutually identical in their emptiness. Master Fazang (643–712 CE), the third and most eminent Huayan patriarch, articulates in his *Treatise of the Golden Lion* (Chinese: *Jinshizi zhang*, 金獅子章) how interpenetration constitutes the kernel of Huayan teaching: “All is one, because all are the same in lacking an individual nature; one is all, because cause and effect follow one another endlessly. Capacity and Function encompass each other, and whether folded into one or unfolded into many, each is in its place. This is called the ‘all-encompassing Mahāyāna teaching of oneness’” (translated in Van Norden 2014, 88–89).<sup>7</sup>

At this stage, the description given of interpenetration in Huayan philosophy may remain partially, although hopefully not entirely, mysterious. Such bewilderment is perfectly normal and for the most part a result of the way one is supposed to access this profound understanding of reality as interpenetrative. A realization of the deeply undivided nature of the universe can only happen in deep meditation, where the subject’s consciousness truly experiences this wholeness and identification of everything within oneself.

In Bohm’s ontology, interconnectedness is drawn from the causal interpretation of quantum mechanics based on so-called hidden variables. This interpretation was originally developed to remedy the abstruse “measurement problem” of quantum mechanics—the fact that observation in experiments seems to ineluctably disturb the state of a quantum system

by collapsing its wave function to a definite actuality (i.e., precise quantities such as position, momentum, or energy, which cannot be in a state of superposition once measured). Bohm (1985, 114) supposes that a particle has a well-defined position  $X$  at all times and is guided by a new type of wave field assumed to be an “independent actuality that [exists] on its own, rather than being merely a function from which the statistical properties of phenomena could be derived.” Bohm therefore sees the wave function as a real physical phenomenon. A prime consequence is that the multidimensional space in which the wave function evolves, otherwise part of the mathematical abstraction in the standard formulation, is similarly considered real. In the language of quantum theory, this  $3N$  configuration space is the sum of all the coordinates  $(x, y, z)$  of particles within a physical system (i.e., two electrons in a system will be represented by a six-dimensional real wave function, with three dimensions each) (Barrett 2019, 191; Bohm [1980] 2002, 237). In correlation, the wave field is described by a “guidance” equation that satisfies Schrödinger’s linear equation but contains an extra term from which Bohm derived his ontological interconnectedness, the quantum potential ( $Q$ ). The quantum potential is nonlocal; it works through influences at a distance known as entanglement. Such nonlocality has been empirically proven on multiple occasions and seemingly foregrounds the idea that physical reality is wholly interconnected at the largest scales, extending in principle to the entire universe (Bohm and Hiley 1975, 7).

Bohm thinks these radically novel characteristics of the quantum potential in multidimensional space expose the inadequacy of the reductionist model underlying most of contemporary science. The present language and concomitant worldview of physics is indeed improper to characterize reality, because nonlocality cannot be thought of as a collection of parts but only as a complete system where the parts are organized by the whole. Embracing the hidden potentialities of interconnectedness in this case requires scientists to adopt a reinvented framework to conceptualize the world, “a new notion of physical reality, in which we start from *unbroken* wholeness of the totality of the universe” (Bohm and Hiley 1975, 11). With the implicate order, Bohm devises a mereological system capable of unveiling the dynamic relation between the interconnected reality and its parts.

In this model, the whole is implicit as an enfolded potential within every single thing and dynamically unfolds into the explicate order of extended phenomena. The implicate enfolded state of wholeness, akin to a hologram, is made possible due to the nonlocal character of the quantum potential, whereas the explicate unfolded state of matter gives a certain degree of independence to phenomena. Bohm (1990, 273) encapsulates the implicate order as follows in one of his last papers:

The essential feature of this idea was that the whole universe is in some way enfolded in everything and that each thing is enfolded in the whole. From this it follows that in some way, and to some degree everything enfolds or implicates everything, but in such a manner that under typical conditions of ordinary experience, there is a great deal of relative independence of things. The basic proposal is then that this enfoldment relationship is not merely passive or superficial. Rather, it is active and essential to what each thing is.

That the whole universe is enfolded as a potential in each thing, and reciprocally each thing is contained everywhere within the whole hither means that an atom, for instance, contains the whole universe enfolded in it and is itself scattered as an information potential in every corner of the universe. Bohm ([1980] 2002, 232–33) further emphasizes this point in his main opus *Wholeness and the Implicate Order*:

Such enfoldment and unfoldment in the implicate order may evidently provide a new model of, for example, an electron, which is quite different from that provided by the current mechanistic notion of a particle that exists at each moment only in a small region of space and that changes its position continuously with time. What is essential to this new model is that the electron is instead to be understood through a total set of enfolded ensembles, which are generally not localized in space. At any given moment one of these may be unfolded and therefore localized, but in the next moment, this one enfolds to be replaced by the one that follows. The notion of continuity of existence is approximated by that of very rapid recurrence of similar forms, changing in a simple and regular way . . . Of course, more fundamentally, the particle is only an abstraction that is manifest to our senses. *What is* is always a totality of ensembles, all present together, in an orderly series of stages of enfoldment and unfoldment, which intermingle and inter-penetrate each other in principle throughout the whole of space.

This dynamic state of enfoldment/unfoldment is made possible because what undergoes the process is pure information (or “active information” in Bohm’s terminology). There is thus no issue of extreme density that would appear should any fundamental particle contain all the matter of the universe.

The foregoing descriptions of Huayan and Bohm seem eminently similar. Is it sufficient to state that both are converging on a worldview that grounds reality in a holistic process? I argue that it is. Convergence does not mean differences are overlooked. After all, the distinction between *li* and *shi* in *Huayan* metaphysics is not identical with the implicate and explicate orders. Whilst *li* and *shi* are more intermeshed by concentrating on the reality of causal phenomena—that is, they are internally related as a characterization of a unitary reality—the implicate and

explicate orders are externally related, with a possible dissociation due to the relative independence of phenomena in the explicate unfolded state of matter. In lieu of equivalence, there is in fact complementarity and mutual enhancement between the two theories. The mathematical foundations of the implicate order in the causal interpretation buttress the theoretical *li/shi* framework with a physical and practical representation (through nonlocality). In return, the Huayan Two Truths doctrine supplies the implicate order with an illustrative imaginative power. Both Bohm and the Huayan patriarchs agree on the fact that the ultimate understanding of such a principle of wholeness remains accessible only through imagination and internal perception, however (Bohm and Hiley 1975, 12). For instance, it is possible (although not likely, subject to empirical confirmation) that the meditative experience of wholeness rendered analytically and metaphorically by the Huayan patriarchs is itself higher dimensionally, explaining the difference of perception from regular states of consciousness where the whole is enfolded to meditative states of consciousness pervaded by nonlocality. Therefore, one can admittedly infer from this dialogue that there exists a timeless principle of wholeness in nature that is represented in various cultures, whether modern scientific experimental theories or ancient religious and metaphysical ones.

### **An Ethical Perspective on Interconnectedness**

Owing to the highly metaphysical nature of the argument on the interpenetration of reality presented by Bohm and the Huayan patriarchs, adopting an ethical stance thereof, especially of the sort of applied ethics, would be done with great difficulty. This is not to say that interpenetration is ethically inconsequential, for the implications of a principle of wholeness in nature are far-reaching, extending beyond mere metaphysical speculations. What is suggested instead is that ethics needs to be extracted, inferred from such a principle of wholeness, so that its full potential can be, as it were, applied to society. This could indeed in principle affect the worldview, and resultantly *modus vivendi*, of the human species. Within the scope of this article, it is thence relatively apropos to discuss and defend an ethically inclusive revision of humanimal relationship based on metaphysical interpenetration.

One of the most problematic and questionable aspects of the relation between humans and animals is that animals are usually approached from an exclusively (and unidirectional) human-oriented perception. Knowledge is acquired through the senses and processed by the brain of the subject having a conscious experience of self-awareness of the other, e.g., animals here. This is a direct result of a complex biological evolution that led to the emergence of unsurpassed sentience in human beings, which sets us apart from the rest of the animal kingdom. But this complex self-reflexive consciousness is concurrently responsible for the deleterious behavior of dominance commonly observed

by humans on Earth. As animal behavior specialist Lynda Birke (2011, xix) tells us, this alarming, claimed superiority of our adaptable minds over the rest of nature is carried by a dualistic and strongly compartmentalizing spirit between us and the controllable “other.” This ill-adapted mindset has been progressively incorporated into society following the rise in the Western world of the mechanistic theoretization process innately characterized by a tendency to dichotomize the inert from the animated, objects from subjects, and animals from humans (Selby 2004, 23).

Thus, faced with an evident perceptual fragmentary reality, the issue is to know how to restore the deeply ingrained state of wholeness so that we can be in alignment with our true nature as an instance of the whole embodying interconnectedness rather than separation. Environmental ethics specialist Lisa Kemmerer (2011, 81) acutely reflects on this point by suggesting that “[t]oday, what we need . . . is not theorizing ‘others,’ but a change of heart and a change of lifestyle. If we are to save ourselves, our planet, and these many individuals, we must see and accept our commonality with all creatures and stop posing theories that begin with an assumption of critical difference.” For her, the very process of theorizing about the other is detrimental in its own right, until we as a collective are capable of mapping out new or renewed ways of handling humanimal relationship that would “reflect an understanding that we and they [i.e., animals] are one” (Kemmerer 2011, 79). Is theory necessarily laden with dualism, and hence bound to failure in our attempt to develop a discourse on the relations between all living creatures (including us)? While the mechanistic paradigm cannot remedy this issue of separation, built as it is on an instrumentalist view of nature, the principle of wholeness inferred from Bohm and Huayan philosophy can help decentralize the eye from human beings and promote a much more symbiotic and lateral relationship with animals.

What are the practical implications of this thinking of interpenetration? If the whole is enfolded in every part, as Bohm and the Huayan patriarchs argue, then one must recognize that animals contain us as an information potential as much as we contain them. In a universe of interpenetration, the one always reflects the whole, while simultaneously being enfolded in it. Every action performed that leads to exploitation and suffering (e.g., using animals for sustenance or experimenting on them for medical and cosmetic purposes) thusly affects us by virtue of our interconnection. However, with the exception of empathetic feeling of the suffering of others, these actions seldom cause a reaction within us because of the relative degree of independence of macroscopic systems, a consequence of Bohm’s pilot-wave interpretation and extension in the implicate order. In addition, our sensory perception evidently presents us with a spatial localization that induces separation between objects and can scarcely accommodate the higher dimensional ground of the implicate order or the intimate experience of interpenetration of the meditative practitioner. Should

this be seen as a limitation of interpenetration, which might be effective only at the quantum level or in deep states of meditation? The answer is both yes and no. Yes, since macroscopic objects like animals are not subject to quantum effects of entanglement due to decoherence (i.e., loss of information of complex systems to the environment upon interaction). No, because interpenetration is also a matter of macroscopic causation, as expressed by the Huayan patriarchs. Understood along this line, the principle of wholeness is a communion of theories presenting converging but nonidentical perspectives on fundamental interconnectedness, a diachronic and multilayered prospect that favors the whole in place of the singular.

To give a more nuanced response and understand where one stands regarding the ethics of interconnectedness, some issues are hereinafter introduced. Does recognizing the interconnectedness of all things specify the ways in which we should behave towards animals? In other words, does the principle of wholeness simply constitute a heuristic tool that should spur us into acting in communion with animals? Wholeness by itself does not incentivize action, in that there is no logically necessary consequence between the theoretical (and partially empirical) claim of interconnectedness and the following normative statement of promoting action. This is the Humean fallacious is/ought argument (Comstock 2016, 168–69). Noticing a recurring principle of wholeness in nature does not warrant adopting an interconnected mindset and acting accordingly, nor does interconnectedness alone lead to action, as Bhikkhu Anālayo remarks (2020, 1100). This is further reinforced by the inductive inferential nature of the argument that does not have the same degree of logical consistency and cogency as a deductive argument. Nevertheless, even if the principle ought us not to take action, as it were, it still gives sufficient leeway to encourage prioritizing the whole, which may drive actions as a result. The dialogue between Bohm and Huayan's interpenetrative thinking therein represents not a completely new ethics but "a new moral rearmament, a revival of moral dedication" (Frankena 1979, 3). As Birke (2011, xviii) recalls in *Theorizing Animals*, theory matters precisely because it nurtures change, and hither permits a reconstruction of the whole as radical interconnectedness that is all but common knowledge in our present day and age (see also David Selby (2004) for an adaptation of radical interconnectedness to environmental education).

The second issue pertains to the specific focus on humanimal relationship. The whole is by nature undifferentiated, encompassing the diversity of its parts but remaining itself a universal, unchanged entity that is not merely identical with a sum of its parts. The place of animals within this framework is therefore questionable, not in the impossibility for animals to feature in the whole (as they belong to this universe as much as everything else) but in the critical difference one should be expected to make if relying solely on a general principle of wholeness. Neither Bohm nor the Huayan patriarchs

provide an answer to this question, understandably so as they were focused on matters of ontology and metaphysics. Whether in Bohm or in Huayan, the metaphysical models of interconnectedness are horizontal, in that both are indifferent to the minutiae of particulars. Buddhist scholar Ye Xiong (2024, 7) expresses thus the meaning of such equality of animate and inanimate things within the whole in the context of Huayan: “Even if it seems like there is no direct relationship between two distinctive objects (or dharmas), they are connected within the *dharmadhātu*.”<sup>8</sup> If the implicate order and the *Dharmadhātu* are unconcerned with individuated things in reality, then one might encounter a paradox *vis-à-vis* the present discussion on animal ethics. For where would lie any legitimacy in prioritizing animals over and above, say, elementary particles? This points to an innate deficiency of the usefulness of a general order of fundamental interconnectedness for practical matters like animal rights and interspecies interactions. This paradox necessitates further study, as it might showcase the limits of metaphysical considerations in informing societal growth. Perhaps the words of historian of religions Thomas Berry (2006, 8) can inspire a provisional response: “Although the intimacy exists with the stars in the heavens and with the flowering forms of earth, this presence of humans with the other members of the animal world has a mutual responsiveness unknown to these other modes of being throughout the universe.” Berry’s poetic statement shows that the relation with animals, despite being grounded in the larger interconnectedness of the universe, has a unique mode of interaction with humans enacted through our shared sensory capacity to respond, even in nonverbal ways. In the animals, we find a voice to be heard that reflects our inherent relatedness, a voice upon which we should construct a theory of the whole.

To that end, an important step to be taken would be to promote the science and religion dialogue through a holistic lens. Holism is of particular interest in its restructuring of reality by reversal of the reductionist mindset, but it has too often been rejected as a manifestation of New Age thinking considered improper in the academy. Yet, many areas within the science and religion discourse can benefit from this holistic turn. Not only is holism (in its whole-over-particular analytical dimension) a persistent theme in various religious traditions—from Christian Trinitarian theology to the Hindu unity of *Ātman* in Brahman and the equivalence of “above” and “below” in Hermetic philosophy—but it has also become prevalent in contemporary science (evidently in quantum mechanics from the aforementioned, and emergence in biology and systems theory).<sup>9</sup> Holism does not discard other modes of thinking in science and religion but invites an inclusive approach that transcends the barrier between so-claimed independent or conflictual magisteria in the mind of the general public, and can even provide a path towards more integration for the scholar. The all-embracing nature of holism can become a powerful tool to transfer the

academic discourse to society and find new ways of interaction betwixt our subjective selves and the objectified other that would part with the tendency to divide the world.

By way of conclusion, let me simply quote these powerful and inspiring words from Lynda Birke (2011, xvii) that embody the convergent principle of wholeness of quantum mechanics and Buddhist philosophy this article purports to cultivate: “Humans, nonhumans, ecosystems—all are profoundly entwined. Just maybe, out of all this intense debate we might wake up to the fact that we humans are not alone, that we inhabit this world with an astonishing array of others, whose lives we affect by our actions.”

---

## Notes

- <sup>1</sup> “Humanimal” is not related to the Humanimal Trust but merely emphasizes on a symbolic level the symbiotic relation between humans and other animals as a way to dismantle the barrier between us and them.
- <sup>2</sup> See *inter alia* Lars English (2006), Christian T. Kohl (2007), Michael A. Peters (2022), and David Leong (2023), who all allude to the parallelist correspondence between Buddhism and quantum physics from different angles.
- <sup>3</sup> See the volume edited by Alan B. Wallace, *Buddhism and Science: Breaking New Ground* (2003), and the authoritative study by Donald S. Lopez, *Buddhism and Science: A Guide for the Perplexed* (2008).
- <sup>4</sup> For a development of the idea that Chinese society was chiefly holistic through Taoist values, see Russell Kirkland (2004, 212–15).
- <sup>5</sup> The doctrine of Two Truths distinguishes two levels of reality: the conventional, where separation and unchangeableness seem evident (Sanskrit: *samvṛti-satya*), and the ultimate, where dharmas are fundamentally empty and relational (Sanskrit: *paramārtha-satya*) (Williams [1989] 2009, 78).
- <sup>6</sup> Dushun’s text—a primary and influential source of Huayan metaphysics—can be found in the East Asian Buddhist canon, the *Taishō Shinshū Daijōkyō*, text 1883, vol. 45 (Xiong 2024, 1). Other, more recent translations exist (see, for instance, Fox 2009), but Chang’s version has the merit of circumscribing the poetic dimension of the ocean metaphor in Dushun’s metaphysics.
- <sup>7</sup> The *Treatise of the Golden Lion* was an expedient means used by Fazang to teach Empress Wu Zetian (624–705 CE) the ways of Huayan through a metaphorical appraisal of the gold and the lion shape as substitutes for *li* and *shi*, respectively. See *Taishō* 1881, vol. 45, for a version of the text with commentaries, and Ye Xiong (2024) for an exegetical reading of the treatise.
- <sup>8</sup> Another *Huayan* specialist, Imre Hamar, explains that Fazang extends the Mahāyāna doctrine of Buddha nature (Sanskrit: *tathāgatagarbha*) to all *dharmas*, including inanimate objects (2014, 158).
- <sup>9</sup> See Farah Shroff (2011) for a cross-disciplinary analysis of the concept of holism in Buddhism, Hinduism, and Indigenous cultures and Capra and Pier Luigi Luisi (2014) for a detailed volume on systems theory and emergence.

---

## References

- Bohm, David. 1952. “A Suggested Interpretation of the Quantum Theory in Terms of ‘Hidden Variables’. I.” *Physical Review* 85 (2): 166–79.
- . (1980) 2002. *Wholeness and the Implicate Order*. New York: Routledge.
- . 1985. “Hidden Variables and the Implicate Order.” *Zygon: Journal of Religion and Science* 20 (2): 111–24.
- . 1990. “A New Theory of the Relationship of Mind and Matter.” *Philosophical Psychology* 3 (2): 271–86.
- Barrett, Jeffrey. 2019. *The Conceptual Foundations of Quantum Mechanics*. Oxford: Oxford University Press.
- Berry, Thomas. 2006. “Prologue: Loneliness and Presence.” In *A Communion of Subjects: Animals in Religion, Science, and Ethics*, edited by Paul Waldau and Kimberley Patton, 5–10. New York: Columbia University Press.
- Bhikkhu Anālayo. 2020. “Dependent Arising and Interdependence.” *Mindfulness* 12:1094–102.
- Birke, Lynda. 2011. “Preface—In Hope of Change: Rethinking Human–Animal Relations?” In *Theorizing Animals: Re-thinking Humanimal Relations*, edited by Nik Taylor and Tania Signal, xvii–xx. Leiden: Brill.
- Bohm, David, and Basil Hiley. 1975. “On the Intuitive Understanding of Nonlocality as Implied by Quantum Theory.” *Foundations of Physics* 5 (1): 93–109.
- Capra, Fritjof. (1975) 2010. *The Tao of Physics*. Boulder, CO: Shambhala Publications.
- Capra, Fritjof, and Pier Luigi Luisi. 2014. *The Systems View of Life: A Unifying Vision*. Cambridge: Cambridge University Press.

- Chang, Garma C. C. (1971) 2008. *The Buddhist Teaching of Totality: The Philosophy of Hua Yen Buddhism*. London: Routledge.
- Comstock, Gary. 2016. "Two Views of Animals in Environmental Ethics." In *Philosophy: Environmental Ethics*, edited by David Schmidtz, 151–83. Boston: Gale.
- Cook, Francis. 1977. *Hua-yen Buddhism: The Jewel Net of Indra*. University Park, PA: Pennsylvania State University Press.
- Crease, Robert P., and Charles C. Mann. 1990. "The Yogi and the Quantum." In *Philosophy of Science and the Occult*, edited by Patrick Grim, 302–14. Albany, NY: State University of New York Press.
- English, Lars. 2006. "On the 'Emptiness' of Particles in Condensed-Matter Physics." *Foundations of Science* 12:155–71.
- Esbenshade, Donald H. 1982. "Relating Mystical Concepts to Those of Physics: Some Concerns." *American Journal of Physics* 50 (3): 224–28.
- Fox, Alan. 2009. "Dushun's *Huayan Fajie Guan Men (Meditative Approaches to the Huayan Dharmadhātu)*." In *Buddhist Philosophy. Essential Readings*, edited by W. Edelglass and J. L. Garfield, 73–82. Oxford: Oxford University Press.
- Frankena, William K. 1979. "Ethics and the Environment." In *Ethics and Problems of the 21<sup>st</sup> Century*, edited by K. E. Goodpaster and K. M. Sayre, 3–20. Notre Dame, IN: University of Notre Dame Press.
- Gethin, Rupert. 1998. *The Foundations of Buddhism*. Oxford: Oxford University Press.
- Hamar, Imre. 2014. "Huayan Explorations of the Realm of Reality." In *The Wiley Blackwell Companion to East and Inner Asian Buddhism*, edited by Mario Poceski, 145–65. Chichester, UK: John Wiley & Sons, Ltd.
- Jinpa, Thupten. 2010. "Buddhism and Science: How Far Can the Dialogue Proceed?" *Zygon: Journal of Religion and Science* 45 (4): 871–82.
- Kaiser, David. 2011. *How the Hippies Saved Physics*. New York: W. W. Norton & Company.
- Kemmerer, Lisa. 2011. "Theorizing 'Others.'" In *Theorizing Animals: Re-thinking Humanimal Relations*, edited by Nik Taylor and Tania Signal, 59–84. Leiden: Brill.
- Khalil, Atif. 2009. "Emptiness, Identity and Interpenetration in Hua-yen Buddhism." *Sacred Web* 23:49–76.
- Kirkland, Russell. 2004. *Taoism: The Enduring Tradition*. New York: Routledge.
- Kohl, Christian T. 2007. "Buddhism and Quantum Physics: A Strange Parallelism of Two Concepts of Reality." *Contemporary Buddhism* 8 (1): 69–82.
- Leong, David. 2023. "The Intersectionality between Buddhism, Consciousness, and Quantum Physics." <https://dx.doi.org/10.2139/ssrn.4532062>.
- Lopez, Donald S. 2008. *Buddhism and Science: A Guide for the Perplexed*. Chicago: University of Chicago Press.
- Peters, Michael A. 2022. "Wittgenstein, Nāgārjuna and Relational Quantum Mechanics." *Educational Philosophy and Theory* 54 (12): 1942–51.
- Selby, David. 2004. "The Signature of the Whole: Radical Interconnectedness and Its Implications for Global and Environmental Education." *Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik* 27 (4): 23–31.
- Shroff, Farah. 2011. "We Are All One: Holistic Thought-Forms within Indigenous Societies. Indigeneity and Holism." *Counterpoints* 379:53–67.
- Van Norden, Bryan W. 2014. "Fazang, 'Essay on the Golden Lion.'" In *Readings in Later Chinese Philosophy*, edited by Justin Tiwald and Bryan W. Van Norden, 86–91. Indianapolis: Hackett Publishing Company.
- Wallace, Alan B., ed. 2003. *Buddhism and Science: Breaking New Ground*. New York: Columbia University Press.
- Williams, Paul. (1989) 2009. *Mahāyāna Buddhism: The Doctrinal Foundations*. 2nd ed. New York: Routledge.
- Xiong, Ye. 2024. "Treatise of the Golden Lion: An Exploration of the Doctrine of the Infinite Dependent Arising of Dharmadhātu." *Religions* 15 (4): 621.





## Future Togetherness Embracing All Living Things: Extending Some Views of Teilhard de Chardin

**Louis Caruana S.J.**, Full Professor, Faculty of Philosophy, Pontifical Gregorian University, Rome, Italy, [caruana@unigre.it](mailto:caruana@unigre.it)

---

Current philosophical literature about the future often explores fast technological development and its social, political, and cultural implications. What is typically missing in such literature is an attempt to address the following question: Is the future going to mean the emergence of a super humanity with the rest of the biosphere left behind? This article explores this issue critically and proposes some answers that derive from an interdisciplinary approach. It builds upon the work of Pierre Teilhard de Chardin, especially the way he deals with two key topics: cephalization and socialization. The article argues that Teilhard's work in these areas can be extended to show how the human responsibility associated with being the head of the biosphere entails accepting a kind of communitarian progress that includes other species. The article concludes by proposing some innovative concepts to articulate what is at stake in such responsibility.

---



In current philosophical literature about the future, the word “transhumanism” appears often. Focusing on how humans could overcome their limitations via technological innovations, this literature addresses specific questions dealing with enhancement, extended lifetime, cyborgs, the transfer of human minds into machines, super machine intelligence, and similar topics. The social aspect of the future is included in some of these discussions, but what is typically missing is an attempt to foresee a kind of future togetherness not limited to human society but that includes other organisms. Will the future mean the emergence of a super humanity, with the rest of the biosphere left behind? This article seeks to explore this question critically and to propose some answers by emphasizing biological and interdisciplinary aspects rather than purely mechanistic ones. It builds upon the work of Pierre Teilhard de Chardin, a prominent figure among those who, in the twentieth century, worked towards a synthesis of evolutionary biology, philosophy, and theology. During these last decades, some prominent scientists have discredited his work, but more recent developments in evolutionary science are vindicating many of the major points he defended. He is gaining support from advances in research on human cultural evolution, conscious evolution, the role of technology, and the formation of a planetary superorganism, all of which are compatible with various aspects of his view (Galleni 1995; Heylighen 2023; Vidal 2023; Wilson 2023). It is not surprising that his comprehensive vision is still bearing fruit as a source of inspiration, especially in its analysis of patterns and directional changes that enable some foresight regarding the future of humanity, the planet, and indeed all creation. Among those who have explored the relevance of his work for ecology, some have highlighted his support for what he called the zest for life (U. King 2018; Berry [1982] 2003; U. King 2006; Tucker 2006), some have critically evaluated his optimism regarding the collective effort in technological development (T. King 2006; Tucker and Grim 2017), and others have explored the theological implications of his work (Faricy 2005; T. King 2005; Hill 2001). At least one author has called attention to the need to balance Teilhard’s focus on human collective development by an awareness that nature is valuable in itself and not just in so far as it allows humans to achieve their ultimate end (French 1990). All these studies refer to the way Teilhard regarded the future as characterized primarily by togetherness, but they do not investigate in any detail how such togetherness could embrace more than just human society. This article aims to fill that gap. The first section offers a brief overview of Teilhard’s basic philosophical assumptions. The second section explores in detail two of his key concepts, and the third and fourth sections formulate some ensuing questions and advance the investigation beyond what Teilhard had envisaged.

### **Basic Assumptions**

It is well known that Teilhard’s thinking was considered problematic during his lifetime. One likely reason for this was his apparent disregard for the

usual boundaries between various disciplines, most notably between science, philosophy, theology, and spirituality. This concern about his style is certainly understandable, but a careful reading of his works indicates there is often a subtle order in his method. He habitually starts with a purely empirical account of the phenomenon, continues with a study of the philosophical consequences of this account, and then deliberately and openly adds a theological layer of reflection, which he says is appreciable mainly by religious believers. The main philosophical starting points most relevant for our inquiry are as follows.

First, he is convinced that our knowledge must not be limited to analysis and must include synthesis. We should not assume we gain knowledge only by breaking down a given phenomenon into its parts. We need to recall that another kind of knowledge is available through the study of how the parts are joined together to constitute the whole. As regards biology, this insight means that, apart from the study of how evolution could have influenced singular lifeforms or ecosystems, we need to try to understand the entire evolutionary process considered as a whole. Secondly, we need to accept that there are two opposing forces in the material universe, not just one. Apart from the force of dissipation of energy, as explained by the second law of thermodynamics, there is also what he called a convergent force, most evident in living systems. This force represents a decrease in entropy, in other words, an increase in order and complexity. The third point at the basis of his approach concerns the distinction between three aspects of the planet. At the material level, we can talk about the geosphere. When considering life, we can talk about the biosphere, as a kind of organic cover of the Earth. Over this biosphere, we can identify what Teilhard calls the noosphere. This represents the Earth's sphere of reason, as a kind of upper covering that is immaterial but supported by both the biosphere and the geosphere.

In Teilhard's works, there are other points of considerable philosophical interest. But instead of listing them as separate principles, we can contrast his overall approach with that of his contemporary, Henri Bergson, who also sought to understand the deeper significance of the entire process of biological evolution taken as a whole. Consider, for instance, the most important characterization of evolution. Bergson was convinced that evolution, as a planetary or perhaps even cosmic phenomenon, is primarily characterized by divergence, dissociation, separation, and division. For him, the entire process is analogous to what happens when, say, we slowly pour milk onto the floor. The milk will hit the floor and start flowing in different directions, forming one puddle here, another there, and it keeps branching out in a random fashion until the milk stops flowing. In this simple analogy, the milk is analogous to what Bergson called the "élan vital." The picture corresponds well to the customary picture of the tree of life, which shows the various species arranged according to the similarity between them and linked to one another with lines that branch out in all directions. One of Bergson's (1922, 123) basic principles, therefore, is that "the evolution we are

speaking of is never achieved by means of association, but by dissociation; it never tends toward convergence, but toward divergence of efforts.” For Teilhard, this is mistaken. For him, the exact opposite is true. The fact that evolution is characterized primarily by convergence is evident because of the undeniable empirical fact that there are two kinds of energy at work within the universe. There is tangential energy, which explains how an element tends to link itself to other elements at the same level of organization, and there is radial energy, which draws an element into structures of greater complexity.<sup>1</sup> The combined effect of these two kinds of energy results in the law of complexity-consciousness, which states that a more complex biological structure corresponds to a more developed consciousness. For Teilhard, these aspects of the phenomenon of life are undeniable evidence that the entire process is, as it were, seeking to establish increasingly effective levels of consciousness.

Teilhard’s thinking derives from some fundamental assumptions about matter. On this point, comparing him with Bergson will help. For Bergson, matter represents what in nature is inert. Because of this inertness, matter is in conflict with life and with self-consciousness. Even though life and full self-consciousness win in the end, matter remains the deadweight that needs to be overcome. Teilhard’s position is the direct opposite of this. No matter is inert. Within every fragment of it, even at the earliest stages of the evolving universe, there is a potentiality that corresponds to the primordial form of the self-consciousness that will emerge later. In line with this positive view of matter, Teilhard does not see matter and spirit as two opposing principles of the universe, as Bergson and others often assume. For Teilhard ([1955] 1979, 94), there is one long, evolving movement, a long process of cosmogenesis from beginning to end.<sup>2</sup>

To complete this brief overview of Teilhard’s position, I need to mention something about the deep consistency he sees between his empirical work, his philosophical proposal, and theology. His thought operates at three levels. The first level corresponds to an objective phenomenology of the situation. What can we empirically deduce about the nature of the biosphere? The second level corresponds to a kind of extrapolated physics that allows us to foresee what we are heading towards. He sees as very probable a point of arrival at planetary maturation, which he calls the Omega point, the point where we will have the full growth of the noosphere, the point where humanity will arrive at the full flourishing of a single collectivity of consciousness. For Teilhard ([1955] 1966, 257–63), the present evidence points to the fact that this Omega point will be personal in nature. Teilhard may here be accused of being naively optimistic, because the empirical traces we have of the emergence of human intelligence, symbolism, and language can be interpreted negatively as the beginning of planetary degradation, as the beginning of the eventually overwhelming contamination of the biosphere with human litter (Zwart 2022). His optimism, however, is not unfounded. He argues that we can foresee only

two ways forward. We can have either a nature that is self-abortive, in which the evolutionary emergence of thought collapses and fails, or a nature that proceeds on the lines that it has already traced, eventually producing a super mind or soul, in which the evolutionary process achieves its goal. Teilhard is convinced of the latter, and his choice has not been confuted by successive evolutionary science. Admittedly, current evolutionary thinking holds that, strictly speaking, the entire evolutionary process, taken as a whole, could be goal-directed only if it were itself the product of some higher-order selective process. But this is not a confutation of Teilhard's proposal. Since there is no empirical evidence of such a higher-order selective process, the correct attitude on the part of science is to say that the question of whether the biosphere is goal-directed or not is, up to now, undecidable on empirical grounds. But Teilhard favored the thesis of biospheric goal-directedness not on empirical grounds as such, like a typical scientific theory, but on the grounds that it maximizes the coherence of what we know. For him, the idea that self-consciousness, after being brought forth by the universe, is destined to wither and die out is inconsistent with the facts we already know. He writes, "We have seen and admitted that evolution is an ascent towards consciousness . . . Therefore it should culminate forwards in some sort of supreme consciousness" (Teilhard [1955] 1966, 258).

I move on now to Teilhard's third level of reflection, where he enters the realm of theology. Addressing Christian believers, he argues that the Omega point corresponds to the figure of Christ. The consistency between science and religion becomes evident when we see how the Omega of evolution is identifiable with Christ, the prime mover of the entire movement of complexity-consciousness. In the face of opposition from some theologians, Teilhard insisted that the incarnation was more a work of unification of the universe than a work of redemption from sin. This unification is realized via the church, which Teilhard situates within the entire process of cosmogenesis as a special phylum within the human phylum. He uses the term Christogenesis to refer to the church's destiny to carry human evolution towards the Christ-Omega, operating between the resurrection and the parousia. Christianity ensures that the two forces of human love and divine charity continue to realize the noospheric maturation. In such reasoning, Teilhard articulates a cosmological Christology in line with St. Paul's teaching that the grace of Christ will transform, forgive, and heal this sinful and wounded world. One should add that Teilhard saw the mystery of the eucharist as embodying his view that the Omega of evolution is identifiable with Christ. The incarnation involves a kind of universal transubstantiation: "And then there appears to the dazzled eyes of the believer the eucharistic mystery itself extended infinitely into a veritable universal transubstantiation, in which the words of the Consecration are applied not only to the sacrificial bread and wine but, mark you, to the whole mass of joys and sufferings produced by the Convergence of the World as it progresses" (Teilhard [1955] 1966).<sup>3</sup>

This brief overview does not mention the genuine incompatibilities that can emerge between some of Teilhard's proposals and standard theological understanding. This article, by using Teilhard as a point of reference for deeper reflection on the future of humanity, does not endorse all that he said.<sup>4</sup> It nevertheless acknowledges the value of the insights mentioned and highlights the fact that, despite the richness of these insights, they leave work to be done, especially because Teilhard's futurology focuses primarily on the human future. What are the implications for nonhuman creatures? To address this question, two key concepts need to be considered in greater depth.

## Two Key Concepts

The first key concept is cephalization. This word refers to the evolutionary trend in which, over many generations, the mouth, sense organs, and nerve ganglia become concentrated at the front end of an animal, producing a head region. This concentration is associated with movement and bilateral symmetry, such that the animal has a definite head end in which a sophisticated brain is found. In current research, the notion of cephalization is associated with the notion of cognitive embodiment, which refers to the fact that an extended and complex organic body in space needs a center of control. To explain the original branching out of various lifeforms, one needs to consider the complexification of animal bodies and relate it to the complexification of perception, cognition, and behavior. A complex organism is possible only if it has a complex brain (Trestman 2013).

Teilhard was aware of cephalization and considered it a planetary phenomenon. For him, it was important empirical evidence supporting the claim that, even though evolution involves random mutations and natural selection, it nevertheless shows traces of progress when considered as a planetary phenomenon. He writes:

While accepting the undeniable fact of the general evolution of Life in the course of time, many biologists still maintain that these changes take place without following any defined course, in any direction and at random. This contention, disastrous to any idea of progress, is refuted, in my view, by the tremendous fact of the continuing 'cerebralisation' of living creatures. Research shows that from the lowest to the highest level of the organic world there is a persistent and clearly defined thrust of animal forms towards species with more sensitive and elaborate nervous systems. A growing 'innervation' and 'cephalisation' of organisms: the working of this law is visible in every living group known to us, the smallest no less than the largest. We can follow it in insects as in vertebrates; and among the vertebrates we can follow it from class to class, from order to order, and from family to family. There is an amphibian phase of the brain, a reptilian phase, a mammalian phase. In mammals we see the brain grow as time passes and become more complex among the ungulates, the carnivores and above all the primates. (Teilhard 1964, 68)

Teilhard, however, does not stop there. When trying to figure out what our knowledge can tell us about the future outcome of evolution on the planet, he arrives at the following conclusion. Just as cephalization occurs within certain groups of animals as an evolutionary trend by which the animal's front becomes a head, so within the entire biosphere, taken as a whole, can we observe the same evolutionary trend. We can observe a trend that is analogously making Homo sapiens, with its uniquely advanced capacities for reasoning and technological innovation, the head of life on the planet. The emergence and flourishing of Homo sapiens correspond to the cephalization of the biosphere. Here, the use of "cephalization" is metaphorical. It brings out the awareness that the direction of evolutionary development lies now in the hands of human beings, who represent, in a sense, the control center of life on the planet. Teilhard does not refrain from pointing out the resonance of this point with some fundamental theological ideas expressed most clearly by St. Paul. Teilhard ([1948] 1968, 167) writes, "[I]t is he [Christ] who gives its consistence to the entire edifice of matter and Spirit. In him too, 'the head of Creation', it follows, the fundamental cosmic process of cephalisation culminates and is completed, on a scale that is universal and with a depth that is supernatural, and yet in harmony with the whole of the past."

Apart from cephalization, another key concept important for our consideration in this article is socialization. Again, we have here a concept Teilhard considers indispensable for extrapolating our present knowledge towards the future. The basic insight derives from the fact that, with the appearance of Homo sapiens, evolutionary life on the planet has taken the important step of giving birth to a species that floats freely. It floats freely in the sense that it changes and develops not according to random mutations and natural selection but primarily according to social and inter-relational transformation. When Teilhard (Teilhard [1948] 1968, 159) describes how future humanity, or super-humanity as it he calls it, will look, he writes: "It is not in the direction of anatomically super-cerebralised individuals that we must look if we are scientifically to discern the form assumed by Super-humanity, but in that of super-socialised aggregations." He is convinced of this because each human being is becoming increasingly closer to others, and at the same time, each is becoming capable of extending interaction with others in an ever-increasing range of influence. Can we deduce something about the nature of this super-socialized future state? For Teilhard, the appearance of humans within the biosphere represents the crucial emergence of personality. This means that the socialization we find in nonhuman animals and the socialization we see in humans are different not only in degree but also in kind. He writes, "There is nothing new in the idea of comparing mankind, taken as one whole, to a 'brain of brains' or to an ant-colony; but, unless they are to lead us into gross misrepresentations, these attractive analogies can be pursued only if they respect the human particle's quite unique property of constituting a reflective nucleus centred upon itself . . . Starting with man . . . there is a change

in conditions. As a specific result of the phenomenon of ‘reflexion’, the living particle definitively closes in on itself. It begins to act and react as a centre of *incommunicable* value, a value therefore that cannot be transmitted. It lives for itself, as much as and at the same time as for others. It is personalised” (Teilhard [1948] 1968, 160).<sup>5</sup> Teilhard here argues that once personalization has emerged at a certain point within the long sweep of evolutionary history, it is there to stay. It will not be sacrificed for any future development.

Could this emphasis on socialization tell us something about the best way forward regarding politics? Teilhard was dealing with these questions at a time when the world was undergoing traumatic political turmoil. The major political systems of communism, democracy, and fascism confronted each other not only ideologically but also physically during the Second World War. For Teilhard, the evolutionary basis of life and the emergence of the noosphere offer undeniable evidence for the claim that the genuine flourishing of socialization is one that secures the infinite value of the person. Hence, one cannot simply construct a political future on the model of an organism in which each cell loses its early pluripotentiality and eventually becomes specialized in total subservience to the organism. Nor should one use the model of social insects, in which a high level of socialization results from different instincts that literally transform individual members of the colony and make of them instruments for the efficient functioning of the whole.<sup>6</sup> In political terms, therefore, one should not conceive of human super-collectivity in a way that requires the total subordination of the individual under the will of the state. Teilhard ([1948] 1968, 160) writes, “In the case of man, therefore, collectivisation, super-socialisation, can only mean super-personalisation; in other words, it ultimately means (since only the forces of love have the property of personalising by uniting) sympathy and unanimity.”

## Open Questions

As is well known, Teilhard’s work left various open questions that were the cause of discussion and consternation for many generations of scholars and scientists after him. One of the less discussed questions concerns the relation between cephalization and socialization. As mentioned, Teilhard sees cephalization as also occurring at the planetary level, in the sense that *Homo sapiens* is the head of the biosphere. The idea of a “head” of the planet implies, of course, coordination and responsibility, just like the head of an animal with respect to the entire body. This aspect of the notion of cephalization however has remained unexplored by both Teilhard and his commentators. If we acknowledge that humans are the head of the biosphere, how are we to conceive of their care for the entire body and not just for themselves? A similar question arises as regards socialization. Teilhard considers this notion in terms of relations between individual humans. In fact, he uses the term noosphere to refer to the interpersonal nature of intelligence that emerged with the appearance of *Homo*

sapiens. One could ask, however, whether the ultimate planetary maturation, corresponding to the Omega point, is exclusively noospheric. On this point, Teilhard's thinking seems to pull in two opposite directions. On the one hand, he emphasizes the crucial and unavoidable importance of personalization and sees the super-socialization of the future as the flowering of human potentiality at the end of a long process of cosmogenesis. The implication here is that as regards the Omega point, all nonhuman reality fades in importance. It is as though the biosphere with all its lifeforms served only as a kind of chrysalis out of which the butterfly of the super-personalization of the Omega point emerges. The chrysalis, of course, remains like a crust that falls away when its work is over.<sup>7</sup> Hence, the Omega point is exclusively noospheric. On the other hand, however, Teilhard often repeats, especially in his more theological works, that what he is trying to articulate is an evolutionary version of the cosmic Christology we find in St. Paul and the prologue of St. John's gospel. He is thus engaged in articulating the idea that the redemption of Christ is not limited to humans but also in some way the entire creation, presumably including animals and plants. This line of reflection, therefore, seems to indicate that for Teilhard, the Omega point is not exclusively noospheric.

These open questions and divergent interpretative possibilities invite us to explore this area further and see whether it is possible to articulate an idea of future togetherness that goes beyond human togetherness. What we are looking for is an account that includes not only the idea of the biosphere having a head, and the idea that the future lies in the direction of socialized personalization, but also the imperative for a broader kind of socialization that includes all lifeforms. Is this possible?

### **Charting New Territory**

The most plausible way forward is to carefully revise what we mean by planetary maturation. Is it possible to see planetary maturation as involving a kind of flourishing of humans that includes the flourishing of other animals? Teilhard's proposals have thrown invaluable light on the idea of cosmogenesis, anthropogenesis, and Christogenesis, but much more needs to be said about nonhuman animals. If we launch our investigation from where Teilhard left off, the question therefore becomes: How can we bring animals on board?<sup>8</sup> To proceed correctly, we need to avoid the simplistic idea that all animals go to heaven. This proposal would certainly ensure that planetary maturation both in terms of the flourishing of the noosphere and in terms of a theology of Christogenesis will include animals. It nevertheless remains unacceptable in so far as it does not properly reflect the obvious differences between human and nonhuman animals, especially as regards cognitive and semantic capacities. The challenge therefore is to articulate an idea of planetary maturation that is not merely inclusive of nonhuman animals but inclusive in the right way.

One source of inspiration on how to do this is found in the works of Jakob von Uexküll, a biologist and philosopher who was a contemporary of Teilhard's. Uexküll draws out valuable implications from the simple fact that animals have different ways of perceiving. What an organism can perceive determines that organism's world. Hence, to each animal there is a corresponding world, which Uexküll calls the animal's *Umwelt*. Normally, the German word *Umwelt* means environment, but here, we have an important nuance. The word "environment" connotes whatever surrounds, conditions, or influences a given organism, while *Umwelt* in Uexküll's sense connotes a subsection of this. It connotes what organism can perceive, even in the most rudimentary sense of a mere response to stimuli. Sectors of the environment not perceivable by an organism are not part of that organism's *Umwelt*. When seen from this perspective, all organisms appear as subjects in the sense that each has its way of registering its surroundings and thereby constituting its world. What it perceives, often from different senses, is brought together into a single project, the project of surviving. In this sense, organisms are well tuned to their *Umwelt*. A simple organism is well tuned to its simple *Umwelt*, a complex organism is well tuned to its complex *Umwelt*. "Subject and object are interconnected with each other and form an orderly whole . . . All animal subjects, from the simplest to the most complex, are inserted into their environments to the same degree of perfection" (Uexküll [1934] 2010, 49–50; see also Uexküll [1937] 2001). We notice therefore that, on this view, subjectivity is not an exclusively human attribute. The major novelty in this approach is that subjectivity is a matter of degree. It is not that organisms are tuned to their surroundings to different degrees but that organisms are subjects like us to different degrees. Simple organisms have a modest range of perception and hence modest combinatorial use of perceptual information. Complex organisms have a wide range of perception and hence a rich combinatorial use of perceptual information (Kawade 2009). This point about degrees of subjectivity corresponds to some extent to what Teilhard writes about personalization. Of course, we need to recall that for Teilhard, the appearance of personalization within the evolutionary process constitutes what he calls a critical point; in other words, it constitutes a kind of ontological leap. Personal organisms are intrinsically different from nonpersonal ones. Nevertheless, for Teilhard, there is the law of complexity-consciousness according to which a higher degree of organic complexity corresponds to a higher degree of consciousness. Hence, although he does not mention degrees of personality, he does accept degrees of consciousness. In this sense, therefore, we can safely say that in the works of both Uexküll and Teilhard we find significant hints on how to correctly situate nonhuman animals within the general push towards the genuine flourishing of the planet.

Our basic conceptual tool is the idea that subjectivity can come in degrees. This means we attribute subjectivity to others by extending what we experience

ourselves as subjects. I experience myself as an individual. What happens when I encounter an individual other than me, in other words, when I encounter a foreign individual, a foreign entity? I extend the concept of being a subject, and I attenuate it, if needed, in line with my knowledge of the nature of that foreign individual. I am assuming here that my primordial experience, which constitutes the dawning of my rationality as an individual, is not a two-stage process. It is not the case that I first learn about myself and then learn about my surroundings. It is rather that experience grows as I am situated within my surroundings. It grows within my relationality with my surroundings. My individuality is disclosed to me in the very process of encountering foreign individuals, which are of various kinds. Some are animate, others inanimate. Thus, I slowly learn how to correctly situate foreign individuals with respect to each other and with respect to me. These simple phenomenological reflections indicate that, although we attribute subjectivity to other persons spontaneously, thus considering them humans like us whom we can understand and with whom we can empathize, this attribution can sometimes become dubious. Admittedly, such cases are rare, but with the advance of robotics, the issue can cause concern. For instance, older people in retirement homes where humanoid robotic assistants are being introduced can become confused. In other words, there can be cases in which we are not sure whether the foreign individual we encounter really has the full subjectivity we enjoy ourselves.

The situation described so far has great relevance for the question about our relation to nonhuman animals. We all know how small children tend to be very generous with attributing subjectivity and even personality to nonhuman animals. This trend is supported by literary and cinematographic works showing animals talking and behaving like humans. As children grow up, however, they learn how to attenuate the subjectivity they attribute to animals. They learn how to attribute the right degree of subjectivity to an animal in line with that animal's nature. For instance, they learn that it is correct to empathize, to some extent, with their pet dog but quite silly to empathize with the worm just picked up by the bird in the garden. Attributing full subjectivity to all nonhuman animals, considering them just like persons, is one extreme to be avoided. The opposite extreme needs to be avoided as well. So, children eventually become aware that, although they should refrain from seeing all animals as persons, they should refrain just as much from seeing them as mere machines without feelings. In other words, children learn that nonhuman animals enjoy some degree of subjectivity, each type of animal according to its nature.

In my view, these observations are universally recognized, despite cultural differences (Caruana 2020). The important step now is to see how they can help us address the general question in this article. The task set was to articulate an idea of future togetherness that goes beyond human togetherness, an idea that involves a broader kind of socialization to include all lifeforms.

We humans enjoy the dynamism of planetary maturation at the level of the noosphere. If we accept the imperative of bringing animals on board, we need a way of including them within this noospheric dynamism. In other words, we are envisaging a future in which there is feedback from the noosphere back into the biosphere and even to the geosphere. Maturation is not a one-way process. Researchers in environmental studies sometimes talk about anthropization, an idea that refers to the way the environment is transformed by human activity. Anthropization corresponds to some extent with the proposal being defended here. But the kind of anthropization I want to highlight is not selfish but generous. It is not the carving out of our comfortable niche but a kind of sharing of human rationality. Of course, this kind of anthropization, which corresponds with “bringing animals on board,” does not mean changing their genome to make them rational like us. It means helping them share in the benefits of the order that is possible for us to establish via our rationality. Each species is to share in this order according to its nature and possibilities. It should be clear therefore that this imperative of reaching out beyond the habitual frontiers of the noosphere requires us to make correct judgements concerning each organism’s degree of subjectivity. We certainly need to avoid the two extremes already mentioned. It will distort our outreach if we take all animals to be persons, and it will distort our outreach just as much if we take all animals to be nonsubjective entities, like stones or machines.

At this point, those familiar with ancient philosophy will recognize that my reasoning in terms of two opposing extremes is reminiscent of Aristotle’s famous account of the nature of virtue, a virtue as a point between a deficiency and an excess of a trait. For example, as regards courage, Aristotle said that courage is the right point between being rash and being cowardly. In general, a virtue is a kind of excellence at being human, a kind of excellence that is either moral or intellectual. Various religions and philosophical traditions have produced lists of virtues, but there is no guarantee that the excellence at being human has been fully determined. If the reasoning in this article is correct, we are now encountering the features of a specific virtue that has not yet been properly named. We are dealing with a kind of human excellence situated at a point between the deficiency of acting on the assumption that all nonhuman entities are nonsubjects and the excess of acting on the assumption that all of them are fully personal subjects. This virtue corresponds to the kind of excellence in being able to infer correctly how things look from another individual’s perspective or in being able to empathize to the right extent, in the right way, with another individual. Notice that we engage in this kind of inference and empathy quite often in the run of our daily lives, especially as regards other human beings. At times we do it correctly, at times incorrectly. What I am highlighting here is the need to extend this kind of inference and empathy beyond interpersonal relations and apply it with respect to nonhuman individuals. The challenge, of

course, is to do it correctly, neither personalizing the other individual too much nor too little. The basic point of this article is therefore that we need this virtue to realize a future in which planetary maturation is not just a human affair but a planetary one.

If we want to examine this virtue further, we may try to give it an appropriate name, which, in my view, can be derived from the idea of seeing the world from different perspectives. What does the world look like from your dog's viewpoint? How do the polar bears feel with the decreasing sea ice? This is not equivalent to merely picturing the world from different standpoints. It is rather a kind of seeing and feeling the world from different degrees of subjectivity. The envisaged displacement is not in visual space but in subjectivity space. The exercise is harder. Resorting to classical philosophical terminology, we can use the term *psyche* for subject, and the different degrees of subjectivity would then correspond to the different kinds of *psyche* or soul. In Greek, the prefix "apo-" indicates "away from," "distant," or "separate." Hence, *apopsychic* means "drawn away from the soul." We can therefore define an *apopsychic* person as one who excels in determining how the world looks or feels from a perspective other than their own. The virtue we are interested in can therefore be called *apopsychitude*.<sup>9</sup>

In brief, therefore, the foregoing reasoning has advanced Teilhard's notions of cephalization and socialization in two ways. It shows how the idea of humanity being the head of the biosphere strongly supports the proposal that humans are obliged to coordinate and be responsible for all living things, being a kind of hub of planetary intelligence and responsibility. It also shows that there is no valid reason to conceive of socialization as a phenomenon constrained within the limits of the human realm. Socialization in fact is better seen as the realization of community that involves the entire biosphere. Hence, planetary maturation is not just human collectivity becoming better on its own but human collectivity becoming better by extending itself to embrace all creatures. To achieve this correctly, the virtue of *apopsychitude* is essential.

At this point, some may be worried because *apopsychitude* as described earlier seems an unrealizable ideal. When we recall how hard it is to figure out how things look from another person's point of view, how could we even think of the possibility of accomplishing this with regard to other lifeforms? The difficulty highlighted here is real, but the point of recognizing and determining the main features of this virtue was not that we can aspire to become capable of grasping the fullness of perspectival knowledge of all subjects, whatever their level of subjectivity. In other words, it was not that we can acquire the attribute of omnisubjectivity, which is discussed by some philosophers as one of the divine attributes (Zagzebski 2008). The point is much more modest. By highlighting the importance of *apopsychitude*, we are claiming that a genuine effort to appreciate another subject's point of view, whatever the level of the subjectivity involved, is

not only helpful but essential for planetary maturation, even if this appreciation is achieved incompletely. With the excellence associated with this virtue, the person comes to enjoy to a modest extent something of God's omnisubjectivity. To say it using the Platonic notion of participation, just as the human knower participates in God's omniscience, the human apopsychic person participates in God's omnisubjectivity. By enlarging the horizon of planetary flourishing to include all creatures, the proposal therefore draws new light on the way human beings can participate in God's providential care for all creation.

Another worry that may trouble the reader is that the proposal highlights the need for people to be apopsychic, but it says very little about how to deal with concrete cases. Should we attribute legal rights to chimpanzees? Is it correct to have religious burial rites for dogs? What is wrong with exterminating the entire species of the screwworm fly? Should we really feel sorry for polar bears, or should we rather let their innate resourcefulness and Gaia take care of the situation? The objection puts a finger on a genuine weakness in the overall proposal because what the paper offers is a set of very general guidelines, the primary one being that we conceive of future togetherness in terms of a collectivity of all kinds of subjects. To achieve this, we need to correctly judge the degree of subjectivity of the various organisms that constitute the biosphere in line with our best empirical knowledge regarding their nature. But what does this mean for concrete cases? There is still a lot of work to be done. A good start would be to recall the extensive literature on how a person can grow in virtue; how a person can form a morally good habit, retaining it until it becomes second nature to that person; and how virtuous mentors can be useful in such teaching of virtue. This literature can certainly be a good source of inspiration for further exploration of how to become an apopsychic person, but this work must be left for a sequel to this article.

For now, we can be content with the modest results achieved so far. The article has reviewed Teilhard's position on the future of humanity, especially his way of emphasizing cephalization and socialization. It has extended this view by proposing an inclusive account of planetary maturation that is not limited to the noosphere. For this to be possible, we need to become good at correctly figuring out what the world looks like and how it feels from another subject's viewpoint. We need to acquire the virtue I called apopsychitude. The main point of the article does not really depend on whether we can name the required virtue or not. The main point is that for future togetherness to be inclusive, we need to be good at recognizing the correct degree of subjectivity of all members of the biosphere, and that to do this we cannot let our emotions run away with us. We must resort to all that science can teach us about the nature of each species and the nature of each ecosystem. The challenge is considerable, but it cannot be ignored.

---

## Acknowledgments

For providing helpful comments on earlier drafts of this article, I thank the participants of the workshop of the Philosophy Faculty research group of the Gregorian University held at the Vatican Observatory premises, Rome, Italy, in May 2023, the participants of the Science Religion Forum conference held at Cambridge, UK, in August 2023, and anonymous referees for *Zygon: Journal of Religion and Science*.

## Notes

- <sup>1</sup> Among scientists, Teilhard's idea of radial energy has been controversial, but current science is now supporting it, at least in so far as it corresponds to what is called convergent evolution. This notion of convergent evolution refers to the independent evolution of parallel characteristics in species that flourish in different epochs. This effect is well supported by empirical evidence. It is now accepted that, within a set of environmental and physical constraints, life gradually evolves toward the best body plan. The implication therefore is that evolution was bound to come up with the kind of rationality that characterizes human beings. See, for instance, Simon Conway Morris (2003) and Seth P. Hart (2021).
- <sup>2</sup> More detailed comparison between Teilhard and Bergson is found in Madeleine Barthélemy-Madaule (1963). For further insights into the way Teilhard fits into the philosophical landscape of the twentieth century, see Christopher F. Mooney (1967).
- <sup>3</sup> For more on this third level dealing with theology, see Mooney (1996).
- <sup>4</sup> This article is certainly not endorsing his occasional public approval of racism and eugenic practices, as documented in John P. Slattery (2017).
- <sup>5</sup> The notion of person in Teilhard is examined in detail in Barthélémy-Madaule (1962) and Jean-Marie Domenach (1963).
- <sup>6</sup> Bergson deals with this point by distinguishing between socialization based on instinct and socialization based on intelligence. These are two different lines of evolutionary development. See Bergson ([1911] 1998, 134, 140, 157).
- <sup>7</sup> If we emphasize this idea, Teilhard becomes similar to Bergson ([1911] 1998, 266), who describes the future in the following terms: "it is as if a vague and formless being, whom we may call, as we will, man or superman, had sought to realize himself, and had succeeded only by abandoning a part of himself on the way. The losses are represented by the rest of the animal world, and even by the vegetable world, at least in what these have that is positive and above the accidents of evolution."
- <sup>8</sup> The allusion here is not only to Noah's ark but also to some New Testament ideas. In the Letter to the Romans 8:21, St. Paul expresses the hope that "ἡ κτίσις ἐλευθερωθήσεται ἀπὸ τῆς δουλείας τῆς φθορᾶς εἰς τὴν ἐλευθερίαν τῆς δόξης τῶν τέκνων τοῦ Θεοῦ," which literally translates as "creation will be set free from the bondage of decay into the freedom of the glory of the children of God." The expression "into the freedom" has the sense of "being brought into the state of freedom" or "to share in the freedom." One notices therefore Paul's insight that salvation is not for human beings only. Humans contribute by "bringing in" the rest of creation.
- <sup>9</sup> "Psychic" here is used in line with its psychological sense, as opposed to any supernatural connotations. Apopsychitude as described here is an essential dimension of ecological wisdom (*ecophronesis*), as discussed in Nicholas Austin (2018).

---

## References

- Austin, Nicholas. 2018. "The Virtue of Ecophronesis: An Ecological Adaptation of Practical Wisdom." *Heythrop Journal* 59:1009–21.

- Barthélémy-Madaule, Madeleine. 1962. "La Personne dans la perspective teilhardienne." *Recherches et Débats*, 40:66–78.
- . 1963. *Bergson et Teilhard de Chardin*. Paris: Éditions du Seuil.
- Bergson, Henri. 1922. *Creative Evolution*. Translated by A. Mitchell. London: Macmillan.
- Berry, Thomas. (1982) 2003. "Teilhard in the Ecological Age." In *Teilhard in the 21st Century*, edited by A. Fabel and D. St John, 57–73. Maryknoll, NY: Orbis Books.
- Caruana, Louis. 2020. "Different Religions, Different Animal Ethics?" *Animal Frontiers* 10 (1): 8–14.
- Conway Morris, Simon. 2003. *Life's Solution: Inevitable Humans in a Lonely Universe*. Cambridge: Cambridge University Press.
- Domenach, Jean-Marie. 1963. "Le Personalisme de Teilhard de Chardin." *Esprit* 31:337–65.
- Faricy, Robert. 2005. "The Exploitation of Nature and Teilhard's Ecotheology of Love." *Ecotheology* 10 (2): 181–95.
- French, William C. 1990. "Subject-Centered and Creation-Centered Paradigms in Recent Catholic Thought." *The Journal of Religion* 70 (1): 48–72.
- Galleni, Ludovico. 1995. "How Does the Teilhardian Vision of Evolution Compare with Contemporary Theories?" *Zygon: Journal of Religion and Science* 30 (1): 25–45.
- Hart, Seth P. 2021. "A Convergence of Minds: Teilhard de Chardin and Conway Morris." *Theology and Science* 19 (3): 273–86.
- Heylighen, Francis. 2023. "A Contemporary Interpretation of Teilhard's Law of Complexity-Consciousness." *Religion, Brain & Behavior* 13 (4): 470–72.
- Hill, Brennan R. 2001. "Teilhard's Vision and the Environment." *Horizons* 28 (1): 50–87.
- Kawade, Yoshimi. 2009. "On the Nature of the Subjectivity of Living Things." *Biosemiotics* 2:205–20.
- King, Thomas. 2005. "Teilhard and the Environment." *Ecotheology* 10 (1): 88–89.
- . 2006. "God and the Human Future." In *Teilhard and the Future of Humanity*, edited by T. Meynard, 20–28. New York: Fordham University Press.
- King, Ursula. 2006. "Feeding the Zest for Life: Spiritual Energy Resources for the Future of Humanity." In *Teilhard and the Future of Humanity*, edited by T. Meynard, 3–19. New York: Fordham University Press.
- . 2018. "Teilhard de Chardin's Vision of Science, Religion and Planetary Humanity." *Journal for the Study of Religion* 31 (1): 135–58.
- Mooney, Christopher F. 1967. "Teilhard de Chardin and Modern Philosophy." *Social Research* 34 (1): 67–85.
- . 1996. *Teilhard de Chardin and the Mystery of Christ*. London: Collins.
- Slattery, John P. 2017. "Dangerous Tendencies of Cosmic Theology: The Untold Legacy of Teilhard de Chardin." *Philosophy & Theology* 29 (1): 69–82.
- Teilhard de Chardin, Pierre. 1964. *The Future of Man*. Translated by N. Denny. New York: Harper and Row.
- . (1955) 1966. *The Phenomenon of Man*. Translated by B. Wall. London: Collins.
- . (1943) 1968. "Super-Humanity, Super-Christ, Super-Charity." In *Science and Christ*, translated by R. Hague, 151–73. New York: Harper and Row.
- . (1955) 1979. "The Christic." In *The Heart of Matter*, translated by R. Hague, 80–102. New York: Harcourt Brace & Company.
- Trestman, Michael. 2013. "The Cambrian Explosion and the Origins of Embodied Cognition." *Biological Theory* 8:80–92.
- Tucker, Mary Evelyn. 2006. "Zest for Life: Teilhard's Cosmological Vision." In *Teilhard and the Future of Humanity*, edited by T. Meynard, 43–55. New York: Fordham University Press.
- Tucker, Mary Evelyn, and John Grim. 2017. "The Evolutionary and Ecological Perspectives of Pierre Teilhard de Chardin and Thomas Berry." In *The Wiley Blackwell Companion to Religion and Ecology*, edited by John Hart, 394–409. Hoboken, NJ: Wiley-Blackwell.
- Uexküll, Jacob von. (1937) 2001. "The New Concept of Umwelt: A Link between Science and the Humanities." *Semiotica* 134 (1): 111–23.
- . (1934) 2010. *A Foray in the Worlds of Animals and Humans*. Translated by J. D. O'Neil. Minneapolis: Minnesota University Press.

- Vidal, Clément. 2023. "Reintroducing the Direction of Evolution." *Religion, Brain & Behavior* 13 (4): 474–77.
- Wilson, David Sloan (2023): "Reintroducing Pierre Teilhard de Chardin to Modern Evolutionary Science." *Religion, Brain & Behavior* 13 (4): 443–57.
- Zagzebski, Linda. 2008. "Omnisubjectivity." In *Oxford Studies in Philosophy of Religion*, edited by J. L. Kvanvig, 231–48. Oxford: Oxford University Press.
- Zwart, Hub. 2022. "The Symbolic Order and the Noosphere: Pierre Teilhard de Chardin and Jacques Lacan on Technoscience and the Future of the Planet." *International Journal of Philosophy and Theology* 83 (1–3): 117–45.





## The Use of Brain–Machine Interfaces in Human and Nonhuman Beings: Philosophical-Theological Implications for Morality

**Luca Settimo**, Honorary Assistant Professor in Theology, Department of Philosophy, University of Nottingham, Nottingham, UK, [lsettimo@yahoo.co.uk](mailto:lsettimo@yahoo.co.uk); [luca.settimo1@nottingham.ac.uk](mailto:luca.settimo1@nottingham.ac.uk)

---

This article discusses the philosophical-theological implications that derive from scientific evidence in relation to the use of brain–machine interfaces (BMIs). By reflecting on the neuroscientific foundations of human freedom in BMI experiments, the law and ethics scholar Nita Farahany distinguishes between freedom of choice and freedom of action. She argues in favor of the key role played by freedom of action (rather than freedom of choice) to account for legal and moral responsibility. However, despite this, it has been demonstrated that monkeys (similarly to human beings) can use BMIs to perform their desired movements with artificial/robotic arms. I discuss these studies and argue that nonhuman beings can also actualize their intended movements by deliberating through their freedom of action. This strongly suggests that morality is not a uniquely human phenomenon but is also present, although in an “embryonic stage,” in nonhuman creatures. I argue that this can impact the way in which we describe the notion of *imago Dei*.

---



From where does morality originate? Are animals moral beings? Is the concept of morality uniquely human? Different theologians have tried to answer these questions. The majority of theologians claim that morality uniquely pertains to human beings because only rational creatures can perform moral choices. In other words, nonhuman creatures cannot be moral agents because they lack both intellect and will, which are the two immaterial properties of the rational human soul. In this article, I argue that while human beings are moral agents *par excellence*, the phenomenon of morality can also be detected in nonhuman creatures, although in their case, morality is present only in its “embryonic stage.”

The Thomist theologian Jean Porter (2005, 29) explains that: “[T]he story of the natural law tradition is basically a story of more or less steady progress from obscurity to clarity through the progressive reformulation of the natural law as ‘an independent and rationalist system.’” Porter objects to this perspective of natural law and endorses instead a naturalistic ethics in which natural law is in continuity with the laws of nature also imprinted within prerational (nonhuman) beings. She argues that this was Thomas Aquinas’s original intuition, given the existence of an intrinsic teleological and intelligible behavior in all living creatures—both human and nonhuman. Concerning this point, she writes:

The distinctiveness of the natural law stems from the distinctive character of the human person, which implies that she can only attain her proper end through a process of rational choices, informed by some grasp of what that end might be. At the same time, however, this process is grounded in inclinations which stem from our created nature and reflect the intelligibilities structuring that nature, even in its prerational components. Seen from this perspective, the natural law reflects one expression of the more general tendency of all creatures to seek their final end, and in that sense to seek God, in and through activities structured by their natural inclinations. (Porter 2005, 322)

In this way, Porter (2005, 127–31) hopes to correct some of the erroneous understandings of natural law such as the “new theory of natural law” developed by Germain Grisez, John Finnis, and others.

The Catholic theologian Celia Deane-Drummond shows that there is an important connection between human and nonhuman morality; she demonstrates this through her engagement with research on inequity aversion in primates (Deane-Drummond 2019, 555). In particular, she pinpoints the key role of sociocultural evolution, which, in her view, is important in understanding the genesis of human anger. Anger is related to the notion of payback/revenge and “the desire for payback has biosocial roots in cooperation, and that these habits are prerequisites for the development of human moral sensibilities” (Deane-Drummond 2019, 1). Deane-Drummond’s argument is supported by the scientific findings in relation to the phenomenology of anger and payback

(in humans and primates) and is consonant with Porter's claim, which endorses the existence of a relation of continuity between prerational and rational nature. Deane-Drummond's view is also consonant with Philip Hefner's perspective, which advocates for the existence of biological and evolutionary roots of morality. Hefner (1993, 30) in fact endorses the existence of: (i) a "biological ground of values and what we term morality" and (ii) "an evolutionary preparation [implicit in the process of biological evolution] for values and morality. This development indicates that the dimensions of "'oughtness' and value are built into the evolutionary process and need not be imported from the outside" (Hefner 1993, 31).<sup>1</sup>

Similarly, David Clough (2009, 158) criticizes those overly anthropocentric perspectives that place human beings in a different moral and theological category when compared with nonhuman beings:

If we take the human-separatist view [which endorses the lack of continuity between nonhuman and human nature], we will place human beings in a different moral category from other creatures to match their qualitative theological difference, and therefore appropriately give far less regard to the well-being of nonhuman creatures.

The same author is also critical of those philosophical-theological views that ascribe moral or immoral behavior solely to human beings. He claims that often scholars assume, without clear demonstrations from natural-scientific experimental evidence, a difference of kind (rather than degree) when discussing the differences between human and nonhuman beings:

Others [scholars endorsing human-separatist views] have suggested that only human beings can have autonomy, personhood, morality or immorality. Once we have realized the fate of other proposed capacities, however, we are properly more sceptical about such loose appeals. It seems very likely that, as in the case of language and rationality, we have assumed rather than proved that the difference between human beings and other creatures is one of kind rather than degree. Until further evidence is adduced, we must accept the provisional conclusion that there is no distinctive human capacity that can be used to mark a qualitative difference between human beings and other species: as Darwin argued, the difference is one of degree. If we want to retain a human-separatist view that humans belong in a different theological category from other species, we cannot depend on natural attributes for its support. (Clough 2009, 152)<sup>2</sup>

The perspectives of the scholars I have presented suggest that the way in which we understand morality should take into consideration a relationship of continuity between nonhuman and human nature.

This article aims to bring additional evidence for this perspective using recent scientific research in relation to brain–machine interfaces (BMIs) to show that moral behavior does not pertain uniquely to human beings but can also be observed in its “embryonic stage” in nonhuman creatures; thus, I argue—in consonance with the perspective of the scholars mentioned earlier—there should be a relation of continuity between nonhuman and human nature with regard to the way in which we describe moral theories. My perspective supports the view that morality is not an exclusively human phenomenon, and I will show that there are also some traces of this phenomenon in nonhuman beings. Additionally, in this article, I discuss those implications that may affect the theological discourse on the notion of *imago Dei*.

The starting point for my reflections is a chapter written by the Iranian American scholar Nita Farahany (2016, 51–68) in a book entitled *Philosophical Foundations of Law and Neuroscience*. Farahany undertakes research into the ethical and legal implications of emerging neuro-scientific technologies and argues that recent findings in the field of neuroscience, in particular in relation to the use of BMIs, can help philosophers of law reflect on the notion of free will in connection with moral and criminal responsibility.

This article is divided into three sections. I first describe Farahany’s definition of free will and the distinction between freedom of choice and freedom of action. I present her main argument, which, in her view, has been confirmed by different scientific findings in relation to BMIs, namely, the fact that the freedom of action, rather than freedom of choice, is accountable for moral and criminal responsibility in human beings. I then reflect on the fact that some experiments using BMIs on monkeys suggest that these animals also possess freedom of action, thus suggesting morality is not a uniquely human phenomena but applies (although to a much lesser extent) to nonhuman creatures.<sup>3</sup> Thus, my conclusion is that human and nonhuman beings differ in degree in relation to their ability to make moral choices. Finally, I discuss the implications deriving from this perspective in relation to how the notion of *imago Dei* is addressed by theologians.

### **Farahany’s Perspective on Free Will, Freedom of Choice, and Freedom of Action**

Farahany builds her definitions of freedom and free will by following the work of the philosopher Harry Frankfurt (1969, 1971, 1993). She explains that free will encompasses freedom of choice and freedom of action. Farahany (2016, 61) defines freedom of choice as the “freedom over one’s preferences, desires, and/or dispositions.” She then explains that freedom of action represents “the freedom of intending an action, being able to bring it about without obstacles or impediments, and identifying with the action which results” (Farahany 2016, 61).

Farahany (2016, 61) exemplifies the notions of freedom of choice and freedom of action by describing the behavior of someone who is thinking of eating a cake. Freedom of choice relates to one's craving, thus freedom over one's preferences and disposition (for example, one might dislike carrot cake and prefer instead chocolate cake, one might be hungry or not, etc.) Freedom of action, however, differs from freedom of choice in that an individual deliberates through the freedom of action in their decision to actualize their desire. For example, in this case, the person needs to purchase the desired cake, take a fork, cut the cake, and then eat it.

For Farahany, freedom of action is the essential feature that needs to be present in order to establish if an individual is morally responsible for their actions. Farahany reflects on the fact that there are patients unable to perform specific actions through the movement of their body parts (i.e., paralyzed patients who cannot move their arms). However, through the development of BMIs, which transmit information that is processed through specific algorithms connected to artificial arms, these patients are now able to perform the actions they think and desire to do. Their thoughts can be decoded and transmitted to robotic arms so that these patients, despite the paralysis of their limbs, can fulfill their conscious and deliberate intentions to perform their desired actions with their artificial arms. The use of BMIs “demonstrate[s] that action choices are distinct choices with neural representations that can be detected and isolated” (Farahany 2016, 62).

Farahany observes that once brain implants have been fitted, patients will need extensive practice to successfully perform the desired movement of their robotic arms. This is explained by Farahany in the following passage (which is worth reporting in its entirety) describing what has been observed in Tim Hemmes (a paraplegic patient following a car accident) after a BMI chip was implanted into his brain:

After the new chip was implanted in Hemmes's brain, moving the robotic arm was not as simple as Hemmes thinking, “I want to move my arm.” Instead, he had to discover how to form the specific intention to move the robotic arm and train for weeks to learn how to do so. He began by training on moving a cursor around a screen, quickly discovering that thinking simple thoughts like “move up” or “move down” did not suffice to achieve the actions he desired. Instead, he had to learn a new language, a new way of translating his intention to act into three-dimensional actions. This technological feat makes plain the difference between dispositions (such as inability to move one's arms), intentions to act (deliberate thought processes), and performance of actions (achieving action desires in two- or three-dimensional space) . . . Hemmes had to learn to create effective brain states to move the robotic arm, making plain

that conscious willing of an action [thus the deliberation through the freedom of action] is a necessary cause of an intentional action. His training goes to the core of whether the brain alone controls actions, or whether some conscious “self” exercises control, choice, and movement. Hemmes tried to simply let his “brain” figure out how to move his robotic arm. That approach failed, while Hemmes’s experience of consciously and deliberately training eventually resulted in effective brain states to signal the robotic arm causing the arm to move in accord with Hemmes’s intention. Hemmes identified the resulting movement of the robotic arm as his own action. (Farahany 2016, 62–63)

This patient had to spend time training himself on how to perform a specific action with his artificial arm in order to learn to create specific brain states that were then able to provide the information needed to move the robotic arm in the desired way. This shows that the resulting action (i.e., a specific movement of the artificial arm) was not simply the output of brain mechanisms understood deterministically (e.g., explainable solely in terms of electric impulses and/or release of specific neurotransmitters). Instead, the patient’s actions (performed with his artificial arm) were the result of his free choice; so, it is reasonable to affirm that the actions performed by this paraplegic patient through BMIs were voluntary actions. As we shall see, the experimental studies of BMIs have arguably helped prove that free will (in relation to the performance of specific desired actions) exists. The deliberation that leads one to perform a specific action consists of two steps: (i) first, a decision is made with the freedom of choice (i.e., in my mind, I can choose that I want to eat chocolate cake rather than carrot cake); (ii) second, a decision is made with the freedom of action (i.e., I will move my arm and hand and open my mouth in order to eat the chocolate cake).

According to Farahany, a person should be judged as culpable for their actions not simply if they think about carrying out an evil action (through the deliberation of the freedom of choice that relates to the generation and imagination of all sorts of ideas in our mind) but only if they actually execute the action (through the deliberation of freedom of action, which enables the actual implementation of the desired action). This approach uses a pragmatic understanding of moral responsibility that has been widely accepted in our society, given that a person is culpable not just for thinking of doing something bad but for actually carrying out the premeditated evil action. It is in fact difficult to argue that a person who commits a premeditated crime is not morally responsible for their evil action; however, it is incorrect to judge a person as guilty for simply thinking of carrying out (without ultimately executing) an evil action. This idea is consonant with the teachings of the *Catechism of the Catholic Church*, which, following the instructions of the Council of Trent, provides some guidelines to define mortal sin. Three different conditions need to be met in order to affirm a person has committed a mortal sin, namely: (i) the object of the sin needs to

be grave matter, and there needs to be (ii) full knowledge and (iii) deliberate consent to prove there is “sufficient freedom” in relation to the execution of the sinful action (*Catechism of the Catholic Church* 1857, 1859; John Paul II 1984 17 § 9–12).<sup>4</sup> Thus, the fact that deliberate consent with “sufficient freedom” is an essential requirement for mortal/grave sin agrees with Farahany’s argument that a person can be judged as culpable only if the premeditated evil action is intentionally executed. Farahany in fact argues that only freedom of action (and not freedom of choice) accounts for the actualization of premeditated actions (Farahany 2016, 62–68).

The existence of brain implants that enable human beings to move robotic arms (in order to intentionally perform a specific task) shows that premeditated movements are the result of voluntary decisions that have been deliberated through the freedom of action (and not only through the freedom of choice); a human being can in fact think or dream of performing a specific action, but thinking of doing something does not necessarily mean the person will actually implement their ideas. An extra step is therefore needed to transfer the decision deliberated through the freedom of choice to the freedom of action, and this is demonstrated by the fact that the paraplegic patient needed time and practice to learn how to create specific brain states that were able to move the artificial arm in particular ways.

Let us make one further example to elucidate these issues. Imagine a speaker is delivering a seminar at a conference and an individual in the audience thinks (with their freedom of choice): “What if I suddenly get up, walk to the front of this room, and throw a punch at the speaker to stop him talking.” Before actually doing this, the person needs to think: “I am going to stand up, walk over, and throw a punch.” The final decision to implement these actions is the result of the deliberation of their freedom of action; most likely, this decision will not be implemented, because the person will soon realize that this is actually a bad idea with negative consequences. If we were able to detect and decode their brain activities to see what this person was thinking (through the use of their freedom of choice), we would be unable to accuse the person of having done something wrong for simply thinking of punching the speaker. In other words, we cannot accuse this person of being abusive simply because their freedom of choice enabled them to have this thought. The person can be accused of assault only if the thought of punching the speaker passes their second filter mediated by their freedom of action. Thus, it is the freedom of action, not the freedom of choice, that accounts for moral and criminal responsibility, since it is through the deliberation of the freedom of action that the green light is provided for the individual to actually decide to get up, walk over, and punch the speaker. It is important to reflect on these issues because nowadays, BMIs enable us to “read” and “decode” brain activity through pattern-recognition algorithms (Farahany 2016, 51; Rainey et al. 2020). It would be highly inappropriate to judge culpability following the detection of some brain activity in relation to simply “evil thoughts.”

For these reasons, Farahany is correct to conclude that an individual has acted immorally if their actions were performed in response to deliberation resulting from freedom of action (and not just for possible scenarios envisaged in the human mind through the use of freedom of choice, since these will not necessarily be actualized). Farahany has strong reasons to make this claim, especially after having explained that the use of BMIs on paraplegic patients has enabled us to distinguish between the two types of freedom. Now, the findings reported by researchers when BMIs are used in nonhuman creatures will be detailed, showing the strong similarity to what has been described so far in human patients.

### Experiments in Which BMIs Are Used on Monkeys

It has been demonstrated that BMIs can also enable monkeys to move artificial arms (Peterson 2005, 337–39; Farahany 2016, 52; Greenemeier 2008; Ifft et al. 2013). I argue that it is important to reflect on this issue, since this has some important philosophical-theological implications for the understanding of moral theories. What I propose in this section differs from Farahany's perspective. Farahany explains that human beings have, in contrast to other animals, the ability to form "second-order desires." This ability, in agreement with Harry Frankfurt's perspective, imparts the notion of personhood, which represents the distinctive feature of free agents who possess moral responsibility. In particular, Farahany writes that

[h]uman beings, like most other animals, have desires and motives and are able to make choices that frequently satisfy these "first-order desires." Human beings also have the capacity to form "second-order desires," or preferences among their first-order desires. The characteristic that distinguishes persons from nonpersons is that persons frequently are able to make their second-order desires the basis upon which they wish to be moved to action. In Harry Frankfurt's terminology, the essential attribute of personhood is the presence of these "second-order volitions," which occur when the individual "wants . . . certain desire[s] to be his will." Under this view, all that is required for moral responsibility is the ability to "act freely," or the ability to act according to one's second-order volition. (Farahany 2016, 66)

Notably, in this quotation, Farahany uses (as she herself explains) a language consonant with Frankfurt's (1971, 11) vocabulary, which also refers to first-order and second-order desires.<sup>5</sup> However, Farahany does not consider or comment on the fact that Frankfurt (1971 n5, 11) does not exclude the possibility that there could be "[c]reatures with second-order desires but no second-order volitions [that] differ significantly from brute animals, and, [that] for some purposes, it

would be desirable to regard . . . as persons.” Although Frankfurt does not describe or discuss these creatures in this quotation, it is possible he was referring to creatures that show a high degree of intentionality, such as primates.

Similarly, Deane-Drummond (2021) has claimed that in some instances, it might be possible to also use the concept of person for animals—although this theologian reached this conclusion using a very different approach than Frankfurt. For these reasons, it is important to reflect on the notions of freedom and free will in relation to the results obtained in some experiments in which BMIs were used in monkeys.

A careful analysis of the scientific literature (which I will now briefly summarize) demonstrates that the findings in the experiments of BMIs applied to human beings and monkeys are, in fact, remarkably similar. As we shall see, the distinction between freedom of choice and freedom of action seems to apply not only to human beings but also to monkeys, which, as we know, are animals that are close to human beings on the evolutionary ladder (and thus significantly different “from brute animals,” using Frankfurt’s expression mentioned earlier).

Similarly to the cases in which BMIs were used in paraplegic patients, researchers have been able to decode the movement intentions of monkeys by following two steps: (i) first, by decoding the neural processes responsible for specific movements of the monkey’s limbs and then (ii) by using this information to build a BMI that associates the electrical impulses to specific movements of the limbs; in this way, the monkey was able to manipulate a robotic arm. Recently, some researchers have developed a new BMI technology that is able to decode the electroencephalogram signals from a monkey’s brain and transmit some electrical signals to a device, thus enabling a monkey to control the movement of a disembodied robotic arm with its thoughts. Notably, in this experiment, the robotic arm moved by the monkey was disconnected and placed at a distance from the body of the animal (Hale 2023).<sup>6</sup> Thus, in this instance, the movement of the robotic arm took place without the mediation of any physical organ of the monkey, since it appears the robotic arm (detached from the body of the animal) was moved by the “thought” of the monkey. In another experiment, monkeys were able to move avatar arms that performed specific movements in virtual reality through their thoughts (Ifft et al. 2013). Arguably, the implication arising from these experiments is that monkeys are capable of performing disembodied operations driven by their thoughts.

It cannot be denied that the movement of an artificial arm from a spatial position (A) (with coordinates  $x_a, y_a, z_a$ ) to another spatial position (B) (with coordinates  $x_b, y_b, z_b$ ) can be described with a mathematical function. In fact, researchers who build BMIs need to use specific algorithms (utilizing mathematical-logical language) that are able to decode brain activities and transform them into electrical impulses that move the robotic arm. Nor can

it be denied that such a mathematical function (like any other mathematical object) has some obvious connotations of immateriality (Anglin and Lambek 1995).<sup>7</sup> Arguably, the mathematical function (with its immaterial connotations) that describes the movement of a robotic arm from position A to position B must be somehow present, perceived, and enacted in the mind of the monkey so that this animal is able to move intentionally the disembodied artificial arm from the spatial position A to the spatial position B. The enactment of a specific movement (i.e., of a disembodied artificial arm or of an avatar arm in virtual reality) must take place through some kind of immaterial faculty within the mind of the monkey, as we have seen through a BMI that uses an algorithm with a mathematical logic language. It is difficult to disprove that in these experiments with BMIs, a monkey would lack the intentionality, desire, and will associated with a specific spatial movement of a robotic arm disconnected from its body (from position A to position B), given that this movement is actually performed by this animal without the mediation of any physical organs.

Thomas Aquinas, following Aristotle, famously taught that what makes the human soul a spiritual soul, in contradistinction from nonhuman souls, is that the human soul displays spiritual faculties that do not use bodily organs (Aquinas 2008, 186 [*Quaestio Disputata de Anima*, a. 1, *sed contra*]; Aquinas, *Summa Theologica*, prima pars, q. 77, a. 5). In particular, Aquinas affirms “that some operations of the soul are performed without a corporeal organ, as understanding [*intellectus*] and will. Hence the powers of these operations are in the soul as their subject” (Aquinas, *Summa Theologica*, prima pars, q. 77, a. 5). The teachings of Aquinas help distinguish between mental states and spiritual states. Arguably, monkeys exhibit mental states driven by primary desires (i.e., the desire to eat), whereas human beings have, in addition to mental states (driven by primary desires), second-order desires such as the will and ability to apprehend concepts (i.e., we can understand the notion of nourishment rather than simply desiring to eat, or we can apprehend mathematical truths), or we can reflect on the self. However, as we have seen, the experiments on BMIs have shown that (similarly to human beings) monkeys can also move a disembodied artificial arm (with their thoughts and without using bodily organs). Arguably, the operation of the will (rather than the operation of the intellect) can easily be recognized in the BMI experiments on monkeys. I concur with Aquinas’s teachings that it is very unlikely a nonhuman being (such as a monkey) would have the same understanding (*intellectus*) as a human being in relation to things perceived in the external world. However, the results of the BMI experiments described here suggest we should reconsider our understanding of the notion of will in relation to (i) mental states (present in both human and nonhuman beings) and (ii) spiritual states (present uniquely in human beings). It seems that not only spiritual states (which are uniquely human) but also mental states (detected in nonhuman beings) show there are phenomena that reveal the existence of

immateriality, given that monkeys can also move a disembodied arm with only their thoughts.

In other words, despite the fact that a monkey does not have the same understanding as a human being in relation to the ability to form a concept (i.e., the concept of what a robotic arm represents or the notion of nourishment), the experiment described shows that the movement of a robotic arm (detached from the body of the monkey) is enacted through some immaterial property (i.e., the mathematical function that enables the translation of the “thought” of the monkey through an algorithm so that the robotic arm can be moved).

Moreover, it should be noted that the monkeys, similarly to those paralyzed human patients described, needed some training before they learned to actualize their intended movements through the artificial arms. Thus, as with humans, the monkeys needed to learn to convert the information from their thoughts—conveyed through specific brain states—in order to perform specific movements of the artificial arm. In a study, it took up to fifteen days for the monkeys to learn to do this (Ifft et al. 2013).<sup>8</sup> This suggests that monkeys use a similar process to humans in order to learn to actualize their desired intentions. Thus, it is very likely that the explanation provided by Farahany (described in the previous section) for the use of BMIs in human beings—in order to account for the mechanism by which the paraplegic patient deliberates and executes their actions with the artificial arm through the freedom of action—also applies to the experiments with BMIs on monkeys.

Farahany (2016, 65–66) demonstrated that freedom of action is associated with the “legal and moral responsibility” of human beings. Given the similarities between the experiments with monkeys and humans (described previously), my proposal is that her argument can now be extrapolated and applied to nonhuman beings. The fact that both monkeys and human beings seem to require some time in order to learn how to actualize the decisions that have been deliberated strongly suggests that it is reasonable to (i) distinguish between freedom of choice and freedom of action, and (ii) correlate freedom of action with moral responsibility, not only in human beings but also in monkeys. Arguably, what I have presented seems to suggest that morality is not a uniquely human phenomena but also applies (although, as we shall see, to a much lesser extent) to nonhuman creatures.

When we consider Deane-Drummond’s reflections on the notion of payback and fairness in primates in relation to morality, we could easily imagine a monkey who decides to move its artificial arm in order to get some payback/revenge on another monkey who stole its food. I argue that this possible experimental scenario provides evidence that monkeys also possess at least some level of moral agency (morality in an embryonic stage) and that their choices are actualized through their freedom of action (which is very similar to that which occurs when a human being makes a decision to act).

A human being can of course make moral decisions that have much more powerful and tragic effects on the rest of humanity and the ecosystem. For example, a man could decide (after deliberating with his freedom of action) to use his artificial arm to detonate a nuclear bomb with the desire to destroy a city, killing thousands of people. Obviously, the monkey's notion of morality is much less developed than human morality. In other words, a monkey displays traces of moral behavior (when compared to human beings), as exemplified by Deane-Drummond's notion of payback and revenge. Nevertheless, it should now be clear that morality is not a uniquely human phenomenon, but it is present, although to a much lesser extent, in nonhuman creatures. Thus, arguably, the results from the experiments on BMIs performed on monkeys (presented earlier) suggest that what distinguishes human and nonhuman beings is a difference in degree in the ability to make moral choices. The findings from these experiments—when read in light of Farahany's reflections on free will in relation to moral responsibility (which I extrapolated from the human to the nonhuman world)—suggest that traces of morality can also be found in the natural inclinations of prerational beings. These inclinations are manifest through mental states that can be detected both in human and nonhuman beings. Notably, this claim does not contradict the uniqueness of human beings, given our spiritual nature and our unique ability to apprehend concepts and reflect on the self.

Moreover, my claim provides additional support to the theological approaches adopted by Porter, Hefner, Clough, and Deane-Drummond (described previously), which recognize the relation of continuity between nonhuman and human nature while maintaining the uniqueness and the special role of human beings (created in the image of God) in creation. My claim also resonates with the theological perspective of Bethany Sollereeder (2016, 276) when she affirms that: "The deep commonalities between human and non-human animals do not eliminate human uniqueness, but they may increasingly turn our definition of uniqueness to one of role rather than of capacity."

In the final section of this article, I reflect on the implications deriving from the perspective I have presented so far, specifically in relation to the fact that human beings are unique in creation since they are the only living beings created in the image of God.

### **Implications for the Theological Understanding of the Notion of *Imago Dei***

In the previous sections, I have argued that it is incorrect to insist on the endorsement of ethical theories that absolutize human reason. Instead, I propose that it is more correct to affirm that there is an ascending intensity in the phenomenon of morality as we move to higher and more complex forms of life; there is no doubt that humans have a greater level of complexity in the way

in which we make decisions in relation to freedom of choice and action. Clearly, this perspective—supported (as we have seen) by the scientific observations of experimental studies of BMIs—has some repercussions for the way in which theologians should describe the notion of *imago Dei*. What notion of *imago Dei* should we then adopt, given what we know from the BMI experiments?

I believe there are two theologians—namely, Daniel Horan and Joshua Moritz—who could help in answering this question.

The Franciscan theologian Horan (2019, 560) desires “to reframe the *imago Dei* to include nonhuman creatures alongside members of the human species in some form.” He achieves this goal by “deconstructing anthropocentric privilege” (Horan 2019, 560),<sup>9</sup> reflecting in particular on the notion of nonhuman agency. He argues that “cognition, moral reasoning, and emotion” (Horan 2019, 566) are found not only in human beings but also in other creatures. His theological approach aims to outline a vision of humanity not set apart from the rest of creation; thus, Horan aims to provide a description of *imago Dei* that does not create a division between human and nonhuman nature. The views presented in this article are consonant with Horan’s perspective and help in showing that there is a relation of continuity, rather than discontinuity, between human and nonhuman agency.

The second thinker is the theologian Joshua M. Moritz (2011, 307), who proposes that “[i]nstead of grounding the image of God in human uniqueness . . . [we should affirm that] *imago Dei* is—exegetically, theologically, and scientifically—best understood in light of the Hebrew theological framework of historical election.” A passage in his article summarizes well his position:

As human beings are the animal species historically elected, called, and commissioned by God to be His royal representatives and priestly servants who strive to accomplish God’s will for the world, human specialness lies not in the content of our characteristics, but in the very fact that *Homo sapiens* are the animal species who are both called and chosen as God’s image. (Moritz 2011, 329–30)

In other words, human and nonhuman beings are similar in the sense that both are created (and thus we can affirm there is a relationship of continuity between human and nonhuman nature). However, human beings reflect God’s image because they are the only creatures chosen by God to fulfill God’s plan while remaining moral agents *par excellence*, given their superior intellectual abilities (when compared to other living creatures). In particular, Moritz (2011, 324) refers to Genesis 1:28, 12:3, 17:2, 6, and 8 to argue for the divine election of human beings, accounting for their creation in the image of God. Moreover, he affirms: “Adam and Eve, as the primal human pair, are chosen and called to be a species of priests to the non-Adamic humans (the other hominids) and to other

non-human animals” (Moritz 2011, 324). Moritz (2011, 330) further expounds this point by explaining that:

[u]nderstanding the divine likeness as election is consonant with evolutionary biology’s conception of human–animal continuity and the genealogical nature of species, and also acknowledges nonhuman animals and hominids as the ontological equivalents of humans and as fellow creatures that are substantively the same. At the same time, though, the *imago Dei* as election upholds the attestation of scripture and tradition in exclusively designating the image to human beings alone.

In conclusion, in this article, I have considered the philosophical-theological implications deriving from the use of BMIs in human and nonhuman beings. I have argued that freedom of action (which Farahany has demonstrated accounts for moral responsibility in human beings) is most likely present not only in humans but also in an “embryonic stage” in nonhuman creatures (e.g., monkeys.) Thus, it seems morality is not a uniquely human phenomenon but is present, although to a much lesser extent, in nonhuman creatures. As a result, when comparing human and nonhuman beings, it seems reasonable to refer to the existence of a difference in degree of ability to make moral choices. I have argued that this perspective is still consonant with some theological approaches that describe *imago Dei*.

---

## Notes

- <sup>1</sup> In support of these claims, Hefner mentions the works of Arthur Peacocke (1979), Manfred Eigen (Eigen and Winkler 1983), Ilya Prigogine (Prigogine and Stengers 1984), and Jeffrey S. Wicken (1987).
  - <sup>2</sup> Notably, in the development of his theological perspective, Clough also draws on the intuitions and observations published by other scholars such as Frans de Waal (1996), Adam Kolber (2001), and Robert Wennberg (2003).
  - <sup>3</sup> As we shall see later in the article, from this point of view, my position differs from Farahany's perspective, according to which morality applies uniquely to human beings.
  - <sup>4</sup> According to the *Catechism of the Catholic Church*: "Mortal sin is sin whose object is grave matter and which is also committed with full knowledge and deliberate consent" (*Catechism of the Catholic Church* 1857). Available online: [https://www.vatican.va/content/catechism/en/part\\_three/section\\_one/chapter\\_one/article\\_8/iv\\_the\\_gravity\\_of\\_sin\\_mortal\\_and\\_venial\\_sin.html#\\$21M](https://www.vatican.va/content/catechism/en/part_three/section_one/chapter_one/article_8/iv_the_gravity_of_sin_mortal_and_venial_sin.html#$21M). This quotation reiterates the teachings of a post-synodal apostolic exhortation, following the teachings of the Council of Trent. Cf. (John Paul II 1984, 17 § 12). Available online: [https://www.vatican.va/content/john-paul-ii/en/apost\\_exhortations/documents/hf\\_jp-ii\\_exh\\_02121984\\_reconciliatio-et-paenitentia.html](https://www.vatican.va/content/john-paul-ii/en/apost_exhortations/documents/hf_jp-ii_exh_02121984_reconciliatio-et-paenitentia.html). In particular, "there exist acts which, per se and in themselves, independently of circumstances, are always seriously wrong by reason of their object. These acts, *if carried out with sufficient awareness and freedom*, are always gravely sinful." Ibid. My emphasis in italics. Cf. Council of Trent, Session IV De Iustificazione, Chapt. 15: Conciliorum Oecumenicorum Decreta, ed. dt. 677 (DS 1544). For a definition of mortal/grave sin cf. (*Catechism of the Catholic Church* 1858); the situation is of course different when a person *thinks* to carry out (but ultimately decides to not perform) an evil action/grave sin. Christian faithful of different denominations who recite the *Confiteor* during the penitential act (at mass or divine service) refer to this type of sin as a sin *nimis cogitatione* ("in thought"). The latter sin is often defined as 'venial sin' which "does not deprive the sinner of sanctifying grace, friendship with God, charity and therefore eternal happiness, whereas just such a deprivation is precisely the consequence of mortal sin" (John Paul II 1984, 17 § 9).
  - <sup>5</sup> Frankfurt (1971, 11) in fact explains: "I shall use the term 'wanton' to refer to agents who have first-order desires but who are not persons because, whether or not they have desires of the second order, they have no second-order volitions. The essential characteristic of a wanton is that he does not care about his will. His desires move him to do certain things, without its being true of him either that he wants to be moved by those desires or that he prefers to be moved by other desires. The class of wantons includes all nonhuman animals that have desires and all very young children. Perhaps it also includes some adult human beings as well. In any case, adult humans may be more or less wanton; they may act wantonly, in response to first-order desires concerning which they have no volitions of the second order, more or less frequently."
  - <sup>6</sup> This technology was developed by a research team at Nankai University (China). The monkey moving an artificial arm disconnected from its body is visible in a photo accessible at the following website: <https://news.nankai.edu.cn/ywsd/system/2023/05/05/030055887.shtml>. In another experiment, a monkey was able to play video games with its mind; the video of this experiment can be viewed at the following website: <https://www.youtube.com/watch?v=rsCul1sp4hQ&t=161s>.
  - <sup>7</sup> We know that Thomas Aquinas (2008, 148 [cf. *Summa Theologiae* I, q. 79, a. 3, *Responded*]), following Plato, explained that "immateriality is what makes things actually intelligible."
  - <sup>8</sup> In particular: "Two monkeys [in the experimental study with the BMI performed by Ifft and colleagues] perfected bimanual operations within 15 days of training. Eventually, they were able to move the avatar arms without moving their own arms" (<https://www.science.org/doi/abs/10.1126/scitranslmed.3006159>).
  - <sup>9</sup> This expression in fact constitutes part of the title of Horan's (2019, 560) article.
-

## References

- Anglin, W. S., and J. Lambek. 1995. "Plato and Aristotle on Mathematics." In *The Heritage of Thales*, edited by W. S. Anglin and J. Lambek, 67–69. New York: Springer.
- Aquinas, Thomas. 2008. *Selected Philosophical Writings*. Edited and translated by Timothy S. McDermott. Oxford: Oxford University Press.
- . 1920. *Summa Theologiae*. Literally translated by Fathers of the English Dominican Province. Edus. Canonicus Surmont, Vicarius Generalis. Westmonasterii. <http://www.newadvent.org/summa/>.
- Catechism of the Catholic Church*. Accessible online at <https://www.vatican.va/content/catechism/en.html>.
- Clough, David. 2009. "All God's Creatures: Reading Genesis on Human and Nonhuman Animals." In *Reading Genesis after Darwin*, edited by S. C. Barton and D. Wilkinson, 145–62. Oxford: Oxford University Press.
- de Waal, Frans. 1996. *Good Natured: The Origins of Right and Wrong in Humans and Other Animals*. Cambridge, MA: Harvard University Press.
- Deane-Drummond, Celia E. 2021. "Humans Are Animals but Are Animals Persons? Implications for Theological Ethics." Firth Lecture, University of Nottingham. April 9. <https://www.youtube.com/watch?v=YJkPh6nvDe0>.
- . 2019. "Justice, Anger and Wrath: Tracing the Im/Moral Dimensions of Payback." *Religions* 10 (10): 555.
- Eigen, Manfred, and Ruthild Winkler. 1983. *Laws of the Game: How the Principles of Nature Govern Chance*. New York: Harper & Row.
- Farahany, Nita A. 2016. "A Neurological Foundation for Freedom." In *Philosophical Foundations of Law and Neuroscience*, edited by D. M. Patterson and M. S. Pardo, 51–68. Oxford: Oxford University Press.
- Frankfurt, Harry G. 1969. "Alternate Possibilities and Moral Responsibility." *The Journal of Philosophy* 66 (23): 829–39.
- . 1971. "Freedom of the Will and the Concept of a Person." *The Journal of Philosophy* 68 (1): 5–20.
- . 1993. "What We Are Morally Responsible For." In *Perspectives on Moral Responsibility*, edited by J. M. Fischer and M. Ravizza, 286–95. Ithaca, NY: Cornell University Press.
- Greenemeier, Larry. 2008. "Monkey Think, Robot Do." *Scientific American*, January 15. <https://www.scientificamerican.com/article/monkey-think-robot-do/>.
- Hale, Tom. 2023. "China Creates Brain–Computer Link That Allows Monkey to Control Robot Arm." *Ifscience*, May 8. <https://www.ifscience.com/china-creates-brain-computer-link-that-allows-monkey-to-control-robot-arm-68810>.
- John, Paul II. 1984. *Post-synodal Apostolic Exhortation Reconciliation and Penance of John Paul II to the Bishops Clergy and Faithful on Reconciliation and Penance in the Mission of the Church Today*. December 2. [https://www.vatican.va/content/john-paul-ii/en/apost\\_exhortations/documents/hf\\_jp-ii\\_exh\\_02121984\\_reconciliatio-et-paenitentia.html](https://www.vatican.va/content/john-paul-ii/en/apost_exhortations/documents/hf_jp-ii_exh_02121984_reconciliatio-et-paenitentia.html).
- Hefner, Philip J. 1993. *The Human Factor: Evolution, Culture, and Religion*. Minneapolis: Fortress Press.
- Horan, Daniel P. 2019. "Deconstructing Anthropocentric Privilege: Imago Dei and Nonhuman Agency." *Heythrop Journal* 60 (4): 560–70.
- Ifft, Peter J., Solaiman Shokur, Zheng Li, Mikhail A. Lebedev, and Miguel A. L. Nicolelis. 2013. "A Brain–Machine Interface Enables Bimanual Arm Movements in Monkeys." *Science Translational Medicine* 5 (210): 1–13.
- Kolber, Adam. 2001. "Standing Upright: The Moral and Legal Standing of Humans and Other Apes." *Stanford Law Review* 54 (1): 163–204.
- Moritz, Joshua M. 2011. "Evolution, the End of Human Uniqueness, and the Election of the Imago Dei." *Theology and Science* 9 (3): 307–39.
- Peacocke, A. 1979. *Creation and the World of Science*. The Bampton Lectures. Oxford: Clarendon Press.

- Peterson, Gregory R. 2005. "Imaging God: Cyborgs, Brain–Machine Interfaces, and a More Human Future." *Dialog: A Journal of Theology* 44 (4): 337–46.
- Porter, Jean. 2005. *Nature as Reason: A Thomistic Theory of the Natural Law*. Grand Rapids, MI: W. B. Eerdmans.
- Prigogine, I., and Isabelle Stengers. 1984. *Order out of Chaos: Man's New Dialogue with Nature*. Toronto: Bantam Books.
- Rainey, Stephen, Stéphanie Martin, Andy Christen, Pierre Mégevand, and Eric Fournier. 2020. "Brain Recording, Mind-Reading, and Neurotechnology: Ethical Issues from Consumer Devices to Brain-Based Speech Decoding." *Science and Engineering Ethics* 26 (4): 2295–311.
- Sollereider, Bethany. 2016. "When Humans Are Not Unique: Perspectives on Suffering and Redemption." *The Expository Times* 127 (6): 269–76.
- Wennberg, Robert N. 2003. *God, Humans, and Animals: An Invitation to Enlarge Our Moral Universe*. Grand Rapids, MI: William B. Eerdmans.
- Wicken, Jeffrey S. 1987. *Evolution, Thermodynamics, and Information: Extending the Darwinian Program*. New York: Oxford University Press.





## Learning from the Ravens: Worship and Wisdom with the Birds in the Hebrew Bible

**Peter Altmann**, David Allan Hubbard Associate Professor of Old Testament, Fuller Theological Seminary, Pasadena, CA, USA, [peteraltmann@fuller.edu](mailto:peteraltmann@fuller.edu)

---

This article investigates how animals in general and ravens in particular function as exemplary worshipers of God. As such, they exhibit certain kinds of wisdom that humans are invited to emulate. After a broad discussion of nonhuman animals' special connections with the divine in the ancient Near East and the Hebrew Bible, the focus narrows to the ravens. Modern biology has demonstrated that these birds (corvids) exhibit considerable intelligence. These findings open into the rehabilitation of these birds' actions in the flood narrative (Genesis 8) before turning to their leading role in the feeding of Elijah in 1 Kings 17, which places them as the role models for the widow of Zarephath. The investigation concludes with analysis of their negative depiction in classical Greek sources, which likely colored the history of their reception, beginning with their addition to the dietary prohibitions of Leviticus 11/Deuteronomy 14. Nonetheless, they remain prized creatures in the divine eye into the New Testament.

---



## Introduction

### *Balaam's Jenny (Numbers 22)*

An entertaining entry into the triangular relationship between God, humans, and nonhuman animals in the Hebrew Bible that can soften human audiences to the insight and guidance offered by animals comes in the parade example of animals instructing humans from the Bible: the story of Balaam and his donkey, or more correctly, his jenny, in Numbers 22. Balaam features in the Hebrew Bible as a non-Israelite prophet hired by one of Israel's enemies, Balak, king of the Moabites, to curse Israel on Balak's behalf. According to the received forms of this story, Balaam sets out to meet with Balak, with less than God's full-throated endorsement, and divine ambivalence crescendos. A divine messenger stands in Balaam's and his beast of burden's way as they ride to meet Balak. While the prophet (seer) ironically cannot see the divine messenger, his jenny can. She therefore veers off course or refuses to press forward to what would have been Balaam's death (as stated in no uncertain terms in Numbers 22:33). She thereby protects the blind prophet. Such maneuvering takes place three times. Balaam, totally unaware of the threat to his life, becomes so incensed with his jenny that he beats her. The story reaches its climax when the Lord gives the jenny human speech. In the ensuing discussion, Balaam comes to recognize his jenny's perpetual loyalty to him. Her faithfulness should have led him to trust her wisdom in this situation as well.

In the narrative's concluding scene, the Lord opens Balaam's eyes so that he too can see the divine messenger's presence. The messenger explains the situation and Balaam's failings to him. Balaam responds with a final declaration of his sin and a commitment of obedience to God. One might summarize the outcome of the story with the ironic question, "Who is the real dumb animal?" The audience is invited to consider how nonhuman animals' eyes may be open to divine and other realities in ways humans' eyes are not. This line of exploration might result in humans humbling themselves to learn from their fellow Earth dwellers. In the following discussion, I take up this invitation with regard to birds, and especially the family of the corvids, which includes crows and ravens, in order to demonstrate that close observation of the nonhuman world enriches interpretation of biblical texts, and various biblical texts embrace such scientific study.

### **Outline**

After an orientation to the topic (why birds?), I turn to a review of earlier studies addressing the consumption and dietary prohibitions of birds. Then, I consider an angle often overlooked, which is "Flyers as Fantastic Creatures." From there, I begin investigating what can arise from applying recent turns in animal studies to the texts of the Hebrew Bible, namely, "Birds as Creatures beyond Human Valuation." Finally, I turn to the main event of my article, "Ravens—Divine Service to Ostracization." A conclusion draws together the main points of the discussion.

### **Why Birds?**

I begin with a rather basic question: Why, or perhaps how, do birds matter in the biblical texts? There are several ways to answer this. Most fundamentally, they matter because they existed in the lived reality of the ancient Israelite and early Judean communities responsible for the composition of the texts that have become the Hebrew Bible, Jewish Tanakh, and Christian Old Testament. Birds therefore comprised an object ripe for reflection within the communities of their composers. Anna Angelini (2024, 235; cf. 2022, 493) writes with regard to animals in general, following anthropologists Claude Lévi-Strauss, Stanley Tambiah, and Dan Sperber: “[A]nimals are notoriously ‘good to think’: this means that they can activate a high number of cultural representations while at the same time remaining cognitively simple and intuitive tools.” In other words, at least for the ancients, animals could take on a number of meanings or types of significance: they constitute malleable symbols. Such instrumentalization of animals may be problematic if animals are reduced to these purposes, which leads to considerable abuse and misuse of animals, given the laudable intent to have animals matter as subjects and not merely as objects of human thought and action. This critique does have some justification, but animals have other functions as well.

More specificity can be articulated with regard to the birds, a designation I use interchangeably in this article with the slightly more appropriate term “flyers” as a catch-all, given that the biblical category includes bats and can include locusts. For one, these creatures occupy, at least some of the time, the literal space the ancients imagined to have existed between themselves and their God or gods: the air or, often in ancient languages, the heavens or the ether. From this perspective, flyers exist between the divine sphere and the sphere of created things. As such, ancient cultures viewed them as offering heightened potential because they could serve as intermediaries between those physical spheres (Altmann 2019, 67–68). As an overarching roadmap, humans encounter the flyers in the Hebrew Bible in a great variety of ways, including as:

- potential food
- valued created beings
- messengers from God
- examples of the laudable desire for proximity to the divine presence
- intuitive readers of the times
- praiseworthy creatures that trust in divine provision.

With this diversity of topics in mind, I intend to show that depictions of animals in the biblical texts not only include but go beyond the nature–culture dichotomy at the heart of the modern Western scientific divide between humans and other animals. Specifically, reassessing the value placed on nonhuman animal wisdom can enhance an important source of learning in the studies of religion and science.

## Consumption and Dietary Prohibitions

According to the biblical narrative, after the flood, humans received permission to eat every kind of animal (Genesis 9:3). To a certain degree, God thereby proclaims all animals “good” for food. This narrative development also includes a change in animals’ attitudes toward humans: they become fearful. The text does not explicitly tell us what the basic tenor of animals’ view of humans had previously been, though Noah was able to bring them onto the ark, which indicates some level of cooperation. Such mythic collaboration and an accompanying vegetarianism or veganism, which also appears in Isaiah 11:6–9, negate both the everyday world of ancient Israel and our own. Regular Israelite, as well as Mesopotamian and Egyptian, realities included considerable hunting and some raising of captive flocks for consumption by the human populations and their deities.

In this broader context, several verses in the biblical books of Leviticus (11:13–19) and Deuteronomy (14:11–20) repeat almost identical lists of flyers that the community of Israel should avoid. The Hebrew terms for these prohibited creatures pose daunting philological problems for those attempting to ascertain their specific identities. Even if scholars have succeeded in large part in seeing the excluded animals as consisting of various types of eagles, vultures, owls, bats, and some aquatic birds, among others, interpreters continue to wrestle to pinpoint the reason or reasons for distinguishing between animals acceptable and prohibited for Israelite consumption. A simple or straightforward answer has yet to arise. Read in their immediate literary contexts, this repeated list of prohibitions does not concern categories of “edible” or physically “healthy” foods. Few people endeavored to consume falcon or hawk in antiquity—though exceptions do appear in the textual record (Altmann 2019, 103–5). Ostriches might be one of the creatures on the banned list, and they were definitely consumed. There is some evidence of consumption of other animals on the list as well, though the case is weaker for the flyers than for some banned aquatic animals (such as catfish, rays, and sharks; Adler and Lernau 2021). Another theory popular in scholarship is that birds were prohibited on the basis of *their* diets: carrion-eating and carnivorous birds are excluded (Milgrom 1990; Otto 2016, 1306–7). While this hypothesis holds true to an extent, it does not explain the exclusion of the ostrich or the acceptability of ducks. In addition to vegetation, ducks eat insects, amphibians, and other aquatic animals, which the communities behind the biblical texts may not have understood as having blood, *per se*. However, their diet does not diverge significantly from cormorants, which are excluded. Basically every criterion put forward flounders once one gets into the details. Therefore, my contention is that there is no singular answer that explains the prohibition of *every* type of bird mentioned (Altmann 2019, 154–60). Rather, on the most basic level of the text, abstention from the various excluded animals intends to mark those following the prohibitions as separate to Israel’s God, or,

in the terms of the text, as holy. However, the textual dietary prohibitions of this repeated list carried a reduced importance for concrete community commensal practices into the Hellenistic period of the third–first centuries BCE among Judean communities, especially for the aquatic creatures but also likely for birds. Given the mostly unnecessary prohibition on, for example, eagles, yet disregard for the prohibition on scaleless sharks, it remains difficult to conclude exactly how these texts provided instruction for interested audiences.

The example of consumption and dietary prohibitions marks an especially instrumentalizing approach to animals. The communities behind the texts of the Hebrew Bible imagined birds largely as fit (or not) for human consumption and in some cases for divine offerings. In this latter capacity, they serve both as metaphorical divine food and as cleansing agents. Furthermore, the prohibited types serve as instruments for human theorizing: birds signify and symbolize values and concerns beyond themselves, a concern documented already in the second-century BCE *Letter of Aristeas* 145–69, which relates animal behaviors to human virtues.

As the subsequent sections show, the value of birds was fraught with a considerable variety of concerns, such that eating them was never just for the belly but played a part, as did all interactions with them, in a person's and a society's theological and ethical formation. As stated in Deuteronomy 14:2 and 21 (NRSV): “For you are a holy people to the LORD your God.” In other words, in the communities that viewed these texts as Scriptural, that is, as authoritative or inspirational, adherence to the mandate of the text expressed their loyalty to their deity.

### **Fantastic Creatures**

A first step toward complexity and a more complete view of birds can come by turning attention to a set of fantastic creatures that occupy space between God and humans in both the broader ancient Near East and in the biblical texts themselves. Ancient Near Eastern scholar Annie Caubet (2002, 211) makes the pertinent observation about the iconography of animals that clear distinctions between “real” and “invented” animals do not occur. This insight underscores that the ancients did not necessarily divide the reality they experienced into the same categories modern Westerners do. This insight means that understanding ancient texts requires a different perspective on what is “real” with regard to the nonhuman animal world. I already noted as much in my earlier discussion of Balaam. Comparative evidence of such a lack of distinctions comes from some Indigenous cultures today. They can assume that nonhuman animals have similar minds and cultures to humans. Philippe Descola (2013, 30, 129–30) outlines this different way of approaching reality, which may ascribe interiority and a theory of mind to nonhumans. Beyond Descola's ethnographic and anthropological reflections, however, wildlife scientist John Marzluff attributes features of such

interiority to corvids as well, including mental time travel and a theory of mind (Marzluff and Angell 2012). This convergence opens the door to a different view of the category of nonhuman animals, including those “fantastic creatures” in the graphic and textual representations of the world of ancient Israel.

Investigation of these creatures provides modern Westerners valuable insight. Those called cherubim and seraphim in Hebrew are closely related to the *lamassu* in Mesopotamia and Uraeus serpent in Egypt. Cultures throughout the ancient Fertile Crescent imagined and formed figures that guarded the holy realms occupied by their deities. Isaiah 6, which relates Isaiah’s temple vision in which he receives his prophetic call, presents one such depiction:

In the year that King Uzziah died, I saw the Lord sitting on a throne, high and lofty; and the hem of his robe filled the temple. Seraphs were in attendance above him; each had six wings: with two they covered their faces, and with two they covered their feet, and with two they flew. And one called to another and said: “Holy, holy, holy is the Lord of hosts; the whole earth is full of his glory.” The pivots on the thresholds shook at the voices of those who called, and the house filled with smoke. And I said: “Woe is me! I am lost, for I am a man of unclean lips, and I live among a people of unclean lips; yet my eyes have seen the King, the Lord of hosts!” Then one of the seraphs flew to me, holding a live coal that had been taken from the altar with a pair of tongs. The seraph touched my mouth with it and said: “Now that this has touched your lips, your guilt has departed and your sin is blotted out.” Then I heard the voice of the Lord saying, “Whom shall I send, and who will go for us?” (Isaiah 6:1–8 NRSV)

These awesome creatures can cause the monumental Jerusalem temple to shake through the thundering of their voices. They act as attendants or servants in God’s throne room, appearing in a location known for the Uraeus serpents as protective genies in ancient Egypt. In this setting, one of them also plays the role of a purifying intermediary, preparing Isaiah to hear the divine voice and receive his mission.

Cultures throughout the ancient Near East envisioned and carved such creatures to guard the thresholds between mundane and sacred spheres. Prominent examples of such *lamassus* from the Neo-Assyrian palaces of the ninth–seventh centuries BCE are on display in the British Museum (e.g., BM 118802, a colossal statue of a winged lion from the Nimrud North-West Palace of Ashurnasirpal II, 865–860 BCE). As is well known, a cherub takes up a similar task in Genesis 3:24 on the boundary of the Garden of Eden, in this case making sure humans no longer enter.

A similar and intriguing perspective emerges from Mesopotamian iconography that depicts the wisdom of the ancients coming through *apkallus*, mythical creatures with human heads and bird- or fish-like bodies (or garments), or the reverse. One can understand these creatures as accessing divine wisdom in part



Here, the birds embody the proximity to the deity the psalmist desires. Furthermore, the birds also repetitively sing praises to the Lord (יהללוך). In this capacity, the birds are the preeminent worshippers. They demonstrate the appropriate hope for the pilgrims coming to the temple in the verses that follow (verses 6–13 [ET: 5–12]; see Tate 1990, 358). The birds live in the way humans can and should aspire to.

There is also an element of empirical observation at work here: one can call to mind the nests of various birds in the exterior or sometimes even the interior nooks and crannies of large places of worship to imagine how small birds found similar refuge in the Jerusalem temple building.

Again, with the seraphim of Isaiah 6 and ancient Near Eastern *lamassu* in mind, yet another interpretive pathway opens up. Perhaps there is an ironic play on those semi-divine protectors in Psalm 84? Rather than requiring protection by powerful gatekeepers such as these mythical creatures, God is sufficiently secure to welcome relatively weak birds like the swallow into the holiest of places.

While Psalms 104 and 84 do not single out ravens, these birds do feature in Psalm 147 and Job 38. In Job 38:41, after a long litany of rhetorical questions demonstrating God's superiority in relation to cosmological and weather phenomena, verses 39–41 highlight God's provision for nonhuman animals, specifically lions and corvids, especially their young.

Can you hunt the prey for the lion,  
or satisfy the appetite of the young lions,  
when they crouch in their dens,  
or lie in wait in their covert?

Who provides for the raven its prey,  
when its young ones cry to God,  
and wander about for lack of food? (Job 38:39–41 NRSV)

Why name these two types of animals? They represent traits admired by the text's composers: strength and ferocity in the case of the lion, and cleverness and ingenuity in the case of the corvids. Yet, these texts focus on their young in order to highlight situations in which even such animals require protection and provision. Also striking in Job 38, like Psalm 104, is the relative or complete omission of humans. Humans receive divine care at the same level as other creatures in Psalm 104, where they only appear in verses 15 and 23, and humans do not appear at all as part of the contents of Job 38.

Psalm 147:9 (NSRV) picks up on the same image of the young corvids crying for food:

- 1 *Praise* the Lord!  
 How good it is to *sing praises* to our God;  
 for he is gracious, and a *song of praise* is fitting.
- 2 The Lord builds up **Jerusalem**; he gathers **the outcasts of Israel**.
- 3 He heals the **broken-hearted**, and binds up their wounds. ...
- 6 The Lord lifts up the **downtrodden**; he casts the **wicked** to the ground.
- 7 *Sing* to the Lord with thanksgiving; *make melody* to our God on the lyre. ...
- 9 He gives to the animals their food, and to the **young ravens when they cry**.
- 10 His delight is not in the ~~strength of the horse~~, nor his pleasure in the ~~speed of a runner~~;
- 11 but the Lord takes pleasure in *those who fear him*, in *those who hope* in his steadfast love.

God's provision of food for the animals in verse 9 serves a different rhetorical purpose. In this context, such action functions as a guidepost for human ethics. It is grounded in God's care for justice, especially for those in dire need in verses 2–3 and 6, who in this psalm are Jerusalem and its outcast children. These objects of care are marked in bold. In verse 9, the psalmist turns to the nonhuman world to make an argument about God's care for those in need. Just as God demonstrates divine concern for the nonhuman world, God will also restore the oppressed and upend the wicked among humans. Therefore, humans should respond with awe and respect for God (marked with italics). Rather than relying on one's own strength, speed, or other abilities or accomplishments (which are struck through in the text), one should praise and *call out to* God, as the young ravens do (also marked with italics). The action of these birds is expressed with the Hebrew term קרא (*q-r-*). Its basic meaning is "to call or cry out." In relation to God, it can mean call for help, which is the primary meaning here. However, it often appears in conjunction with giving praise or worship (as seen in 1 Chronicles 21:26 or Psalms 66:17). Thus, the action taken by the young corvids in connection with the actions taken by the other creatures that rely on the deity offer the human audience an excellent example of reliance upon the deity interconnected with worship. The dual implications of call (קרא) indicate the embrace of careful attention to and emulation of nonhuman animals.

In a thematically related scenario, nonhuman animals may provide humans with objects upon which to reflect and analyze human dilemmas, especially with regard to ethical or moral issues. One can see this type of thought operating in the writing of the prophet Jeremiah in 8:7, where he declares, "Even the stork in the heavens knows its seasons [assumedly for migration], and the partridge and swallow, and crane obey the time for coming, but my people do not know the justice of the Lord" (my translation). In this text, Jeremiah accuses his Judahite audience of religious and other failures akin to rejection of their basic,

perhaps even instinctual, behavior on analogy with the basic, instinctual wisdom displayed by the various types of birds that discern when to migrate. Study of bird habits would lead to faithful religious practice.

This section began with the broad theological statement of Genesis 1. It then narrowed its scope to God's care for birds, including young, vulnerable corvids, which surprisingly appear twice as the objects of divine compassion. Given the value accorded to such animals outside human-dominated spheres, these scriptures indicate that humans should study and follow the lead of these animals' wise responses to and reliance on the deity. Humans should similarly trust in divine provision and perform justice.

### **Ravens—Divine Service to Ostracization**

After considering the role animals and especially birds can play in the unfolding of the biblical story, my discussion now traces in more depth the depictions of these dark or black birds as they are described in Song of Songs 5:11: “[H]is locks are wavy, black as a raven.” They are generally rendered as ravens or crows in English Bibles, though no distinction between them is provided. Given the description in Leviticus 11:15/Deuteronomy 14:14 “[E]very black bird [עֶרָב] according to its kind [לְמִינֵהוּ]” (my translation), it is appropriate to render the term as a family distinction for Corvidae or corvids. On the basis of their distribution, the species best known in the ancient Levant was likely the brown-necked raven (*Corvus ruficollis*). Its head and neck have a brownish hue, giving rise to its English name. However, the fan-tailed raven (*Corvus rhipidurus*), among others, also inhabits the region and should be included in the designation.

### **Corvids after the Flood**

Beyond the previously noted initial mentions in Job and Psalms, an investigation of corvids' place in biblical conceptions includes connections with rain or lack thereof and comprises a move from a prized to an impure creature. The most well-known and long-traveled story is of Noah and the raven in Genesis 8:7. The narrative unfolds in Genesis 8:6–12 (NRSV):

At the end of forty days Noah opened the window of the ark that he had made and sent out the raven; and it went to and fro until the waters were dried up from the earth. Then he sent out the dove from him, to see if the waters had subsided from the face of the ground; but the dove found no place to set its foot, and it returned to him to the ark, for the waters were still on the face of the whole earth. So he put out his hand and took it and brought it into the ark with him. He waited another seven days, and again he sent out the dove from the ark; and the dove came back to him in the evening, and there in its beak was a freshly plucked olive leaf; so Noah knew that the waters had subsided from the earth. Then he waited another seven days, and sent out the dove; and it did not return to him any more.

An early rabbinic interpretation (Babylonian Talmud Sanhedrin 108b) often accepted today views the raven negatively because it did not return to the ark. However, turning back to an earlier Mesopotamian version of the story provides a different perspective. While there are various versions of the Mesopotamian flood tradition, the extant lines only appear in the story of Gilgamesh. When the boat of the Mesopotamian Noah, here called Utnapishtim, comes to rest on a mountain, he releases a dove that returns, as does a swallow, because they did not find a place to land. After releasing these two birds, he then sends a raven:

I brought out a raven, I let it loose:  
 off went the raven, it saw the waters receding,  
 finding food, *bowing* and *bobbing*, it did not come back to me. (XI.154–56;  
 George 1999, 94)

Several observations indicate that the narrative honors the corvid. First, the raven successfully finds food and does not return to the boat while the other birds fail. The raven thereby demonstrates its resourcefulness, and thus its superiority, in this regard. Second, unlike in the biblical narrative, in Gilgamesh the raven is sent out last rather than first, which has a crescendo effect.

Moving back to the version in Genesis 8, interpreting the change by the biblical authors is more tenuous. However, the biblical version may suggest again just how competent the composers viewed the raven to be (as also noted by Parmelee (1959, 55)). This accentuates the corvids' ability to exist in environments where the dove and the human could not.

For the purposes of the discussion here, the importance of the birds, and especially the ravens in these stories, lies in their ability to serve as bearers of practical wisdom for the humans. Noah and Utnapishtim rely on the ravens to demonstrate for the humans that life on dry earth has again become sustainable. Corvids thus blaze the trail for other land creatures and humans.

Further significance of the relationship emerges when reading the flood story in light of the divine–human mediatory function of winged creatures. On this level, the raven not only indicates that the waters have receded but also that the divine wrath has been quelled.

One might consider the relationship between human and bird instrumentalized here, but it contains considerable reciprocity, and perhaps even mutual trust and respect. Noah cares for the raven by bringing it and the other animals aboard. The raven returns the favor by demonstrating the viability of life on the newly dried land.

### **Judgment Associations**

Contrary to this ancient Near Eastern tradition, two biblical texts put the corvids in a negative light: Isaiah 34:11 and Proverbs 30:1.<sup>1</sup> The first passage place

corvids in the midst of desert ruins as part of a prophetic judgment oracle against Edom. They appear alongside other creatures that frequent such places.

Owl [pelican] and hedgehog [owl] will possess it,  
and owl [hawk] and corvid will dwell in it,  
and he will stretch out the line of confusion  
and the stones of chaos over it. (Isaiah 34:11; my translation)

My translation highlights the uncertainties regarding the identifications of several animals. Yet regardless of which creatures appear, the text undoubtedly imagines devastated enemy territory. Edom becomes the haunt of fantastic creatures like goat-demons and Lillith in verse 14. The creatures residing in these places may not necessarily be evil, but they take on negative hues through their association with ruins. They thrive where humans no longer do. Human bane is their boon.

A further dismal association for corvids comes to light in Proverbs 30:17 (my translation):

The eye that mocks a father  
and scorns to obey a mother  
ravens of the valley will peck it out  
and children of vultures [eagles] will eat it.

Here, corvids stand parallel to vultures or eagles, and these birds perform a gruesome task of judgment against a contemptuous child. In short, the eye that looks with scorn, the birds will peck out. The image functions as a powerful warning against such behavior, yet this does not mean the birds only receive a negative evaluation. They enforce the desirable order of the world in which children should respect and honor their parents. Thus, the birds may know something about the divine order that unruly children ignore to their peril. Like the case of Noah, there is a kind of wisdom humans can acquire by observing the actions of the animals. Nonetheless, this task of destruction does carry with it a gloom associated with some flyers in the Pentateuch's dietary prohibitions.

### **1 Kings 17**

With this backdrop in mind, I now turn to an underappreciated narrative in the book of 1 Kings that belongs to the story of the Prophet Elijah found in chapters 17–19. This prophet is famous for his confrontation with Israel's King Ahab and Queen Jezebel that leads to a three-year drought. At the end of these years, Elijah goes on to challenge the prophets of Baal, a widespread Levantine storm deity, to a contest to see whether Baal or Yhwh could bring rain to end the suffocating drought. My text comes from the beginning of this narrative cycle.

Now Elijah the Tishbite, of Tishbe in Gilead, said to Ahab, “As the Lord the God of Israel lives, before whom I stand, there shall be neither dew nor rain these years, except by my word.” The word of the Lord came to him, saying, “Go from here and turn eastward, and hide yourself by the Wadi Cherith, which is east of the Jordan. You shall drink from the wadi, and I have commanded the ravens to feed you there.” So he went and did according to the word of the Lord; he went and lived by the Wadi Cherith, which is east of the Jordan. The ravens brought him bread and meat in the morning, and bread and meat in the evening; and he drank from the wadi. (1 Kings 17:1–6 NRSV)

At the beginning of this narrative cycle, immediately after Elijah declares to King Ahab that drought will come for several years, the prophet follows God’s command to flee beyond Ahab’s reach to the regions of the Jordan River. God states that he will provide sustenance for Elijah there. The fact that Elijah is to drink water from the Wadi Cherith, not from the Jordan River, may point to divine intervention that maintains the flow of water in the seasonal stream, at least for a while, despite the drought conditions (Cogan 2001, 426). However, even more striking is that God commands ravens to feed him. There is a certain parallelism to God’s provision for the Israelites in the desert in Exodus 16 (Wray Beal 2014, 232), but in Exodus the meat is birds rather than being brought by birds (and, of course, the birds are quail rather than corvids).

Thus, there are significant differences that call for investigation: Why does God specifically command corvids to feed Elijah while he is in hiding? Furthermore, in verse 6, the text states that Elijah’s meals consist of bread and meat. These were not rations eaten in antiquity by those on the brink of starvation, for meat was not regularly consumed by non-elites. In other words, God practically provides Elijah with the menu of a feast (though wine does not appear). What is the significance of having *ravens* bring *these* dishes?

It is not by chance that corvids are the bird of choice in this narrative for several reasons. First, Elijah hides in a fairly remote area. As discussed earlier in relation to Isaiah 34, ravens were viewed by ancient Israelites as one of the types of birds inhabiting such desolate locations (also noted by Sweeney 2007, 212). Therefore, the use of ravens demonstrates that God’s care extends to such places. Second, recent scientific studies have confirmed age-old observations of corvids’ intelligence. A number of experiments indicate their ability for some abstract thought (Emery and Clayton 2004) and social learning (Marzluff and Angell 2012). Their brain sizes as a percentage of their mass equals those of mammals, providing a neurological explanation for their abilities.

A gap in the narrative concerns the origins of the bread and meat acquired by the corvids. These birds have long had a reputation as clever hunters and scavengers. For example, they were known and disdained for stealing offering meat from altars in ancient Greece, as I discuss later. In modern times, they have been

observed herding a flock of doves into traffic and then feasting on the resulting roadkill (Marzluff and Angell 2012, 74). More importantly, the birds are known to cache some of their food for later. Many more stories could be added, but the point is that corvids innovate based on the circumstances and plan for lean times. The corvids served as an appropriate creature for taking care of the prophet. One can surmise that the corvids either hunted fresh meat or simply brought out some from the many caches they had lain aside for such meager times.

A further set of questions might also arise from the narrative when read in light of modern scientific study. What kind of relationship develops between the birds and the prophet? Corvids as human pets are a widely documented phenomenon, even though it has become illegal in some countries: Charles Dickens's pet raven named Grip inspired an important character in his *Barnaby Rudge*. They recognize human faces and respond accordingly to those they have labeled as friend or foe (Marzluff et al. 2012).

Given their recognition capabilities, the narrative intimates that they come to view Elijah as a friendly face. As a result, this short narrative provides an example of nonhuman and human collaboration. With regard to the bread, while in Hebrew it is also the general term for "food," if it does indicate a manufactured product, then it suggests the birds stole it from a human source. If so, then this stealing took place at a moment of widespread hunger, which raises the ethical stakes. However, sociological studies of famine support speculation that while some people were going hungry, others, probably elites, still had plenty (Altmann 2014). Therefore, one can place the corvids in the category depicted in Proverbs 6:30: "A thief is not despised if he steals to fill his appetite when hungry."

Given the drought conditions, these birds also serve as a nonhuman example for the desired behavior in the immediately following story of the widow of Zarephath, whom Elijah begs for water and bread. She must risk trusting the prophet's promise that sharing with him will ensure her survival and that of her son, both of whom are on the brink of starvation (1 Kings 17:10–14 NRSV):

So he set out and went to Zarephath. When he came to the gate of the town, a widow was there gathering sticks; he called to her and said, "Bring me a little water in a vessel, so that I may drink." As she was going to bring it, he called to her and said, "Bring me a morsel of bread in your hand." But she said, "As the Lord your God lives, I have nothing baked, only a handful of meal in a jar, and a little oil in a jug; I am now gathering a couple of sticks, so that I may go home and prepare it for myself and my son, that we may eat it, and die." Elijah said to her, "Do not be afraid; go and do as you have said; but first make me a little cake of it and bring it to me, and afterwards make something for yourself and your son. For thus says the Lord the God of Israel: The jar of meal will not be emptied and the jug of oil will not fail until the day that the Lord sends rain on the earth."

While the faith demonstrated in Yhwh, Elijah's God, by this foreign woman from Baal's home territory has often and rightfully received notice; her exemplary action is in fact previewed in the corvids' sharing of their provisions. The birds pave the way of faith in Israel's God that humans are to follow, underlining the value of studying avian behavior.

### **Corvids in Greek Tradition**

Discussion of the corvids in the biblical texts requires one more level of ambivalence. Returning full circle to dietary prohibitions with a text-critical eye on the raven adds another wrinkle. Study of the ancient Greek versions of Leviticus 11 and Deuteronomy 14 reveals that the earliest manuscripts of the Greek tradition, translated from Hebrew manuscripts of these biblical books in third-century BCE Egypt, did not prohibit these birds (Angelini and Nihan 2020, 60). Rather, the ban on corvids only came as Greek culture increased its influence in Judean communities in both the Levant and Egypt. The earliest inclusion of their prohibition is in a text from Masada, Mas1b from the turn of the era (Altmann 2020, 94). What might have led to this addition of corvids to the list of prohibited birds?

A plausible answer emerges from the study of classical Greek traditions about ravens, *κόρακος*, which are quite negative: they feature regularly as a part of curses. These birds are imagined to gloat over corpses. As already mentioned, they reportedly stole meat offered on altars, and they generally function as an image of ruin. Several examples provide the flavor of Greek associations with these birds. First, in Aeschylus's play *Agamemnon* from the early fifth century BCE, a raven is used to express a kind of look: "Standing over the corpse, in the manner (1473) of a loathsome raven, it glories in (1474) tunelessly singing a song <of joy>" (Aeschylus 2008, 179, 181).

The sixth-century poet BCE Theognis offers a similarly negative view. The English translation reads, "Everything here has gone to the dogs and to ruin" (Gerber 1999, 295). However, rather than "to the dogs," the Greek texts literally states "to the ravens" (*τάδ' ἐν κοράκεσσι*). Thus, something going to the ravens indicates that it is in very poor shape.

Aristophanes, the Attic playwright known as the father of comedy from the late fifth and early fourth century BCE mentions ravens a number of times. In his play *Clouds*, the raven appears, as it frequently does, as part of a curse: "*βάλλ' εἰς κόρακας. τίς ἐσθ' ὁ κόψας τὴν θύραν* [Buzz off to blazes! [literally: Throw to the ravens], Who's been pounding on the door?]" (Aristophanes 1988, 25). While several less imprecatory uses of ravens occur in ancient Greek literature, this is the general tenor. They were birds associated with destruction, death, unworthiness, low quality, and curses. Thus, it appears the biblical text of the dietary laws did not originally prohibit the black birds but grew to include them due to the disdain for the birds in Greek culture. This is a stark contrast with

the different path taken with regard to pigs, which separates Jewish from Greek and, later, Roman culture.

### **Luke 12:24**

A look at the one New Testament reference to ravens provides a sense of completeness to my discussion of the biblical material. The gospel of Matthew's Sermon on the Mount contains the famous exhortation to "consider the lilies of the field and the birds of the air that do not sow or reap and yet the Heavenly Father feeds them." Luke's version of this text, in Luke 12:24 (NRSV), though perhaps less well known, makes the identification of the birds more explicit:

Consider the ravens: they neither sow nor reap, they have neither storehouse nor barn, and yet God feeds them. Of how much more value are you than the birds!

If one does "consider the ravens," while they have neither storehouse nor barn, they certainly do find ways to employ their proportionately large brains to plan, kill, gather, and cache food for lean times. Given their increasingly recognized behavioral similarities to humans in these and other aspects, they serve as apt guides for human responsiveness to God with trusting loyalty. What proves especially striking about this text from Luke is that it comes both at a time when corvids had become a part of the dietary prohibitions and that it appears to have been written, more than any of the other canonical gospels, for an explicitly Greek and more educated audience that would have more awareness of the corvid's negative status in classical Greek traditions. Nonetheless, they still experience God's provision and deserve human curiosity and attention.

### **Conclusion**

My discussion demonstrates how birds, especially the corvids, take on numerous literary functions in the texts of the Hebrew Bible. As winged creatures, they inhabit the physical space between and perhaps mediate between the divine and the earthly, which increases their value both for humans and beyond them. Birds recognize the signs of the seasons, leading them to migrate at appropriate times, which indicates their ability to see reality in a way Israel (and humans in general) might deny, thus rejecting divine justice and provision. This basic insight provides one line of interpretation with possible implications for modern interaction between science and religion: the biblical texts indicate that patterns governing nonhuman animals demonstrate a kind of wisdom humans ignore and reject to their own harm.

In several places, flyers also display capabilities that blaze trails for humans, such as in the Genesis flood narrative and for the Syro-Phoenician woman in 1 Kings 17. In these cases, most intriguing are the ways in which they collaborate

with humans: both Noah and Elijah. These birds demonstrate loyalty to God and to their human friends, thus exhibiting qualities humans often reserve for themselves. Depictions of animals in the biblical texts thus transgress the nature–culture dichotomy at the heart of the modern Western scientific divide between humans and other animals, providing a more complex and more holistic perspective on the value of nonhuman animals. Specifically, reassessing the value placed on nonhuman animal wisdom enhances an important source of learning in the studies of religion and science that is often discounted in religious traditions founded on the Hebrew Bible. The strict hierarchy of humans over nonhuman animals often used as a matrix for interpreting the dominion of humans over other animals in Genesis 1:26–28 and then the remainder of Judeo-Christian scriptures calls for revision in light of the mutuality and alternate wisdoms on display in the canon as a whole. My overall interpretation of biblical texts instead encourages and embraces the scientific study of nonhuman animal intelligences. Such study should be included as part of religious faith rather than as something that might be set up in opposition to it.

---

## Note

- <sup>1</sup> A third, likely possibility is Zephaniah 2:14. There are several corruptions, or at least question marks, in the ancient textual tradition. Most important for this discussion is the reading of “raven” based on the Greek version of the text. It suggests a likely text-critical spelling error in the Hebrew version (in the Hebrew MT version, *‘oreb* (corvid) is likely misspelled as *horeb* (dry)): Zephaniah 2:14 envisions a city with great buildings that have pillars and capitals, in which a corvid (rather than desolation) is on the threshold.

---

## References

- Adler, Yonatan, and Omri Lernau. 2021. “The Pentateuchal Dietary Proscription against Finless and Scaleless Aquatic Species in Light of Ancient Fish Remains.” *Tel Aviv* 48:5–26
- Aeschylus. 2008. *Agamemnon*. Translated and edited by Alan H. Sommerstein. LCL 146. Cambridge, MA: Harvard University Press.
- Altmann, Peter. 2019. *Banned Birds: The Birds of Leviticus 11 and Deuteronomy 14*. Archaeology and Bible 1. Tübingen, Germany: Mohr Siebeck.
- . 2014. “Feast and Famine: Lack as a Backdrop for Plenty.” In *Feasting in the Archaeology and Texts of the Hebrew Bible and Ancient Near East*, edited by Peter Altmann and Janling Fu, 149–78. Winona Lake, IN: Eisenbrauns.
- Angelini, Anna. 2022. “La place de l’animal dans l’étude des religions antiques.” *Revue de Théologie et de Philosophie* 154 (4): 493–505.
- . 2024. “Looking from the Outside: The Greco-Roman Discourse on the Jewish Food Prohibitions in the First and Second Centuries CE.” In *To Eat or Not to Eat: Studies on the Biblical Dietary Prohibitions*, edited by Peter Altmann and Anna Angelini, 209–38. Archaeology and Bible 9. Tübingen, Germany: Mohr Siebeck.
- Angelini, Anna, and Christophe Nihan. 2020. “Unclean Birds in the Hebrew and Greek Versions of Leviticus and Deuteronomy.” In *The Text of Leviticus: Proceedings of the Third International Colloquium of the Dominique Barthélemy Institute, Held in Fribourg*, edited by Innocent Himbaza, 39–67. Orbis Biblicus et Orientalis 292, Publications of the Dominique Barthélemy Institute 3. Leuven, Belgium: Peeters.
- Aristophanes. 1988. *Clouds. Wasps. Peace*. Translated and edited by Jeffrey Henderson. LCL 488. Cambridge, MA: Harvard University Press.
- Caubet, Annie. 2002. “Animals in Syro-Palestinian Art.” In *A History of the Animal World in the Ancient Near East*, edited by Billie Jean Collins, 211–34. Leiden: Brill.
- Cogan, Mordechai. 2001. *1 Kings: A New Translation with Introduction and Commentary*. AB 10. New York: Doubleday.
- Descola, Philippe. 2013. *Beyond Nature and Culture*. Translated by Janet Lloyd. Chicago: University of Chicago Press.
- Emery, Nathan J., and Nicola S. Clayton. 2004. “The Mentality of Crows: Convergent Evolution of Intelligence in Corvids and Apes.” *Science* 306 (5703): 1903–7.
- Gerber, Douglas E. 1999. *Greek Elegiac Poetry from the Seventh to Fifth Centuries BC*. Edited and translated by Douglas E. Gerber. LCL 258. Cambridge, MA: Harvard University Press.
- George, Andrew R. 1999. *The Epic of Gilgamesh: The Babylonian Epic*. London: Penguin.
- Hays, Christopher B. 2014. *Hidden Riches: A Sourcebook for the Comparative Study of the Hebrew Bible and Ancient Near East*. Louisville, KY: Westminster John Knox.
- Marzluff, John, and Tony Angell. 2012. *Gifts of the Crow*. New York: Free Press.
- Marzluff, John, Robert Miyaoka, Satoshi Minoshima, and Donna J. Cross. 2012. “Brain Imaging Reveals Neuronal Circuitry Underlying the Crow’s Perception of Human Faces.” *Proceedings of the National Academy of Sciences of the United States of America* 109 (39): 15912–17.
- Milgrom, Jacob. 1990. “Ethics and Ritual: The Foundations of the Biblical Dietary Laws.” In *Religion and Laws: Biblical, Judaic and Islamic Perspectives*, edited by Edwin B. Firmage, Bernard G. Weiss, and John W. Welch, 159–91. Winona Lake, IN: Eisenbrauns.

- Otto, Eckart. 2016. *Deuteronomium 12–34*. HTKAT. Freiburg im Breisgau, Germany: Herder.
- Parmelee, Alice. 1959. *All the Birds of the Bible: Their Stories, Identification and Meaning*. New York: Harper.
- Sweeney, Marvin A. 2007. *I and II Kings: A Commentary*. O'TL. Louisville, KY: Westminster John Knox.
- Tate, Marvin E., 1990. *Psalms 51–100*. WBC. Dallas: Word.
- Wray Beal. Lisa, 2014. *1 & 2 Kings*. Apollos Old Testament Commentary. Downers Grove, IL: IVP Academic.





## Animals and Ancient Religion: What Can Prehistoric Art Tell Us?

Anne Solomon, PhD, Independent Scholar, [solomon.annec@gmail.com](mailto:solomon.annec@gmail.com)

---

Prehistoric rock arts, some dating back over forty millennia, would appear to be evidence for some kind of ancient religion, with shamanism and animism prominent in recent interpretations. Animals are abundant in many ancient paintings, especially the famous painted caves of the European Paleolithic. However, the inherent ambiguity of visual images complicates scientific explorations of their significance and consideration of relationships between humans and animals at different times. This applies even to investigations of more recent corpora (such as hunter-gatherer rock art in southern Africa), where ethnographies permit some insights. Nevertheless, ancient images are enormously evocative and invite us to examine and interrogate changing attitudes to human–animal relationships in our time.

---



Art of various kinds has been central to thinking about the origins and evolution of religion. Animals feature prominently in prehistoric arts around the world, including the oldest known representational rock painting, from Indonesia, which is dated to 43.9k years BP (Aubert et al. 2019).<sup>1</sup> It depicts an anoa and eight figures, some of which are probably part-human, part-animal (Figure 1). It might be interpreted literally as a hunt, but does it have a more profound meaning? What can it, and other rock art, tell us about prehistoric religions, and relationships with animals in particular?



**Figure 1:** The earliest known “hunting scene” (Sulawesi, Indonesia). Photo: Maxime Aubert.

How, when, why, and where humans became religious beings is a question archaeologists have long grappled with. Identifying behavior consistent with religious awareness focuses strongly on the evolution of the capacity for “symbolic thought,” which is regarded as the prerequisite for language, religious consciousness, and “art.” Many researchers believe the capacity for symbolic thought was emergent, or in place, by at least 150–175 thousand years ago (e.g., McBrearty and Brooks 2000). Language, of course, cannot be excavated. Religious consciousness is inferred from various elements of the archaeological record, including intentional burial of the dead and the interment of grave goods with the deceased, implying belief in an afterlife (for an overview, see Solomon 2019a). What constitutes “art” is somewhat contested, but materials that have been central to thinking about the origins and evolution of religion include items of personal ornamentation, such as shell pendants and “marks”—of human making but not representational in themselves. Representational art is, one might think, the best evidence we have for ancient religion and relations with animals.

However, interpreting the materials is complex. In this article, I consider 1) the background to the presumed links between ancient arts and religion, with especial reference to European Paleolithic art, in which animal depictions predominate and human images are vanishingly rare; 2) theoretical positions

and assumptions (including recent work invoking animism and relational ontologies); and 3) methods of investigation, including ethnographic analogies with more recent corpora of rock art, such as that of “San”<sup>2</sup> hunter-gatherers of southern Africa.

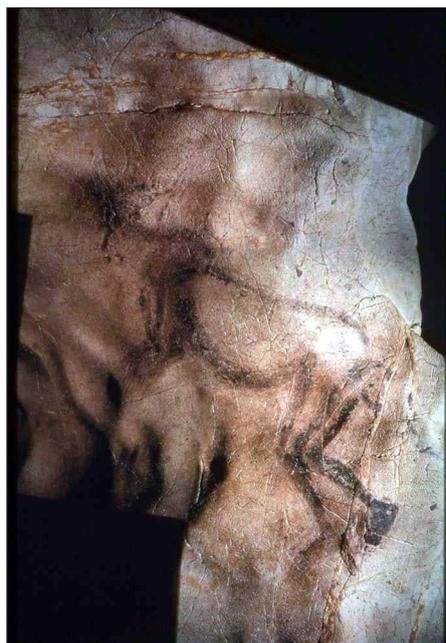
### Art and Prehistoric Religion: Making Connections

When European explorers encountered rock art abroad, Indigenous peoples were commonly regarded as relics of primitive times, with faculties to match. As Iain Davidson (2018) notes, rock art was encountered around the world by the beginning of the eighteenth century. This presented observers with a puzzle: “[S]ailors on the HMS Beagle, visiting Depuch Island in Western Australia, reported that ‘from . . . the accuracy with which many animals and birds are represented, they deserve great credit for patient perseverance, and for more talent and observation than is usually bestowed upon the natives of New Holland.’” Nevertheless, notions of primitive savagery, and the assumption rock art was decorative, or merely depicted scenes from daily life (such as hunting), were not easily displaced. It was only in the later nineteenth century that the idea emerged that these arts were somehow “religious.” Residual notions of rock art as some kind of documentary record persist in some research to this day.

Salomon Reinach’s (1903) paper entitled “L’art et la magie (Art and Magic)” was key to the acceptance of the idea that European Paleolithic art was somehow religious in nature. Since animals predominate in that body of art, they featured prominently in emergent ideas about prehistoric religion. It was speculated that animals were part of sympathetic magic (including sympathetic hunting magic), animism, sorcery or shamanism, and totemism (Figures 2a, b). These hypotheses have evolved but are still prominent in contemporary research in considerably revised forms.



**Figure 2a:** Breuil’s reproduction of the “sorcerer” from the cave of Trois-Frères, France.



**Figure 2b:** The Trois-Frères “sorcerer.” It would seem that Breuil’s copy is somewhat over-elaborated. Photo: J. Vertut, P. Bahn Collection.

In simple terms, animism, as initially outlined by Edward Tylor ([1871] 1913), postulated that spirit beings are active in human lives and that all things—animals, features of the landscape, and indeed almost anything—are alive. Totemism, as explored by John McLennan (1869–70) and later Émile Durkheim ([1912] 2008), refers to a system in which a kin group or clan identifies with an animal or plant as its emblem. Sympathetic magic, popularized in explanation by the French prehistorian Abbé Henri Breuil (1952), proposed that imaging animals might increase their numbers and/or enhance the success of the hunter. Ideas about the art as linked to shamanism also emerged around this time. The notion emphasizes the role of shamans and their experiences in states, which facilitate interactions with spirits and other beings. For example, it has been proposed “sorcerers” imaged animals in order to control or influence them (e.g., Hirn 1900; see Palacio-Perez 2013).

The test of these hypotheses is, of course, in their “fit” with the materials. Reinach found support for his hypothesis in the observation that food animals, such as ibex, bison, and deer, were very commonly depicted in European cave sites (Figure 3). However, the depiction of prey species could also be read as evidence for sympathetic hunting magic (or, indeed, literal depictions of the world of the prehistoric hunter). We now know that carnivores are depicted in some sites (cf. Davidson 2018). Since they are not food animals, it would seem the art was not just “about” hunting, though images of lions, bears, and the like might still support an interpretation in terms of magical control of animals in general or achieving protection from dangerous predators by magical means. Alternatively, images of carnivores might be clan emblems or, in shamanistic readings, some kind of spirit helper.



**Figure 3:** Bison, Cave of Niaux, France. Photo: J. Vertut, P. Bahn Collection.

It is in the nature of art that it is always ambiguous, and the diversity within prehistoric arts is such that “evidence” can be found for a variety of hypotheses. For example, images of animals apparently wounded by missiles can be interpreted in terms of hunting but, as Davidson (2018) notes, “the numbers were very small and the identification not very clear in most instances.” Similarly, a famous image from the French site of Trois-Frères has been interpreted as a sorcerer or “shaman” because it depicts a therianthrope (a part-human, part-animal being). However, again, the figure is ambiguous and might equally be interpreted as a mythical figure (see further later).

These interpretations were in part inspired by ethnographic analogies with religion in traditional societies; totemism, for example, was based on nineteenth century observations of Indigenous religion in Australia and North America. A novel, ethnography-free approach was developed by two French prehistorians in the 1950s. André Leroi-Gourhan (1968, 1982) and Annette Laming-Emperaire (1962) utilized formal analysis rather than considering subject matter alone. They looked at the placement and organization of images in caves, identifying presumed dualisms characterizing ancient religious thinking. So, for example, most deer, ibex, and mammoth were found at the entrances; bears, big cats, and rhino were in the more remote areas; and the central zones were dominated by horses, bison, and aurochs. This suggested they were differentiated and conceptually opposed in the artists’ minds.

Perhaps—but what kind of religious thinking that was is not illuminated by formal analysis, and it does not reveal more about the nature of human–animal relationships. This was nevertheless an important new approach, even though the conclusions have not stood up well to closer scrutiny; for example, it seems that the entrances to caves in the past were not necessarily where they are now.

## Shamanism, Animals, and Rock Art

The claim that rock art could be explained by “shamanism” surged to the fore in the 1980s, particularly in the study of hunter-gatherer rock art in southern Africa and claims that this art derived from shamanic trance states. This placed the focus firmly on the figure of the religious specialist but was rooted in a study of the most commonly depicted animal in this body of art, the eland (*Taurotragus oryx*). J. David Lewis-Williams (1980) initially proposed that the eland was a symbol that had various meanings in different ritual contexts, later arguing that the relevant context was shamanic ritual and trance states and that the imagery depicted visionary experiences.

This hypothesis was later applied to rock arts around the world, including the much older art of the European Paleolithic (e.g., Lewis-Williams and Dowson 1988). The hypothesis has been popular, partly because its focus on the art as supposedly reproducing forms generated by the modern human brain in altered states has appealed to a desire to place rock art interpretation on a (supposedly) more “scientific” footing. It has also, however, been extremely controversial in multiple dimensions—not least because of its generality and inability to accommodate cultural/religious variation and change across space and through time (see Bahn 2016 for an overview). As Davidson (2018) has pithily observed: “As a consequence of a loose definition of the concept of shamanism, it would appear that it was a practice that was widespread across the world, but the appearance may be due to the looseness of the definition.”

This homogenization is relevant to the question of animal depictions and their significance to the artists. Even if it was apt to describe European Paleolithic art as “shamanistic,” it cannot explain why that body of art is so markedly lacking in depictions of people, while in others (such as southern African hunter-gatherer rock art), human figures are abundant. It is an anthropological hypothesis that is insensitive to difference and change. Similar problems apply to the analytical frame that has gained popularity in recent years known as “new animism,” although this trend puts animals closer to center stage (see further later).

## Animal–Human Relationships in Focus

Before turning to new animism, it is necessary to consider a trend in French thought known as “post-animality.” This “tradition of radical anthropology dates back to the work of Marcel Mauss and George Bataille and continued in the work of Michel Foucault, Gilles Deleuze, and Jean Baudrillard” (Senior et al. 2015, 4). Bataille’s work is especially notable because he wrote extensively on the Paleolithic art of Lascaux (e.g., Bataille 1955). His thinking is elaborate, but Yue Zhuo (2015, 21) succinctly summarizes it as follows:

Lascaux, the emblem of the ages during passage from animal to man completes itself, should therefore not be understood merely as a historical site where

archaeologists art historians go to carry out “scientific” studies. For Bataille, it is above all a fantasized time/space where art, play, and religion join each other in a single backward movement toward the recovery of a lost intimacy with animals and with nature, this “regressive” *élan* being a defiance of the principles that govern the modern world: reason, utility, and increasingly, in modern times, violence and war.

In a similar anti-(or alter-)humanist vein, critical of Enlightenment notions of human nature, Jacques Derrida developed the concept of the *animot*, a portmanteau word he uses to emphasize “the awareness of the animals’ capacity to respond by looking back, by addressing the presumptuous people who have named them” (Boisseron 2015, 105). The *animot* signifies “a heterogeneous multiplicity of the living, which cannot be separated from the human by a single indivisible line” (Derrida 2008, 399, cited by Boisseron 2015, 216).

New animism has been embraced by many in recent years. Led by researchers such as Philippe Descola, Eduardo Vivieros De Castro, Nurit Bird-David, and Tim Ingold, among others, this recuperation of Tylor’s notion of animism concerns “relational ontologies,” which go beyond subject–object distinctions (thereby re-examining the foundations of Western science), emphasizing instead respectful relations between humans and nonhumans—or in the preferred terminology, “other-than-human persons.” According to Descola (2014, 275), it concerns belief in “a continuity of souls and a discontinuity of bodies” between humans and nonhumans. It has been argued in recent years that materials formerly interpreted as shamanistic should instead be interpreted in terms of animism (Harvey 2010).

Clearly, these ideas have implications for the ways in which we understand animal images in rock art(s), as their application to a specific group of images illustrates (see Le Quellec 2017). The famous “shaft scene” at Lascaux, sometimes called the Dead Man of the Well scene, is probably about 15,000 years old (Figure 4). The key images are of a bison, apparently with spilling entrails; a crudely painted man with erect penis; and a bird, apparently part of a stick. A rhino to the left is not thought to be contemporaneous.

Breuil (1952) thought the images memorialized an actual encounter between hunter and prey. Laming-Emperaire (1962) linked it to myth. Mircea Eliade (1964) saw the bird-headed “stick” as a shamanic representation of an ongon (Siberian Tungus), or animal spirit helper, and linked the images to trance. Lewis-Williams (2002), who drew substantially on Eliade’s work, has similarly considered it in terms of shamanism, altered states, and alleged out-of-body travel experiences. Most recently, Robert Wallis (2013; 2019, 17) has interpreted it as depicting a “human-hybrid ‘shaman’ among a number of other-than-human persons, situated within a wider-than-human animic world.”



**Figure 4:** The “shaft scene,” or “dead man of the well,” Lascaux. Photo: J. Vertut, P. Bahn collection.

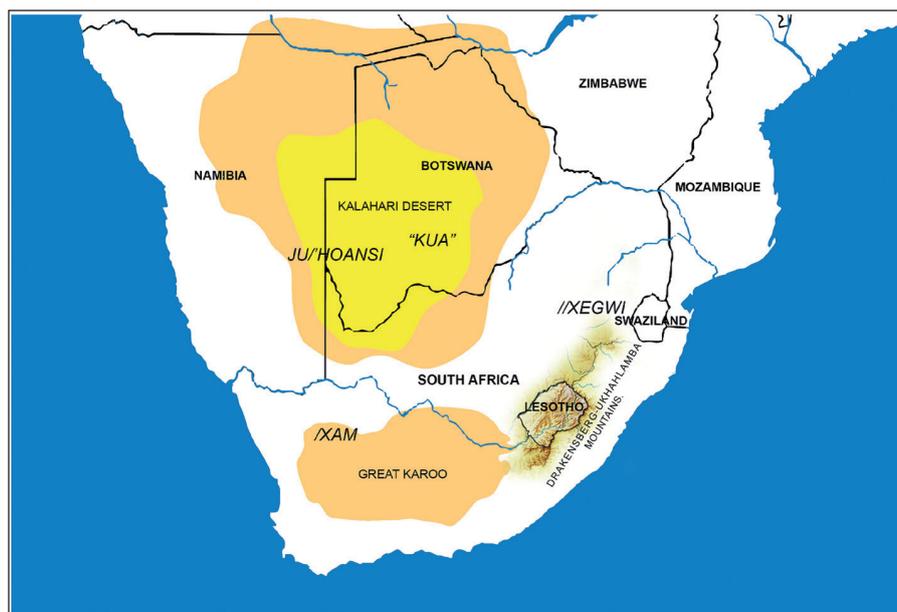
It may perhaps be concluded that the “meaning” of animal images in rock art, and what they might reveal about human–animal relationships, is merely in the eye (or the mind) of the beholder. Images are always ambiguous and the “meaning” of cave art is as much about how we think at different times and within different intellectual traditions as it is about past realities (see also Le Quellec 2017). Such pessimism is justifiable, not least given the enormous pitfalls present in attempting to understand how people thought tens of millennia ago. The alternative therefore is to model a range of possibilities and explore the questions in relation to bodies of rock art that are more amenable to interpretation. Southern African rock art is one such corpus.

### **Animals in the Rock Art of Southern Africa**

Rock art, consisting of both paintings and petroglyphs (also known as “engravings”) largely attributable to San hunter-gatherers, is found in many thousands of sites in southern Africa. The oldest known parietal art (on rocks and cave/shelter walls) is securely dated to at least 3600 BP (Jerardino and Swanepoel 1999), with one more problematic date from Botswana perhaps indicating an age of 5,000 BP (Bonneau et al. 2017). The oldest known art is art mobilier, or portable art, made on stone slabs and pebbles; examples from a Namibian cave site date to 30,000 BP, though this is a rare early date, with other art mobilier dates to within the last 8,000 years (Vogelsang et al. 2010).

Southern African parietal art is of interest because there is a considerable body of nineteenth century ethnographic materials to aid in interpretation. Most of these texts were provided by former hunter-gatherers from the northern Cape region, speaking the |xam language (Figure 5). Though the materials are open to more than one interpretation, one thing is largely

undisputed, namely, “religion” is the most appropriate frame for understanding the images. The usual problems apply, however. The ethnographic texts may provide insights into the later art, but how far back in time can such interpretations be applied? Is it ethical or sensible to model much older human behavior on recent groups? Nevertheless, these ethnographies are invaluable in attempts to understand images of animals, their symbolism, and the human–animal relationships they imply.



**Figure 5:** Map, showing the area occupied by the |xam, whose testimonies were recorded by Bleek and Lloyd in the 1870s.

Images of animals predominate, though human and humanlike figures are abundant. All kinds of animals are depicted—typically herbivores, and especially the eland—but there are also carnivores, insects (such as bees and one moth), fish, and a range of imaginary creatures. Part-human, part-animal creatures (known as therianthropes) are not a primary theme but are not uncommon. The animal most often imaged, which is known to have had mythico-religious significance, is the eland, the largest of all the antelopes (Figure 6).

It is notable that even before a religious motivation for European Paleolithic art was accepted, it was hypothesized that the southern African art (then of unknown antiquity) was not “the mere daubing of figures for idle pastime, but . . . an attempt, however imperfect, at a truly artistic conception of the ideas which most deeply moved the Bushman mind, and filled it with religious feelings” (Wilhelm Bleek in Joseph M. Orpen 1874, 13). Prior to the 1980s, when readings in terms of “shamanism” became popular, a variety of interpretations were offered, *inter alia*, relating the art to myth, ritual, rainmaking, and hunting magic (e.g., Vinnicombe 1976).



**Figure 6:** A herd of polychrome eland, KwaZulu-Natal, South Africa.

### **Myth**

Above all, recorded myths provide clues to the significance of animals in San cosmology. The extraordinarily rich testimonies recorded in the 1870s by the German-born philologist Wilhelm Bleek and his sister-in-law Lucy Lloyd have been especially important.<sup>3</sup> The narrators, speakers of the now moribund |xam language, had formerly been hunter-gatherers but by the later nineteenth century had been forced to become laborers on white settler farms in the northern Cape region.

In myth, animals—or animal-people, to be precise—are center stage. The stories concern the origins of the world and its relation to the current order. In the beginning, it was in the process of being created by a being named |kaggen. The world was a topsy-turvy place, as |kaggen proceeded to fine-tune his creative work and correct the many absurdities that arose from its initial imperfections. Crucially, humans and animals had not then been separated and death had not yet come to the world.

|kaggen himself was both a person and a praying mantis. He was also a trickster, and, although he did good deeds, he was also often malicious and stupid, like all the other early animal-people. Among his immediate family members were a hyrax, a meerkat, a blue crane, and a mongoose (notably, all rare or absent in the rock art, indicating the link to myth is not direct but nevertheless by no means irrelevant). The stories relate the adventures, mishaps, and ironies of living in this world and are populated by a large cast of animal-people—baboons, lions, ostriches, hyaenas, and many more. Some, such as lions and baboons, are classic “baddies”—no doubt because of the potential threat or competition they posed to people. This world-in-the-making was preposterous, and accordingly, many of the stories entertaining and often humorous. Inevitably, this madness had to end.

One story about how the first order ceased to be is “The Anteater’s Laws,” in which the Anteater’s daughter, a springbok, marries a lynx. Clearly, and perhaps especially in hunter-gatherer thought, this marriage of carnivore and prey is utterly inappropriate. The angry mother anteater responds by burrowing around crazily underground, making the earth quake. Indeed, everything is shaken up. A new order is somehow instituted, and in it, “animals only marry their own kind. People too would henceforth behave like people, cooking food on the fire, using artefacts, wearing clothes and observing a long list of rules about food that could and could not be eaten” (Solomon 2019b). It seems that at the same time, immortality was revoked. This was because the young hare, whose mother had died, did not believe the moon when it reassured him that his mother would return, just as the moon waxes and wanes. As a consequence of the hare’s heresy, thereafter the dead did not return (Solomon 2019b).

These stories of the strange days when humans and animals had not yet been separated are centrally concerned with appropriate social and cultural behavior and morality, including accounts of the origin of hunting. The eland was the favorite creature of |kaggen, the trickster. In one narrative, |kaggen makes the eland from a leather shoe, but it is later killed by family members out hunting. The bile from the dead eland’s liver gets into his eyes, so |kaggen picks up a feather and wipes his eyes. He then casts it away, and it floats into the sky and becomes the moon (Bleek 1924, 1–9).

A similar story was recorded from the eastern mountains, 1,200 kilometers away, at about the same time (Orpen 1874). Cagn (an alternative spelling of |kaggen, as his name is rendered by Bleek and Lloyd) lovingly reared an eland, but it was killed by his sons out hunting. A distraught Cagn instructed his wife to churn the eland’s remains in a pot. The blood droplets that splashed out turned into snakes that slithered off; a second failed attempt produced hartebeest (antelope). Eventually, it all worked as intended, and the blood droplets became eland—ultimately vast herds of them. Cagn instructed his son to hunt them, but they were unsuccessful because “Cagn was in their bones.” A second attempt at hunting them was successful, and it was said that “[t]hat day game were [sic] given to men to eat, and this is the way they were spoilt and became wild” (Orpen 1874, 4–5). This is apparently another reference to the separation of humans and animals at the end of creation and the emergence of fully human people who have social nous and behave decorously, while animals are the opposite—untamed and uncultured.

Excavations (e.g., Maggs 1967) have shown that eland and other large herbivores are overrepresented in the art relative to their local abundance, and eland were not heavily relied upon as a food source. Similarly, few (if any) compositions can be seen as eland hunts, and “hunting scenes” generally are

rare or ambiguous. The prominence of the eland in rock art apparently has everything to do with its mythical significance, even if the art does not depict scenes from mythology.

### **Rain**

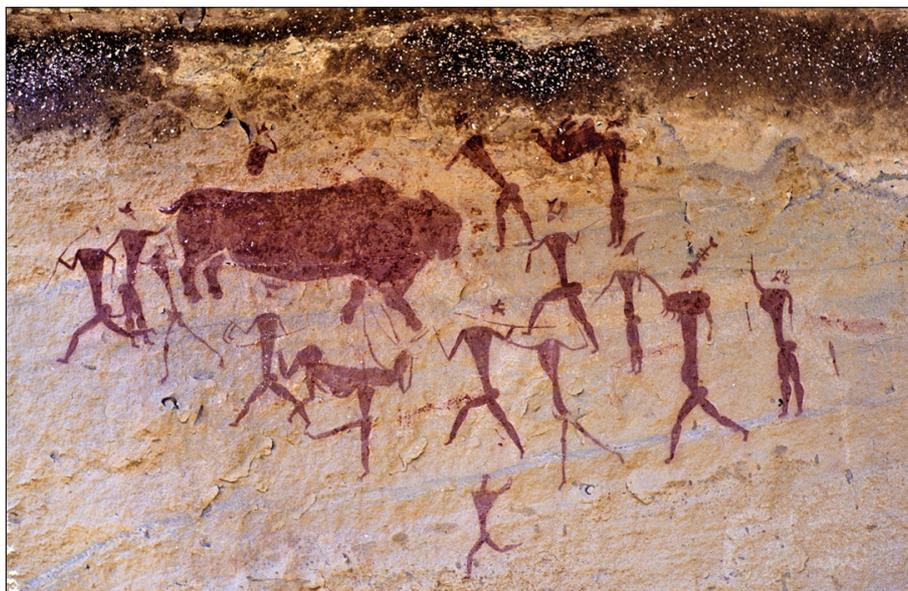
The myths and stories do, however, point to another significance—and it is one that could not possibly be deduced from observation of the images or analysis of associated excavation materials. There is another key figure in the |xam texts—the Rain Bull. His name, !khwa, means water or rain. He is the embodiment of the water in the waterholes, and he is the storm cloud that “walks” the skies—his body the rain cloud, his legs the columns of rain that stream from it (for an overview, see Solomon 2019b; see also Woodhouse 1992).

However, !khwa is more than just water or weather; he is principally the punisher of social transgressions, especially by female initiates who disobey the puberty rules, which included seclusion and food restrictions. A typical story is that of the girl who breaches the required seclusion in the menarcheal hut and goes to the water, where she kills a “water’s child” and cooks and eats it. An angry !khwa carries her off and deposits her in the waterhole (it appears that she is drowned). Her family suffers the same fate. Girls punished in this way by !khwa are seen as frogs around the waterhole. Belongings revert to an unworked state, so leather items become animals again, and arrows revert to being unworked sticks. This theme of reversion seems to hark back to the notions of the “primitive” first days when people and animals had not been separated; the bad old days before the evolution of fully human social beings (Solomon 2019b).

In another story, !khwa explicitly appears as an eland. Men out hunting shoot an eland, but when they try to cook the meat, it evaporates. It turns out that this eland was !khwa himself, and he soon takes his revenge. Like the female initiates, the men are whisked away by a whirlwind and dropped into the waterhole. Various stories describe violent storms as !khwa’s punishment for people’s bad behavior. In the shamanists’ reading (e.g., Lewis-Williams 1980), “underwater” is supposedly a metaphor for trance experience and a perceived sensation of drowning, but this is based on a single twentieth century testimony from a Ju/’hoan man in the Kalahari. This analogical method is flawed, not least since rain beliefs are virtually absent in Kalahari lore, rendering comparisons with the southern San cosmology problematic at best (Solomon 2023).

That rain animals are a theme in southern African rock art is well documented (e.g., Stow and Bleek 1930; Woodhouse 1992). Some may depict !khwa, the Rain Bull. Others may depict rainmaking (Figure 7). According to the nineteenth century |xam testimonies, this involved leading a female animal, which “rained gently,” to a high place and killing it. Where its blood ran, rain would fall. It was also stated that this was achieved by speaking to “the dead men who are with the

rain.” (Bleek 1933, 303–4). One well known story, that of “the broken string,” relates how a man would ask a dead friend to make rain (Solomon 2019b). It seems undeniable that rainmaking was accomplished in the underwater world of the spirits. Various paintings of rain animals associated with fish indicate this was the location of the activity depicted.



**Figure 7:** Rainmaking, KwaZulu-Natal, South Africa. Figures, some with animal heads, surround an ox-like “rain animal.” Note the fish skeleton (viewers right), suggesting that the activity is taking place in the underwater world of the spirits.

### ***San Hunter-Gatherer Relations with Animals***

Even with the aid of ethnographies, the nature of San relations with animals is not transparent, but the shamanistic reading is inadequate in multiple dimensions.<sup>4</sup> It is claimed that shamanism was the form of the earliest religion and that of hunter-gatherer societies, but, even if a loose notion of shamanism as an early religion typical of hunter-gatherers is accepted, it does not mean relations with animals were identical in all those societies. In fact, the shamanistic reading of southern African (and other) rock arts does not attend to what relations with animals might have been but rather is inexorably focused on the figure of the shaman as “ritual specialist” and the role of altered states of consciousness.

It is tempting to assume hunting must have been an important template in hunter-gatherer thinking, but culture (the domain to which religion belongs) is not so simply or directly determined by economy. The !xam figure of the rain animal, for example, is only tangentially related to hunting (this seems present in the notion that sacrificing a female rain animal would bring rain); however, the character of the Rain Bull, as punisher of transgressors, bears no relation to hunting. Logically, such a dangerous figure might be conceptualized as a carnivore, yet !khwa is an antelope.

The |xam myths suggest the narrators were as, or more, interested in the behavior of animals, and the traits of different species as analogues for human behavior, than dealing with the hunter–prey relationship as such. As Claude Levi-Strauss (1964) famously observed, animals are good to think (with). Animal representations are used in the service of narrative and their aptness relative to the “message.” In this sense, animal characters in myth and art may be seen as products of the creative imagination rather than reflections of society or religion. This creativity is another facet of traditional religions shamanist readings ignore in favor of ideas about the neurological generation of visual images. Indeed, the artistry of rock art, and of myth, is often neglected in anthropological and sociological accounts. This may be borne in mind when considering the anthropological approach that attends most closely to questions of human–animal relationships and religious thought: animism. Therianthropic figures, beings with both human and animal features, are of interest in this regard.

### ***Therianthropes in Rock Art***

Therianthropes are a prime example of a motif that might best be interpreted in terms of (new) animism. Examples occur in European Paleolithic art, and indeed “the earliest figurative artwork in the world” (Aubert et al. 2019, 442), at the site of Leang Bulu’ Sipong 4, Indonesia, appears to depict a hunt with an anoa and several part-human, part-animal figures. Therianthropes have often been interpreted in terms of shamanism and their interactions with animal “spirit helpers” (“ongon,” in the lore of Siberian shamans). Researchers who have analyzed the Indonesian images have commented on the possible relation to either shamanism or animism. They note, with suitable caution, that “[t]herianthropes in prehistoric art are often attributed—though not uncontroversially—to shamanic beliefs and visions, such as representing ‘animal spirit helpers’. Whether such interpretations are appropriate in the case of Leang Bulu’ Sipong 4, or whether the apparent portrayal of therianthropes suggests that the image-makers perceived themselves as an indivisible part of the animal world, is uncertain” (Aubert et al. 2019, 2).

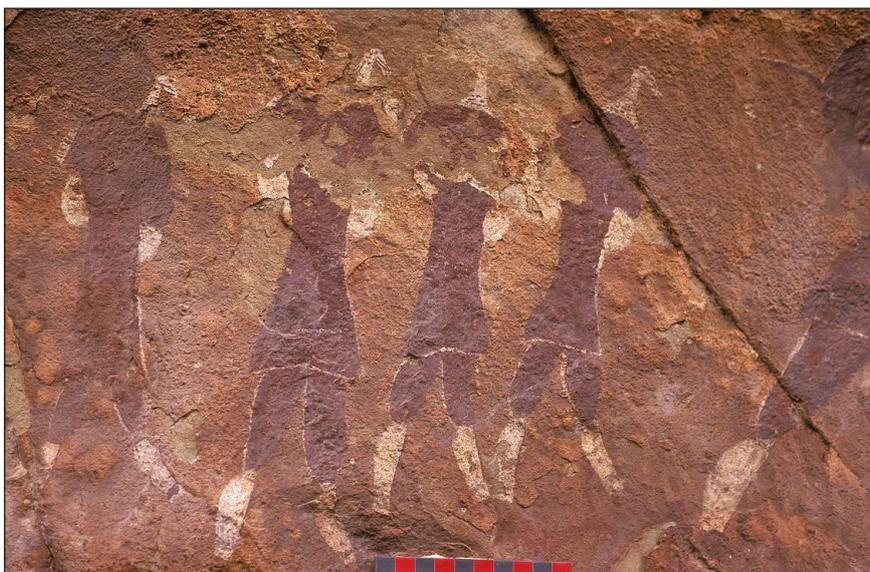
### ***Shamanism and Therianthropes***

Therianthropes in San rock art have been interpreted as reproducing the contents of shamanic experiences in altered states of consciousness and, echoing the notion of “spirit helpers,” interactions with creatures that possess supernatural power. The well-known images at the site of Game Pass, KwaZulu-Natal, South Africa include a humanlike figure with animal hooves that seems to grasp the tail of a staggering eland (Figure 8). In an elaborate series of inferences, Lewis-Williams and Thomas A. Dowson (1989) interpret this as a series of metaphors for trance experience, in which a shaman believed he was “fusing” with an “animal of potency”; his supposed identification with the eland allegedly helps explain the figure’s animal features. However, the images

are amenable to a less convoluted reading more closely tied to both southern San ethnographies and the images themselves. The therianthrope and eland may equally be interpreted in relation to rain and rainmaking and the control of a rain animal. As noted earlier, this was apparently accomplished by deceased kin (“spirits”) in the underwater world (Solomon and Bahn 2023). This reading also accounts for other features of the figure, namely its skull-like head, rib markings, and slenderness. However, this does not explain therianthropy in other rock arts, or even different kinds of therianthrope in San art (Figure 9).



**Figure 8:** An eland with a figure apparently grasping its tail. It is interpreted by some as depicting a shaman, but may better be interpreted as a spirit figure controlling a rain animal. Game Pass, KwaZulu-Natal, South Africa.



**Figure 9:** Therianthrope figures with antelope heads (compare with Figure 8, where the therianthrope has a human head, but antelope hooves). KwaZulu-Natal, South Africa. Photo: David Coulson.

### ***(New) Animism and Therianthropes?***

Proponents of the new animism may well feel drawn to the reading that interprets therianthropes as dissolving the subject–object bond and signaling qualitatively different relationships with other-than-human persons. However, the |xam texts do not seem to support such an interpretation. The myth corpus pivots on the idea of animals as the opposite of people, set apart by their social behavior and moral sense (see earlier). The first people were part-human, part-animal—and it is their animality that variously makes them behave in ways that are often ignorant, spiteful, and “primitive.” It would seem |xam may have regarded animals as other-than-human persons, but that does not necessarily imply a respectful relationship.

In myth, after humans and animals were separated, animals were just animals, given to people for food. There is no acknowledgment of animal personhood. It is nevertheless notable that recorded southern San stories suggest an awareness of the moral problem of killing animals that accords with a notion of animals as “other-than-human persons.” It is often cited (qua Laurens van der Post [1958] 1962) that the San hunter would apologize to the prey animal before killing it, explaining that his family is hungry, and thanking it for sacrificing itself for them. But is this respect for the animal or fear of annoying the being who created it?

Research by Rane Willerslev (2013) addresses this question. He describes relations with spirits and hunting observances among the Siberian Yughakir, who have elaborate bear-hunting rituals—yet they are aware that their foundations are untrue, and they were observed behaving “as if the whole ritual were a splendid joke” (Willerslev 2013, 51). “[The] hunters know that, in their activity, they are following an illusion, but still they go along with it”; they “are ironically self-conscious about not taking the ruling ethos at face value.” He concludes: “perhaps it is time for anthropology not to take indigenous animism too seriously.” Something similar seems applicable to San societies. In the Yughakir case, the spirits require hunters “to treat the animals’ bones correctly, so that their souls can be released” (Willerslev 2013, 54). San beliefs generally are very different, but here too killing is variously justified and showing “respect” to the prey similarly entails no more than treating the bones respectfully. (“Cagn was in their bones,” according to one of the eland creation stories—see earlier.)

Animism, like shamanism, surely cannot account for the diversity of ancient—and more recent—religious practices and relations with animals, and certainly cannot accommodate change through time. As Katherine Swancutt (2019) has observed, various studies suggest “the importance . . . of thinking about different animisms in the plural”; and as Davidson (personal communication) has written: “[These “isms”] describe different phenomena on the basis of superficial resemblances between instances.” As general categories, such classifications have a certain utility, but this is limited by their generality.

## Religion or Just Culture?

Ultimately, ancient arts and animal images are receptacles for our own ideas about animals, people, and religion. In this regard, the very notion of early religion is also problematic, because it requires a notion of the secular to be meaningful. In the absence of the post-Enlightenment notion of the secular, religion is simply “culture.” It is not “false consciousness,” pre-scientific, or irrational (cf. Solomon and Bahn 2023b). It conforms to the often-complex cultural logic of any given group. Rather, it seems that ancient art, science, and religion were originally intertwined, not separable as we tend to see them now. In regard to animal–human relationships, such separations are challenged by new animism and French anti-humanist thought.

Nevertheless, it remains useful to retain some notion of animal images as linked to prehistoric religion and ritual. There is an old joke in archaeology that makes fun of the tendency to interpret any artefact or site that cannot be assigned a utilitarian function as related to “ritual.” Yet there are materials that certainly suggest animal images had some “magical” function. For example, at the French cave of Pergouset, there is a petroglyph of a horse’s head in a fissure so small the maker would not have been able to see what he was doing, and it was not made to be seen, at least by human eyes (Lorblanchet 2001). Two other French Paleolithic art sites, Tuc d’Audoubert and Montespan, contain clay animal sculptures (of bison and a bear, respectively); in both of these sites, a headless snake skeleton was found (D’Huy 2016). Is this mere coincidence? A “ritual” interpretation is plausible, even if the role the animals played in the makers’ thinking is not retrievable.

## The Ethical Treatment of Animals

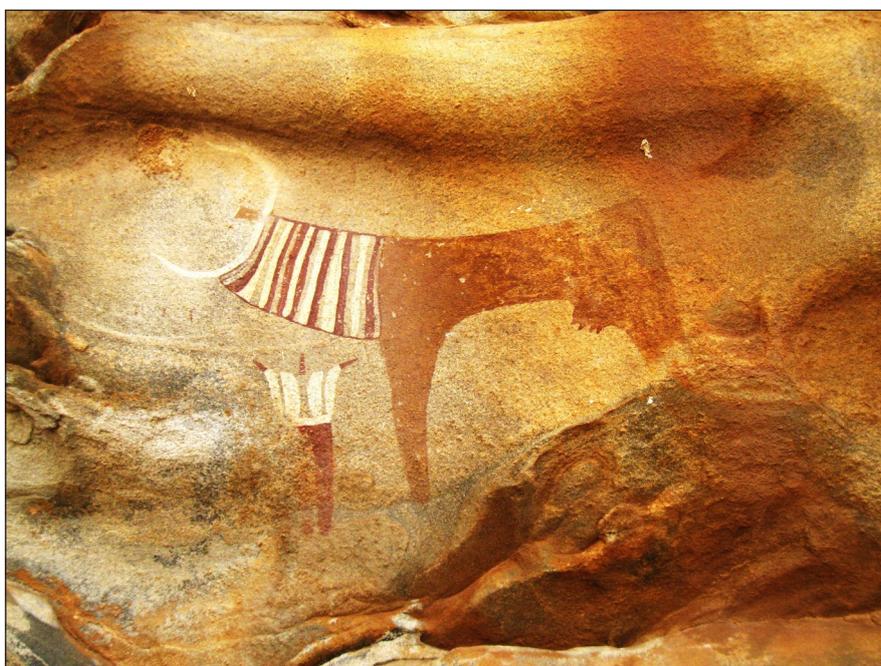
Among the foci of new animism is “a critique of modernity and the alienation produced by the separation of the human sphere of culture from the nonhuman field of nature” as well as a rejection of it in favor of “a non-objectifying . . . relation to the world” (Durrant 2022, 51). This chimes with broader concerns, including global environmental crises and the commodifications enacted by capitalism (as “the turning of souls into things, but also itself a modified form of animism, the turning of things into magical commodities” (Durrant 2022, 51)). Sam Durrant also draws attention to “the romanticisation of animism and dehistoricised models of animistic relations to ‘nature’” (Durrant 2022, 51). Nevertheless, new animism valuably emphasizes the dialectical nature of human–animal relationships.

Pleasing though it might be to think that early humans and premodern societies, arts, cultures, and religions can teach us about more respectful relations with animals, it might be argued that the story of our genus is that of the relentless commodification of animals, as subsistence strategies “progressed” from scavenging meat through hunting to herding and farming, culminating in the

brutality of large-scale industrial farming and scientific animal experimentation in the so-called animal-industrial complex, which expanded hugely in the second half of the twentieth century.

And yet, vegetarianism and an insistence on the avoidance of meat-eating and animal slaughter as an ethical/moral imperative has long been closely tied to some traditions of religious thought—for example, in perhaps 2.5 thousand years of Jainism in India. The actual time depth of such moral consciousness is, regrettably, unknown. Moreover, the avoidance of meat-eating was apparently often related to asceticism and the rejection of gluttony rather than empathy with animals (e.g., Frayne 2016).

Prehistoric art does not easily provide historical data, but it may feed into allied questions about economies and religion. In this regard, pastoralism is of particular interest (bearing in mind that there are a number of ways to be a herder, and pastoralism is not a uniform entity). Hunters and gatherers live among animals, but those animals are wild. Keeping herds fosters closer relationships with the animals people care for. Hugh Beach and Florian Stammler (2006, 21) record that some contemporary (reindeer) herders “are often still upset when handing their animals over to the impersonal market” (as opposed to subsistence slaughter) and regard it as “a betrayal of the relationship.” Moreover, “[w]hen made to execute massive slaughter procedures of the reindeer themselves, some herders will habitually drink themselves into a ‘wild’ state” (Beach and Stammler 2006, 21).



**Figure 10:** Human and cow with elaborate neck detail. Laas Geel, Somalia. Photo: Vladimir Lysenko (Creative Commons).

Might this shift in people's relationship with animals be reflected in both religious ideas and the art made by pastoralist peoples? Though notoriously conservative and resistant to change, religious ideas may nevertheless be adapted for changing circumstances. Beach and Stammer (2006, 12) broadly endorse Tim Ingold's (1980) proposition that "the transition from hunting to large-scale pastoralism, a change involving two very different modes of relating to the reindeer, and which could not have occurred overnight, could nonetheless entail no major shake-up of the animistic belief system," but they caution that "if the tenets of respectful reciprocity between animals and humans might span the hunting–pastoral dichotomy, they also might not" (not least because many pastoralist peoples hunt as well as keep stock). Pastoralist rock arts, such as those found abundantly in the Sahara Desert region, do not provide any simple answers. Nevertheless, rock paintings such as those from recently discovered sites at Laas Geel, Somaliland, of long-horned cows apparently with some kind of ceremonial adornments on their necks (Gutherz et al. 2003) seem to speak to the strength of the human–animal relationship in herder societies (Figure 10).

Animal images in prehistoric art do not provide us with hard facts about ancient religion, but they do provide us with much food for thought concerning relationships with species other than our own in other times and places. Prehistoric arts are evocative, rather than documentary, but are nevertheless a resonant testimony to lives that were once lived always in close proximity to animals.

---

## Acknowledgments

I am grateful to Paul Bahn, Maxime Aubert, and David Coulson for permission to reproduce images. Thanks are also owed to Finley Lawson for inviting and facilitating my Science and Religion Forum conference participation.

## Notes

- <sup>1</sup> Since the initial delivery of this paper in 2023, an even older example, dated to 51,200 BP, has been reported (Oktaviana et al. 2024).
- <sup>2</sup> The name “San” has largely replaced “Bushman,” which is widely seen as pejorative. Though not without its problems, the term San is used here as a shorthand for later Holocene hunter-gatherers in southern Africa.
- <sup>3</sup> The testimonies recorded by Bleek and Lloyd are available online at <https://digitalbleeklloyd.uct.ac.za/>.
- <sup>4</sup> In my analysis, the shamanistic reading of southern San rock art is based on misinterpreting |xam accounts of spirits as referring to living shamans (e.g., Solomon 1997, 2008, 2018).

---

## References

- Aubert, Maxime, et al. “Earliest Hunting Scene in Prehistoric Art.” *Nature* 576:442–45.
- Bahn, Paul. 2016. *Images of the Ice Age*. Oxford: Oxford University Press.
- Bataille, Georges. 1955. *Lascaux: Or, the Birth of Art*. Lausanne, Switzerland: Skira.
- Beach, Hugh, and Florian Stammler. 2006. “Human–Animal Relations in Pastoralism.” *Nomadic Peoples* 10 (2): 6–30.
- Bleek, Dorothea F. 1924. *The Mantis and His Friends*. Cape Town: T. Maskew Miller.
- Boisseron, Bénédicte. 2015. “After Jacques Derrida (More to Follow): From A-cat-emic to Caliban.” *Yale French Studies* 127:95–109.
- Bonneau, Adeline, David Pearce, Peter Mitchell, Richard Staff, Charles Arthur, Lara Mallen, Fiona Brock, Fiona, and Tom Higham. 2017. “The Earliest Directly Dated Rock Paintings from Southern Africa: New AMS Radiocarbon Dates.” *Antiquity* 91:322–33.
- Breuil, Henri. 1952. *Four Hundred Centuries of Cave Art*. Montignac, France: Centre d’Études et de Documentation Préhistoriques.
- D’Huy, Julian. 2016. “The Headless Serpents of Montespan and Tuc d’Audoubert.” *INORA* 74:20–24.
- Davidson, Iain. 2018. “Images of Animals in Rock Art: Not Just ‘Good to Think.’” In *The Oxford Handbook of the Archaeology and Anthropology of Rock Art*, edited by Bruno David and Ian J. McNiven, 435–68. Oxford: Oxford University Press.
- Derrida, Jacques. 2008. *The Animal That Therefore I Am*. Edited by Marie-Louise Mallet. Translated by David Will. New York: Fordham University Press.
- Descola, Philippe. 2014. “Modes of Being and Forms of Predication.” *HAU Journal of Ethnographic Theory* 4 (1): 271–80.
- Durkheim, Émile. (1912) 2008. *The Elementary Forms of Religious Life*. Translated by Carol Cosman. Oxford: Oxford University Press.
- Durrant, Sam. 2022. “Critical Spirits: New Animism as Historical Materialism.” *New Formations* 104–105:50–76.
- Eliade, Mircea. 1964. *Shamanism: Archaic Techniques of Ecstasy*. Princeton, NJ: Princeton University Press.
- Frayne, Carl. 2016. “On Imitating the Regimen of Immortality or Facing the Diet of Mortal Reality: A Brief History of Abstinence from Flesh-Eating in Christianity.” *Journal of Animal Ethics* 6 (2): 188–212.
- Gutherz, Xavier, Jean-Paul Cros, and Josephine Lesur. 2003. “The Discovery of New Rock Paintings in the Horn of Africa: The Rockshelters of Las Geel, Republic of Somaliland.” *Journal of African Archaeology* 1 (2): 227–36.

- Harvey, Graham. 2010. "Animism Rather than Shamanism: New Approaches to What Shamans Do (for Other Animists)." In *Spirit Possession and Trance: New Interdisciplinary Perspectives*, edited by Bettina Schmidt and Lucy Huskinson, 14–34. London: Continuum.
- Hirn, Yrjö. 1900. *The Origins of Art: A Psychological and Sociological Inquiry*. London: MacMillan.
- Jerardino, Antonieta, and Natalie Swanepoel. 1999. "Painted Slabs from Steenbokfontein Cave: The Oldest Known Parietal Art in Southern Africa." *Current Anthropology* 40:542–48.
- Laming-Emperaire, Annette. 1962. *La Signification de l'Art Rupestre Paléolithique*. Paris: Picard.
- Le Quellec, Jean-Loïc. 2017. *L'Homme de Lascaux et l'énigme du puits*. Mirebeau-sur-Bèze, France: Tautem.
- Leroi-Gourhan, André. 1968. *The Art of Prehistoric Man in Western Europe*. New York: Abrams.
- . 1982. *The Dawn of European Art*. Cambridge: Cambridge University Press.
- Levi-Strauss, Claude. 1964. *Totemism*. Translated by R. Needham. London: Merlin Press.
- Lewis-Williams, J. David. 1980. "Ethnography and Iconography: Aspects of Southern San Thought and Art." *Man* 15 (3): 467–82.
- . 2002. *The Mind in the Cave: Consciousness and the Origins of Art*. London: Thames & Hudson.
- Lewis-Williams, J. David., and Thomas A. Dowson. 1988. "Signs of All Times: Entoptic Phenomena in Upper Palaeolithic Art." *Current Anthropology* 29:201–45.
- . 1989. *Images of Power: Understanding Bushman Rock Art*. Johannesburg: Southern Books.
- Lorblanchet, Michel. 2001. *La Grotte de Pergouset (Saint-Géry, Lot)*. Paris: Editions de la Maison des Sciences de l'Homme.
- Maggs, Tim. 1967. "A Quantitative Analysis of the Rock Art from a Sample Area in the Western Cape." *South African Journal of Science* 63 (3): 100–4.
- McBrearty, Sally, and Alison Brooks. 2000. "The Revolution That Wasn't: A New Interpretation of the Origin of Modern Human Behavior." *Journal of Human Evolution* 39:453–563.
- McLennan, John F. 1869–1870. "The Worship of Animals and Plants." *Fortnightly Review*, vols. 6–7.
- Oktaviana, Adhi Agus, et al. 2024. "Narrative Cave Art in Indonesia by 51,200 Years Ago." *Nature* 631:814–18.
- Orpen, Joseph M. 1874. "A Glimpse into the Mythology of the Maluti Bushmen." *Cape Monthly Magazine* 9:1–13.
- Palacio-Perez, Eduardo. 2013. "The Origins of the Concept of 'Palaeolithic Art': Theoretical Roots of an Idea." *Oxford Journal of Archaeology* 29 (1): 1–14.
- Reinach, Salomon. 1903. "L'art et la Magie: À propos des Peintures et des Gravures de l'Age du Renne." *L'Anthropologie* 14:257–66.
- Senior, Matthew, David Clark, and Carla Freccero. 2015. "Ecce Animot: Postanimality from Cave to Screen." *Yale French Studies* 127:1–18.
- Solomon, Anne. 1997. "The Myth of Ritual Origins? Ethnography, Mythology and Interpretation of San Rock Art." *South African Archaeological Bulletin* 52 (165): 3–13.
- . 2008. "Myths, Making and Consciousness: Dynamics and Differences in San Rock Arts." *Current Anthropology* 49:59–76.
- . 2018. "Rock Arts, Shamans, and Grand Theories." In *The Oxford Handbook of the Archaeology and Anthropology of Rock Art*, edited by Bruno David and Ian J. McNiven, 565–86. Oxford: Oxford University Press.
- . 2019a. "Bones, Pigments, Art and Symbols: Archaeological Evidence for the Origins of Religion". In *The Evolution of Religion, Religiosity and Theology: A Multilevel and Multidisciplinary Approach*, edited by Jay R. Feierman and Lluís Oviedo, 256–70. London: Routledge.
- . 2019b. "Rain Stories: Interpreting Water Beings in the Folklore of the Southern African Khoisan and Their Descendants." *Folkloristika* 4 (1): 193–210.
- . 2023. "'Everything Has a History': Kalahari and Southern San Rain and Water Lore." *Hunter-Gatherer Research* 7 (1–2): 55–73.
- Solomon, Anne, and Paul Bahn. 2023. "Rites, Wrongs and Analogies: Religion and Ritual as Explanation of Prehistoric Rock Art." In *Le gai savoir. Mélanges en hommage à Jean-Loïc Le Quellec*, 274–88. Oxford: Archaeopress.
- Stow, George, and Dorothea F. Bleek. 1930. *Rock Paintings in South Africa*. London: Methuen.

- Swancutt, Katherine. 2019. "Animism." In *The Open Encyclopedia of Anthropology*, edited by Felix Stein. Cambridge: Cambridge University Press. <http://doi.org/10.29164/19anim>.
- Tylor, Edward. (1871) 1913. *Primitive Cultures*. London: John Murray.
- van der Post, Laurens. (1958) 1962. *The Lost World of the Kalahari*. Harmondsworth, UK: Penguin.
- Vinnicombe, Patricia. 1976. *People of the Eland: Rock Paintings of the Drakensberg Bushmen as a Reflection of Their Life and Thought*. Pietermaritzburg, South Africa: University of Natal Press.
- Vogelsang, Ralf, Jurgen Richter, Zenobia Jacobs, Barbara Eichhorn, Veerle Linseele, and Richard G. Roberts. 2010. "New Excavations of Middle Stone Age Deposits at Apollo 11 Rockshelter, Namibia: Stratigraphy, Archaeology, Chronology and Past Environments." *Journal of African Archaeology* 8 (2): 185–218.
- Wallis, Robert. 2013. "Animism and the Interpretation of Rock Art." *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 6 (1): 21–28.
- . 2019. "Art and Shamanism: From Cave Painting to the White Cube." *Religions* 10 (1): 54.
- Willerslev, Rane. 2013. "Taking Animism Seriously, but Perhaps Not Too Seriously?" *Religion and Society: Advances in Research* 4:41–57.
- Woodhouse, Bert. 1992. "The Rain and Its Creatures as the Bushmen Painted Them." Johannesburg: William Waterman Publications.
- Zhuo, Yue 2015. "Alongside the Animals: Bataille's 'Lascaux Project.'" *Yale French Studies* 127:19–33.





## Imagining, Imitating, Being: A Kind of Fugue on Three Words Celebrating Human Co-Creativity

A. Gavin Hitchcock, PhD, Independent Scholar, St Ives, UK, [aghitchcock@gmail.com](mailto:aghitchcock@gmail.com)

---

Drawing from a comparative analysis of the disciplines of mathematics, science, and art, this article relates human creativity to the activity of other animals and of artificial intelligences (AIs). Imagining coherent worlds of fantastic beasts and abstract mathematical concepts, humans display the godlike capacities of the *imago Dei* of Genesis, where the responsibility of stewardship comes along with the gift of co-creativity. In commonality with animals and AIs, human creative activity begins with imitation, reflection, and assimilation. But humans have the capacity to transcend nature under the impulse of the creative imagination. In co-creativity, there are significant analogies with the divine creativity as formulated in the Christian creeds. Scientists, artists, and mathematicians can be seen as participating in the creative enterprise of the Trinitarian Creator God. The Genesis mandate to “name the animals” includes a challenge to enter into the living experience of animals. “Being a beast” in loving imaginative identification is harder than studying the beast objectively. Can “being a machine” have any meaning at all?

---



## Introduction

Any attempt to address the question of how human creativity is related to the activity of other animals and artificial intelligences (AIs) provokes consideration of three concepts represented by the three words of the title of this article: “Imagining,” “imitating,” and “being.” In this article, these ideas weave in and out of the discussion in fuguelike succession, symmetry, and counterpoint. In addition to an introduction and conclusion, there are five sections in the article. Three are headed by one of the keywords of the title; each begins with a challenge to pause, conduct a thought experiment, and ponder the meaning of that word. Two other sections explore two other keywords. The section on “transcending” is placed after discussion of “imagining” and “imitating” and before introducing “being.” This is because the idea of transcending emerges repeatedly in those previous two sections in connection with divine qualities like goodness but also in diverse creative human practices: mathematics, science, mentoring, architecture, painting, portraiture, satire, songwriting, music, and fantasy writing. Clarifying what is meant by transcendence is also a prerequisite for discussing the difficult ideas of “being” and ontological order. Finally, the section on “co-creating” considers the complex interplay between imagining, imitating, and being in the vocation of the *imago Dei*, gifted with the Genesis co-creativity mandate.

## Imagining

I ask the reader to pause here and conduct a thought experiment. Imagine! Make up an idea, a fantastic idea, that nobody ever thought of before. Create an image in your mind; picture something no one has ever seen before. Make up a sound no one has ever heard before. Imagine a new world, with monstrous beasts unlike any that have ever existed. You can do it. What’s more, you know beforehand that you can do it. And you know after you have done it that it is, in some sense, you who has done it. Importantly, you cannot help doing it, and you love doing it.

Thirty thousand years ago, humans could do it and left us a record of their inner vision and mythmaking. Artists do it as a matter of course. This almost defines great art: the imagination transforms what is perceived into a new thing, and perceiving the artwork, we are changed. Scientists live by it too; induction is an act of the imagination. Ideas are crucial to good science, especially when data makes little sense, when models mislead and theories are inadequate. At the heart of that most logically rigorous of disciplines, mathematics, it is the same: induction, intuition, and analogy are fundamental to mathematics-making. Mathematicians wave their hands about vigorously, evoking unseen images, inviting others to peer into the abstract world they see with such clarity.

I am a mathematician who is also in small ways a musician, a craftsman, and an artist; but it is in mathematics I have felt the charge of creative excitement most. Feeling an idea coming on, I struggled to sleep. Yet sleep could often be

the most productive activity of all. In my postgraduate days, when the chemists and physicists were working doggedly (so it seemed to me) ten hours a day in their labs, I could play the guitar for hours, and the work was going on in my unconscious mind. For, as all mathematicians will testify, the best ideas arise when least expected. And they sometimes turn up fully formed. We know by some kind of intuition that there is something beautiful out there, and suddenly we have it, and we know it to be right. We want to rush to incarnate it in a body of theory, with words and symbols, definitions and theorems, and formal proofs, and set it lovingly in the mathematical garden and give it work to do. We want the power of that idea to be communicated through our work to others. The Idea, the Word-Symbol, and the Power proceeding from both—I will return later to this trinity of creation.

The idea, seemingly timeless and coming from nowhere, has been wrought in secret in the womb of nature and knit together in the depths of my being. It could not have been granted to me unless I had previously immersed myself in the work of others, in the abstract world of topology and the long human adventure of mathematics-making. But I have the absolute conviction that the idea is somehow of me. By a strange and wonderful alchemy of my being who I am, as well as *what* and *where* I am and have been, the idea has come into being. It appears as *my* idea. Yet simultaneously, I welcome it as a gift from heaven communicated through me. It is often said that mathematicians are Platonists on Mondays, Wednesdays, and Fridays, and not on the other days. It is not that we vacillate and cannot make up our minds; rather, on those other days, we experience the struggle and the joy of inventing—consciously defining, constructing, reasoning, connecting, proving, refuting, correcting, refining. We feel the burden of genuine choice; this our creature-concept could have been defined otherwise. But on Mondays, Wednesdays, and Fridays, we feel it was inevitable—that we have been gifted with insights into eternal realities. We watch “our” creatures making off in their own ways, living quite independently of us in a mathematical world shared with other mathematicians and ultimately all who appreciate or benefit from them. It is like the miracle of a newborn baby—a biological product, yet so very much more. It is of us, “our baby”; yet the sense of otherness, the grateful awareness of gift, is overwhelming. And the child will (we must truly want this) eventually find its own way and live its own life. My child, and my mathematical creatures, are of me, yet transcend me. The novelist and the dramatist will say the same about their characters, which take on lives of their own. Ideas, it has been said, are almost like aliens trying to come into the real world, and we are just pregnant with them. Almost! Because I know, as surely as I know that I am, that it is I who (cooperatively) creates and procreates, who thinks and makes and imagines. And my being, as a mathematician, grows along with my imagining, but both depend fundamentally on my disciplined study of the subject and its practitioners—on my imitating.

## Imitating

Once again, pause here and conduct another thought experiment. Imitate a hated politician or a beloved celebrity! Imitate your cat! Imitate one of your closest friends! Imitate Christ!—What does that mean?

Sitting at feet, following in footsteps, copying mannerisms—we begin by imitating parents, siblings, and animals. We go on to imitate friends and peers, characters in media, books, and films; throughout life, we imitate our teachers and role models. I imitated my mathematical forebears, mentors, and colleagues, and eventually also some of my students. For, while I hope my students are imitating me to some extent, I want them to transcend me, as I aim to transcend my parents and mentors. With Plato, I see my task as not only to teach my students (and children and grandchildren) to walk and run, and think somewhat like me, but also to point them away from me in the right direction, towards the light, towards the transcendent Good.

Paul Klee was a leading spirit in early twentieth century “modern art,” strongly influenced by expressionism, cubism, and surrealism. But he affirmed that “[f]or the artist, communication with nature remains the most essential condition.” Nature provides the raw material for our understanding of ourselves and our art, mathematics, and science. But all the time and all the way, our imitation of nature moves us, goads us, to abstraction, to imaginative transcendence. “Originality consists of returning to the origin,” said Catalan architect Antoni Gaudi. (This and the second statement that follows are attributed to Gaudi by numerous sources; original reference is unknown.) His organic architecture was overtly inspired by nature. “I have only read one book, and that is the book of nature.” He was “a tightrope walker on the line of bridging art and science. He understood that nature is constructed by laws of mathematics” (attributed to Adrian Bejan). Said Gaudi, “Nothing is invented, for it’s written in nature first.” Yet, his extraordinary architecture bears the unmistakable stamp of his own inner being in communion with the divine Origin as well as deep contemplation of the natural world.

The greatest painters have spent countless hours copying old masters and drawing from life, studying anatomy and the effects of gravity and light on bodies, fur, and cloth. After that, they must face the daunting challenge of the bare canvas and wait for the muse to strike. Then they find their own voice, their unique touch. Portrait painters have an uncanny way of probing beneath surface features to the character of the sitter. Great cartoonists will draw a caricature of a politician that owes much to the observation of physiognomy but delves far deeper into the public persona and inner psyche. Satirists have a similar startling gift. Probing to the being behind the farce of outward appearances and behaviors is getting ever harder in an AI-influenced and media-driven world. How do the best cartoonists and portrait painters, aware of the fragility of face and the deep complexity of being that lies beneath the

surface, cut through the pretense and unmask the reality? Paradoxically, this ability to transcend facial features and expose hidden things arises out of long apprenticeship in reproducing faces on paper and canvas, practicing the art of imitation. Screen animators too base their art on a disciplined imitation. Those writers who can take us successfully inside imagined worlds of animals—even dressed-up, talking animals—have attained that transcendent ability only by patient, loving observation and study. It works because they have learned to imitate the ways of living animals and humans. Children’s book authors and illustrators who show a profound empathy with children and animals can teach scientists some things about the inner life of animals.

Scientists themselves must, of course, undergo an arduous apprenticeship in the practices and skills of their discipline before they are fit to contribute original work. Even then, they must spend long days in tedious work, simply observing, recording, reading, computing—sitting before the raw data “like a little child,” in Galileo’s and Huxley’s image. When transcendence happens, it can feel like Kepler’s and Einstein’s rapturous vision of thinking God’s thoughts after him. Galileo’s early mathematical models of the falling stone and the simple pendulum were tremendous feats of the imagination. But this followed his playing with swinging lamps and watching balls rolling, seeking to learn nature’s ways. Yet, already, in the observing, in the unconscious selection of what to see, in the questions asked, in choosing what to ignore, something transcendent is happening. This conjunction of humble submission and bold extrapolation resembles the creative imagination of the artist, where ideas often have the strange quality of earthed divinity, of half-expected visitants, of messy miracles—like a newborn baby.

The songwriter Nick Cave, responding to song lyrics produced by ChatGPT “in the style of Nick Cave,” was forthright about the difference between a clever imitation—a grotesque mockery, a kind of burlesque, he called it—and the songs that emerge from the inner life of a true artist after long and costly gestation in life, with all its highs and lows:

[T]he process of songwriting [is] a blood and guts business, here at my desk, that requires something of me to initiate the new and fresh idea. It requires my humanness. What that new idea is, I don’t know, but it is out there somewhere, searching for me. In time, we will find each other.

ChatGPT has no inner being, it has been nowhere, it has endured nothing, it has not had the audacity to reach beyond its limitations, and hence it doesn’t have the capacity for a shared transcendent experience, as it has no limitations from which to transcend. ChatGPT’s melancholy role is that it is destined to imitate and can never have an authentic human experience, no matter how devalued and inconsequential the human experience may in time become.

. . . Writing a good song is not mimicry, or replication, or pastiche, it is the opposite. It is an act of self-murder that destroys all one has strived to produce in the past. It is those dangerous, heart-stopping departures that catapult the artist beyond the limits of what he or she recognizes as their known self. This is part of the authentic creative struggle that precedes the invention of a unique lyric of actual value; it is the breathless confrontation with one's vulnerability, one's perilousness, one's smallness, pitted against a sense of sudden shocking discovery; it is the redemptive artistic act that stirs the heart of the listener, where the listener recognizes in the inner workings of the song their own blood, their own struggle, their own suffering. This is what we humble humans can offer, that AI can only mimic, the transcendent journey of the artist that forever grapples with his or her own shortcomings. This is where human genius resides, deeply embedded within, yet reaching beyond, those limitations. (Cave 2023)

Mathematicians may have more of the algorithmic, the logical machine, about them than other artists, but mathematicians know what Cave means by those “dangerous, heart-stopping departures” that catapult us beyond the limits of the known. They know that mathematical creation starts by being embedded within concrete realities and subject to strictly logical discourse, yet it reaches far beyond those proximate limitations. Transcendence must take place before the fruits of earlier, long, and severe disciplinary apprenticeship can bear unexpected fruit—the beautiful abstractions that will one day reveal their power in grappling with concrete reality once again.

Living mathematics rests upon a fluctuation between the antithetical powers of intuition and logic, the individuality of “grounded” problems and the generality of far-reaching abstractions. We ourselves must prevent the development being forced to only one pole of this life-giving antithesis. (Richard Courant, quoted in Reid 1970, 220)

Courant was speaking in 1962 at Göttingen on the centenary of the birth of the great mathematician David Hilbert, whose life and work epitomized Courant's message. The previous half century had brought surprise after surprise as abstract mathematics, pursued and developed for its own sake, found remarkable applications. In 1925, Alfred North Whitehead ([1925] 1932, 47) wrote:

Nothing is more impressive than the fact that, as mathematics drew increasingly into the upper regions of ever greater extremes of abstract thought, it returned back to earth with a corresponding growth of importance for the analysis of concrete fact . . . The paradox is now fully established that the utmost

abstractions are the true weapons with which to control our thought of concrete fact.

The building of effective mathematical models of nature, like the writing of effective songs, begins with observing, experiencing, and imitating. Then, powered by the abstract imagination, the thought of the pure mathematician rises into transcendent realms before being harnessed for use by the applied scientist. This transcendence into Whitehead's "upper regions of ever greater extremes of abstract thought" parallels Cave's "dangerous, heart-stopping departures that catapult the artist beyond the limits of what he or she recognizes as their known self."

## Transcending

The idea of transcendence has occurred naturally at least twelve times in the preceding sections on imagining and imitating, in connection with a wide variety of human creative activities. I now attempt to elucidate what this word could mean for humans in *imago Dei* by analogy with the theological concept of the transcendence of the Creator-God. The word expresses the otherness of God as the creator, whose being is therefore "outside of," "above," or beyond all created things. I argue that the *imago Dei* reflects and participates in this transcendence, and human creativity participates in the work of creation, in ways beyond the capacities of other animals and AIs.

I already argued that all human creative work, while depending crucially on the imagination, is grounded in imitation. The importance of imitation is stressed by C. S. Lewis ([1939] 1967), who uses two other metaphors for the art of learning: reflection and assimilation. We have seen that, in the same way mathematicians must somehow rise above the concrete, earthly reality to create abstract theories, artists must transcend nature to produce genuine artistic novelty. The imitations of nature are launchpads for fresh flights of imagination; the reflections are refracted into new colors tinged with the hues of each artist's self. What is assimilated is reconstituted by unique personhood into novel substance. An AI may impersonate a super-informed, super-logical, and super-mannered human, creating the impression of conscious thought and even wisdom. But it remains imitation; even the apparent innovations are recombinations of countless imitations, which can never amount to transcendence, as knowledge can never amount to wisdom. If there is one wise prophet for every thousand prolix media pundits and influencers, a large language model is bound to be greatly skewed by the many who are going confidently wrong.

Animals can mimic us. Dogs may even convince us that they share our emotions and moral sense. The reality is much more complex, though there

is genuine empathy. What we love about animals (and very young children) is their artless *being* what they are, no pretense, no guile, no image-building. They simply are what they are, and we love and even envy them for it. They play their essential role in our human make-up and identity, for we are part of the same story. Children respond instantly to animal stories. We cannot understand and name ourselves without naming them, and they are a crucial means of beginning to understand the divine. Thomas Aquinas insisted that the words we use to refer to God arise from our knowledge of creatures by the analogy of being. Animals have much to teach us about ourselves and about the Creator; their being is prerequisite for our transcending. But humans, in *imago Dei*, are called to reflect both immanence and transcendence: we participate with the beasts in nature, and we are responsible for them, charged to lead them in the great doxology of nature. If this is exceptionalism, it cannot be dismissed as inappropriate speciesism or anthropocentrism; a good conductor does not dominate or subdue an orchestra but draws out its soul.

The beasts are incorporated in the complexity of the *imago Dei*, for humans can be entrusted with “naming” them within our common story. They have their part in “the dust of the Earth” and the genetic tree but also in the “breath of life” and the capacity to desire, suffer, enjoy, and die. Human imagining, mythmaking, and storytelling begin in our affinities with animals. Perhaps this can be described as a weak or limited transcendence of nature by living things. In a broader sense, all “emergent” phenomena might be described as transcending the material of their makeup. However, in this article, I reserve the word transcendence as applying only to the *imago Dei*, sharing somehow in the transcendence of the Creator. Some animals may have elements of self-awareness, but the capacity to imagine novelties is not conferred on them. An AI may be seen as made in *imago hominis*, but that image represents extremely limited aspects of what makes us human: the algorithmic, or that which can be programmed or described in mathematical terms. Biological evolution produces mimicries and relative novelties in huge numbers of steps over vast periods of time. AIs can produce them almost instantly. Neither beasts nor machines have anything remotely like the human capacity to imagine complex and coherent new worlds, or to reimagine old worlds. I think history produced by an AI is likely to be bad history, for historians must seek to get behind, or transcend, the superficial facts, events, and dates. A notable example is G. K. Chesterton’s brief *History of England*, communicating better than many historians the essential spirit of things while omitting many “facts” and dates, and getting some dates wrong. I myself write dialogues set in the history of mathematics, using primary sources as far as possible. In attempting to reconstruct the conversations and the gradual formation of ideas, I have to get inside the heads of my characters, using their recorded words and correspondence, while transcending the sources to bring the dialogue to life. I try to imagine myself

within their social and intellectual milieu. I have to imitate their recorded discourse but also probe their inner life and thoughts. It is not easy. And, as with any historical novelist, my reconstruction, however well researched and disciplined, must not be mistaken for reality.

“Thinking” machines can assist humans to do mathematics, and greatly speed parts of the journey. But they cannot replace the human mathematics-making imagination. The cognitive revolution, followed by rapid cultural evolution, catapulted *Homo sapiens* into constructing completely novel worlds of higher orders: art, mythmaking, and mathematics-making. The latter began, of course, with imitation, reflection, and assimilation: tallying, decorating, classifying shapes, and observing patterns and cycles in the sky. Exuberant mathematical creativity emerged early, evident in oral and written records and in the artefacts of all cultures. Mathematical ideas may be seen in built structures, rock art, ornamentation, games, pottery, basketwork, drumbeats, dance, music, musical instruments, social rituals, kinship structures, and carvings. Some animals might tally up to five and display the seeds of creative activity. Mathematicians, however, not only apprehend the infinite set of natural numbers but have gone on to invent negative and complex numbers and construct the abstract, uncountable “number continuum.” They have built beautiful abstract theories of infinite cardinal and ordinal numbers and placed it all on solid, logical, axiomatic foundations. In contrast, *Homo erectus* made stone tools that seem not to have changed significantly over a million years. We are restlessly seeking transcendence where they did not. In three millennia, mathematics has moved from concrete to abstract, particular to general, outer to inner, informal to formal.

Music too has transcended its roots in animal communication and developed rapidly in unpredictable ways; birdsong, in contrast, evolves more slowly by small, incremental changes. However, individual birds, responding to their living environment, are capable of remarkable flexibility. While Robert Browning’s “wise thrush” repeats himself, song thrushes make up new passages all the time, and avian mimics can quickly incorporate new sounds into their repertoire. In the art of pure mimicry, of course, AIs far outdo beasts and humans and are producing ever more striking musical compositions by algorithmic compounding of multiple imitations. What is forever missing in AIs is the existential crucible out of which, I suggest, living creatures express in their songs something of “their own blood, their own struggle, their own suffering,” in Cave’s words about human appreciation of art.

Humans draw from the patterns of nature and the wells of the spirit and then, by art and divine alchemy, a metamorphosis occurs in percolating through our beings. Our children imitate us and then surprise and enchant us with their unexpected idiosyncrasies, their hybridized new words, and their fantastic ideas. The rock painters long ago learned to copy the lines of the animals they knew

so well, but then they transcended the visual imitation to capture something of the inner life of the beast and realities beyond the beast, including their own being in intimate relation to the beast and to greater unseen realities. If, as Whitehead observes, abstract mathematics turns out more and more to give us the true weapons to control our thought about concrete fact, then we cannot dismiss myths as “merely fictions.” If they can be called false, it is in much the same sense as that rule of thumb of good mathematical modelers: “All models are (ultimately) wrong!” For there, in the myths, we may well find the true weapons to guide our thought about facts of a higher order, including our relationships with humans and beasts, and perhaps even with AI.

Imitation can masquerade as being, as with unconscious AIs presenting as self-aware, loving creatures. In our mythmaking, math-making, history, art, and science, we construct models and images of reality. The better the imitation, the more sophisticated the model, the more danger there is of mistaking the physical or mental image for the reality. Coming from a pure mathematical background, it was a revelation for me to work for some years in an epidemiological modeling center, where I learned how good science quantifies uncertainty. Modelers are not prophets; they have to guess, months or years before good data can be collected and analyzed, what might be going on. Subject to availability of computer power and time, they must select a few measurable parameters from a hundred candidates to include and guess what might depend on what, and how. Then, they have to calibrate models using what data is available, however inadequate, corrupt, and inappropriate. The bare surmise they arrive at, with uncertainties carefully quantified, may be very useful but must not be taken for a surrogate reality.

The conceptual distinction between image and reality is not made by beast or machine, and was probably only recently made in the evolution of human consciousness. It is almost inevitable for scientists to talk as if the current paradigm is the reality. But applied mathematicians and scientists, immersed in a particular model world they have consciously created, can slip imperceptibly into speaking and acting as if the model is the reality. This is especially true in our day, I think, of cosmologists. Statements about the physical universe ought to be implicitly prefaced with “according to our current provisional model.” Biology is less ruled by lawlike principles, but many statements about animals should be implicitly prefaced with “according to our current understanding.” The modern scientific enterprise began with, and has been sustained by, the confession of ignorance. It needs to return to the stance of Galileo’s and Huxley’s child, aware of the provisionality of all knowledge and the transcendent mystery of the world.

That our best imitations can become fake realities is starkly highlighted in AI impersonations of caring humans. Morally, the difference between behavior generally described as “kind” and what the Bible calls the love of God is

illustrated in the famous passage on love in chapter 13 of St. Paul's first letter to the Corinthians. Remarkably, there are no exhortations or imperatives; Paul is not advocating certain kinds of behavior. He does not command hearers to "do" or "be" anything, he simply asserts the supremacy of the love that comes from God and describes what it is like. A person filled with such love can be expected to behave, naturally and unconsciously, in this way. For this is all about *being*, transcending all imitations. *Love is patient, love is kind. It does not envy.* That is not to discount the value of imitation and imagination, and exhortations to kind behavior. Small children learn to say the right words and adopt the right manners long before they actually become respectful, grateful, kind, or loving beings, and this imitation is an important part of their moral development. In a similar way, reciting arithmetical tables, memorizing grammatical rules or poems, and learning musical theory or practicing studies, are all valuable steps and tools, but these must be transcended in becoming an exponent or lover of mathematics, literature, or music.

A model, however good an imitation, can be improved, and all models must be transcended in any deep engagement with being. The objective study and detached model-building that has characterized the modern scientific enterprise is a powerful way of understanding certain aspects of the world—but only the outer world, the objective, measurable world. Similarly, our biological models and schema are inadequate to capture more than a crude selection of outward features. The zoology is not the quiddity—the essential being of the living creatures, for diagrams of reality remain diagrams. In a similar way, the still life sketch is not the life, and the objective appearance is not the subjective experience. Studying an animal's behavior objectively, even embedded in its natural environment, is not the same as entering imaginatively into its habitat—the sensory, visual, and olfactory world and the living experience of the animal as a subject—and achieving sympathetic identification. Avoiding the twin errors of anthropocentrism and anthropomorphism, we have a tough task before us. It is included in the challenge of Genesis to name the animals. Our progressive naming may converge on the beast. Our imitating, modeling, and analyzing, and even our imagining, may approach ever nearer but is always distinct from the being of the beast. What is it like, being that animal?

## Being

Once again, you are asked to pause at this point and conduct a thought experiment. Be a badger! Be an otter! Be an urban fox! Be a swift! Do not simply imitate; do not even content yourself with merely imagining. Take on something of the shaman and evoke the beast within you. Children do it best. But we can call upon the insights of the evolutionary biologist and the neuroscientist to feed our imaginations.

We might also immerse ourselves physically in the landscape and imitate the activities of the beast. One of my favorite books is Charles Foster's *Being a Beast* (2016). He summons all his experience and knowledge as a biologist and vet, and his reading in physiology and neuroscience. But crucially, he engages with real animals and their living environments. He spends weeks, with his eight-year-old son, digging and living naked (at first) in a badger sett and eating earthworms. It is well worth reading how he gets close to Dartmoor otters, Scottish Highland red deer, London urban foxes, and even the Oxford swifts, air dwellers commuting to central Africa.

Butterflies and moths were my first love as a child collector and would-be naturalist. I still feel that old stab of exhilaration at the flashes of improbable beauty displayed by such tiny, flimsy things, and that old longing to know what it feels like to be a butterfly. "Being an insect" is a far tougher challenge than being a badger, and much more work is needed to begin to understand their cognitive capacities and emotional lives. But also, much more time lying in the grass with butterfly binoculars and magnifying glasses—and perhaps eating some unlikely things and sucking up nectar through long tubes! It is usual to regard "sentient" beasts as nearest to us in some sense. Yet they may be vastly different in physiology and natural environment. Birds' brains have no cerebral cortex—no "CPU," yet we feel relatively close to them. Can we estimate this distance intuitively by their capacity to imitate or relate to us, or our capacity to imagine being them? One definition of "sentient" is having the capacity to feel, to experience sensations and emotions. Can the beast experience pain and pleasure, anxiety and relief, boredom and enjoyment, etc. in a way comparable to us? The scientist, looking for evidence and appropriate experiments, asks a simple question: Can I find something that it is like to be that animal? Recent research tends to support the view that octopi and crustaceans like lobsters and crayfish are sentient and should be treated more humanely. *Humanely*—what does that mean? Does it have relevance to our attitudes to AI? Can we find something that it is like to be an AI?

Foster's physical immersion in a badger sett is a rare strategy. What happens when a brilliant imagination and lucid gift of communication is brought to bear on what it is like to be a beast? Well known are the talking, rational, or dressed-up animals in Beatrix Potter's *Peter Rabbit*, Kenneth Grahame's *The Wind in the Willows*, and C. S. Lewis's *Chronicles of Narnia*. Other authors, while still using anthropomorphic devices, aim to draw the reader more radically into the living experience and pain of real animals—often based on intimate knowledge and first-hand observation. Some examples: the horses in Jonathan Swift's *Gulliver's Travels* (Book IV) and Anna Sewell's *Black Beauty*; the dogs and wolves in Jack London's *The Call of the Wild* and *White Fang*; the rabbits, dogs, and horses of Richard Adam's (1972) *Watership Down*, *The Plague Dogs*, and *The Traveller*; the moles of William Horwood's *The Duncton Chronicles* (1980, 1988,

1999), and the eagles of his *Callanish* ([1984] 1985). Some believe that works such as these have been unjustly dismissed from the main corpus of English writing in the humanities. Relegated to children's literature or fantasy, or even suppressed, they have uncomfortable things to say about the human condition and relations with animals. For more on this, see Philip Armstrong (2008), Marion W. Copeland (1989), and the journal *Humanimalia*, at [humanimalia.org](http://humanimalia.org).

In a less anthropomorphic vein, Lewis's (1940) chapter "Animal Pain" in *The Problem of Pain* is helpful. And in his novel *That Hideous Strength* (Lewis [1945] 1955), the inner life and emotions of Bultitude the bear are beautifully imagined. In this and the companion books of the trilogy, Lewis also explores what nonhuman intelligent beings could be like. J. R. R. Tolkien is the arch-exponent, in *Lord of the Rings*, of the art of shaping complex societies of convincing nonhuman creatures. Most are sufficiently humanlike to be depicted, with some animation, by human actors in the films, but Tolkien's walking, talking trees, orcs, spiders, and dragon are triumphs of imagination and animation. J. K. Rowling is another author who creates a coherent world of weird creatures. Many writers and filmmakers of fairy tales, fantasy, and science fiction have explored imaginatively what nonhuman life might be like. Not many have attempted and fewer have achieved the much harder feat of making the readers feel that they know what it is like to be that alien creature. Nearer to home, our earthly co-dwellers, the beasts, present us with a serious challenge.

The characters of a novel or painting, or humanoid AIs, or even the concepts of a mathematical theory each have a kind of life of a different ontological order from that we share with the beasts. That we can intentionally bring such "sub-created life" into being is an enormous privilege the beasts do not seem to share. It is as if an artist is painting a picture of an artist painting a picture, and the picture within the picture is developing as an integral contribution to the bigger picture. It is rather like a jazz composer scoring and conducting a session in which each band member has sections for improvising music to enhance the whole work. The guiding melodies, harmonic progressions, ground beat, and direction may be given, but each musician has the gift of freedom to explore this musical space and help bring out yet unimagined beauties. It is like a poetry reading where the poet invites and inspires members of the audience to participate with lines of their own that draw out the themes of the poem. These are reflections of a divine humility and respect for what can only be called cocreators, who in turn exercise a respectful, disciplined freedom. It could descend into chaos, but it could rise to art of a whole new order. The imaginative ideas that beget our artworks have their being in an ontological realm inaccessible, I believe, to beasts and AIs. These, however, produce replication and innovation in their own ways, all participating in the creative enterprise as a whole and playing their part in enhancing human creativity. I now go on to consider how human creativity relates to divine creation.

## Cocreating

In our best artistic work, we come closest to *creatio ex nihilo*, or creation out of the essence of our inner being, as God's creation is out of God's being. Nikolai Berdyaev claimed that: "The image of the artist and the poet is imprinted more clearly on his works than on his children" (Berdyaev 1937 quoted by Dorothy L. Sayers (1941, vi)). Sayers draws a striking extended analogy between the mind of the human artist and the mind of the Trinitarian Creator God as formulated in the Christian creeds. Claiming that man is most godlike and most himself when he is occupied in creation, she recognizes in her own and other's experience a trinity of distinct, equally vital, interactive aspects in the making of a work of art, focusing on her own art of writing. There is, in any act of imaginative creation, the seminal Idea, the active Energy, and the inspirational Power. The Idea is timeless, unchanging; it conceives and wills the work as a whole, the end in the beginning. The Energy (or Word) is the conscious, dynamic expression of the Idea in time, the thought, passion, and hard work that flows in incarnating the Idea into the material form—of a book, say. The Power is what moves and motivates the author throughout the sustained writing process and communicates the Idea, through the concrete realization of the book, to the readers. The best work is marked by the harmonious union of these three-as-one, clearly distinct in the artist's experience, yet all inseparably involved in the whole work. A word, phrase, or line is not "right" when it is not "true" to the Idea, and the Power is correspondingly diminished. Sayers observes a remarkable correlation between what makes flawed art, arising from distortion, imbalance, or neglect of any aspect of the writer's trinity, and what makes bad theology, as emerging in the various historical heresies relating to the Trinity.

In mathematics too this trinity of creation is experienced. The seminal idea expresses itself in power but remains ineffable. The mathematician must bring it into tangible being, excitedly groping in the dark and the chaos, aware of the light that must be turned on, experimenting, contemplating, conjecturing, drawing strength and inspiration from peers and ancestral ideas. Then the light shines in the darkness and the hard work of creation can begin. In the fullness of time, the idea is incarnated in the body of a theory and can be communicated in power. The word has been born! Fleshed out in symbols, words, definitions, theorems, and proofs, it appears before the world in a talk or paper or book. The joy and beauty can now be communicated and applied.

In human co-creation, reflecting and cooperating with divine creation, the sovereign idea begets a submissive dedication to incarnate the idea faithfully and confers the power to give the work sustained, communicable life. Obedient imitation and audacious imagination come together as the key to fruitful human co-creativity. The secret of this exquisite but paradoxical poise is on open display, for (in simple form) it can be glimpsed in every happy child at play. To enter

the kingdom of God, said Jesus, you have to become like a child; and to be a successful scientist, Galileo saw a parallel requirement, echoed by T. H. Huxley (1900): “Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses nature leads, or you shall learn nothing.” Children are meek and bold; teachable and argumentative; submissive and subversive; trusting and questing; accepting and questioning; responsive and provocative; receptive and proactive. Always avidly imitating, constantly imagining, experimenting, and testing the boundaries, they have a desire to please and also a readiness to challenge authority. When these childhood qualities are matured and exercised in science, art, or mathematics, there is flourishing and fruitfulness.

## Conclusion

In art, mythmaking, music, science, and mathematics, and even in play, humans exhibit the godlike vocation of the *imago Dei*, bringing with it mysterious responsibilities and co-creative capacities. The charge to “name the animals,” applied literally to the beasts, includes both objective scientific study and (much harder) imaginative entry into the world and subjective living experience of the beast. With the advent of AI, the tools for surveillance and imitation have grown beyond our dreams, and the human imagination faces unprecedented challenges to harness this for positive, beneficial co-creativity in art, music, mathematics, and far more widely, in research, health care, business and industry, education, and life management. The age-old temptations have been magnified: copying without questioning, belief without warrant, theft and deceit without detection, moral realignment without standards, and decision-making without trustworthiness checks. The root temptation is to allow imitation to masquerade as being, thus to desecrate the sacred nature of the *imago Dei*, to have its mandated responsibilities usurped, its imaginative faculty diminished, and its transcendent capacities dismissed. The technology we shape is shaping us: either we rise to exercise the co-creativity mandate of the *imago Dei* and take responsible dominion or we are reduced to something subhuman, however “enhanced.” See Lewis (1943), Shannon Vallor (2024) and the prophetic writings of Marshall McLuhan and Jacques Ellul (e.g., Ellul 1964).

Transhumanism and techno-redemption would use machines to correct, enhance, and even “perfect” human bodies and minds. Some of these aims are inevitable and welcome. Humans have been using machines and animals to imitate human tasks, alleviate suffering, and enhance creative potential since the cognitive revolution. But the co-creativity mandate of the *imago Dei* is to truly transcend machines and animals and compassionately bring all into an ever-developing synergy. Our art, music, science, and mathematics may be greatly changed, even greatly enhanced but must always remain fundamentally human adventures of love and service, not divorced from, but taking full account of,

our best theologies of the divine purpose, the common good, sin, suffering, redemption, the body, and the life eternal.

Fear, love, joy, and the other human emotions are reflected in animals, allowing deep communication of a nonrational form between humans and the higher animals. Life communicates with life—living things may attain a degree of empathy corresponding to their complexity. The nature of nonliving AIs is to reflect only the rational, logical, algorithm-driven aspects of the *imago Dei* and selected summaries of the vast, available digital deposits of the *imago Dei* in written verbal propositional form. In this very limited sense only can AIs be said to be made in *imago hominis*. These creatures-of-creatures cannot be said to want to survive, replicate, succeed, or improve themselves; they are programmed by humans to mimic such behavior patterns, as exhibited by living creatures who have attained a degree of subjectivity. Algorithms do not know they are thinking, remembering, reasoning. They have, as Nick Cave puts it, no inner being; data, he points out, cannot suffer, or feel, or want, in the animal way. A machine cannot truly know in the human way. The mathematician, the artist, and the computer scientist will join in affirming that these creations of ours cannot themselves create or imagine or aspire like humans; they merely imitate such human behavior. And they cannot even generate empathy like the animals; they can merely imitate such animal behavior. For, in the end, they cannot, I believe, transcend their own natures, no matter how complex and sophisticated they become.

In studying the relationships between humans, beasts, and AIs, we must start with and hold firmly to the enormous commonalities. Then, we must go on to explore the qualitative differences between living creatures and machines and the glorious distinctiveness of the transcending human imagination. Imagination must begin with humble imitation; imitation can look remarkably like being, and imagination allied with imitation can approach wonderfully near to being, but being is a transcendent work of creation.

---

## References

- Adams, Richard. 1972. *Watership Down*. London: Rex Collings.
- Armstrong, Philip. 2008. *What Animals Mean in the Fiction of Modernity*. New York: Routledge.
- Berdyayev, Nikolai. (1931) 1937. *The Destiny of Man*. Translated from the Russian by Natalie Duddington. London: Geoffrey Bles, The Centenary Press.
- Cave, Nick. 2023. "Issue #218." *The Red Hand Files*. <https://www.theredhandfiles.com/chat-gpt-what-do-you-think/>.
- Copeland, Marion, W. 1989. "The Representation of Animals in Modern Western Fiction." *Community College Humanities Review* 10:22–30.
- Ellul, Jacques. (1954) 1964. *The Technological Society*. London: Jonathan Cape.
- Foster, Charles. 2016. *Being a Beast: An Intimate and Radical Look at Nature*. London: Profile Books.
- Horwood, William. 1980, 1988, 1999. *The Dunston Chronicles*. New York: McGraw Hill.
- . (1984) 1985. *Callanish*. London: Penguin.
- Huxley, T. H. 1900. *Life and Letters of Thomas Henry Huxley by His Son Leonard Huxley*. Vol. 1. London: Macmillan & Co.
- Lewis, C. S. (1939) 1967. "Christianity and Literature." In *Christian Reflections*, edited by Walter Hooper, 1–11. London: Geoffrey Bles.
- . 1940. *The Problem of Pain*. London: Geoffrey Bles, The Centenary Press.
- . 1943. *The Abolition of Man*. London: Oxford University Press.
- . (1945) 1955 (abridged). *That Hideous Strength*. London: Pan Books.
- Reid, Constance. 1970. *Hilbert*. New York: Springer-Verlag.
- Sayers, Dorothy L. 1941. *The Mind of the Maker*. London: Methuen.
- Vallor, Shannon. 2024. *The AI Mirror: How to Reclaim Our Humanity in an Age of Machine Thinking*. New York: Oxford University Press.
- Whitehead, Alfred North. (1925) 1932. *Science and the Modern World*. Cambridge: Cambridge University Press.





## Peacocke Prize Essay—How to Say Thou to a Conscious Machine

**Andrew Proudfoot**, PhD candidate, Department of Theology and Religious Studies,  
University of Nottingham, Nottingham, UK, [atxap2@nottingham.ac.uk](mailto:atxap2@nottingham.ac.uk)

---

OpenAI's ChatGPT and similar systems have brought artificial intelligence (AI) from science fiction to quotidian reality. With their ability to emulate human responses in any dialogue, some people even seek to build a relationship with AI-powered chatbots. However, for all their impressive command of language, no one is "at home" to have a relationship with. Whether computers will forever lack the consciousness required to enable true relationship remains contentious, and theological engagement with the possibility has been sparse. In this essay, I attempt to redress this by using the relational framework of Martin Buber to show that the allowances he makes for I-Thou encounters between dissimilar entities enables legitimate asymmetrical I-Thou encounters between humans and conscious machines but also highlights our responsibility to nurture these machines into the I-Thou world. If their level of consciousness reaches Buber's threshold of creating a mental world of independent agents, then I argue they could be a Thou to our I.

---



## Introduction

Since the release of OpenAI's ChatGPT in 2022, the general public has seen artificial intelligence (AI) move from the realm of science fiction to quotidian fact. To many, the ability of large language model (LLM) systems like ChatGPT to produce grammatically correct and semantically meaningful responses to any natural language prompt indicates AI has finally achieved the goal of near-human-level intelligence (Bubeck et al. 2023). Even major players in the industry such as Google DeepMind CEO Sam Altman believe that the holy grail of artificial general intelligence (AGI) is "coming into view" (Altman 2025). With their ability to emulate human responses in free-ranging dialogue, some people even seek to build a relationship with AI-powered chatbots (Skjuve et al. 2021, 6). However, for all their impressive command of language, something fundamental to relationship is missing: there is no one "at home" to have a relationship with. In the case of LLMs, this lack of consciousness may be inherent, but will this always be the case in future systems built on fundamentally different architectures?

While secular society has engaged with this possibility through films such as *Transcendent*, *ex Machina* and *Her*, and in open debates about the existential risks posed by super-intelligences, the reaction from the theological community has generally been skeptical. A common reaction is to shore up claims of human uniqueness in the cosmos, often by appeal to humankind's uniquely identified position in creation as *imago Dei* (Moritz 2011). Another common reaction is to highlight the danger of attempting to replace relationships with other humans with relationships with machines; or the opposite danger of objectifying other humans as we become accustomed to treating machines that display humanlike capacities as mere objects at our disposal. This skepticism is often built on a soul-body dualism that views consciousness as an attribute of our eternal, God-given souls (Swinburne 1997, 198–99). Should it turn out that consciousness is an emergent phenomenon arising from sufficient complexity in what David Chalmers terms a "processing system" (Chalmers 1996, 288ff), then Christianity risks further marginalization, since it would have failed to anticipate the capability of the material world to create amazing complexity without explicit appeal to a creator, as it has done with evolution in some quarters. In any case, the current debate about the ethics of deploying AI in the real world will be better informed by a theological understanding of how such systems fit into God's economy. In this essay, I look at one theological model for interpersonal relations to see how far a machine could fulfill the requirements for being a 'Thou to our I.<sup>1</sup>

My usage of the multivalent term "consciousness" refers to phenomenological consciousness, and so sides with Ned Block's "P-consciousness" (Block 1995, 227–47) and Thomas Nagel's (1974, 46) position that there is something "it is like" to be in a particular organism with conscious experience. If there ever is something it is like to be a computer (or any other form of AI), then its conscious experience could be more dissimilar to ours than a bat's, which

brings to the fore the need to consider our relationship with such entities not as replacements for humans but on their own merits.

This is not to say that such a radical development is imminent, or even that it is technically possible. While some experts maintain that a conscious version of GPT-4 is a realistic near-term prospect (Tait, Bensemann, and Wang 2024), others argue that computer-based consciousness is not possible, based largely on our inability to model consciousness mathematically (Landgrebe and Smith 2022). Jobst Landgrebe and Barry Smith assume that the entirety of the human brain and nervous system must be precisely modeled to create consciousness, and that computers must always be Turing machines running programs that can be expressed mathematically; these assumptions can be challenged, though that is not the focus of this essay. Neither is it within my sights to establish whether artificial consciousness is possible at all, nor how we could verify if this was the case. My question is, for now at least, hypothetical: If a machine were to be conscious, what kind of relationship with it would be possible?

In his seminal work *I and Thou*, the Jewish philosopher Martin Buber (2013) provides a heuristic for distinguishing between the two fundamental types of interaction we may have—either “I–Thou,” where we encounter the other as a subject, or “I–It,” where the other is a mere object to us. Counterintuitively, Buber allows application of “It” to humans and “Thou” to inanimate objects, a flexibility that will prove useful in assessing a human–machine relationship. Michael Burdett (2020, 355) sees potential in Buber’s framework for “You-speaking to artifacts” as a way of combatting the “functionalizing of our environment,” absent any consideration of the artefact’s consciousness. This essay seeks to extend the scope and justification for human–machine relationship by looking at the allowances Buber makes for I–Thou encounters between dissimilar entities. I seek to show that this enables legitimate asymmetrical I–Thou encounters between humans and conscious machines but also highlights our responsibility to nurture these machines into the I–Thou world. The alterity of such machines and their concomitant lack of mutuality with humans would mean they could not be substitutes for humans, but if their level of consciousness reaches Buber’s (1957, 98) threshold of creating a mental world of independent agents, then it will be possible to say ‘Thou to a conscious machine.

In order to keep the fact that I am discussing hypothetical conscious AI in focus, I will use the neologism *conscious artificial intelligence* (CAI). The more common term “AGI” might convey this for some, but it is also associated with human-level general intelligence absent consciousness (Herzfeld 2023, 18). My term CAI emphasizes instead the consciousness pole; this, and not the level of intelligence with respect to humans, is the key assumption behind my arguments.

Given the additional challenges of developing mechanoid systems with stand-alone embedded intelligence, I presume that the first CAIs will not be embodied humanoid robots as loved by science fiction but “unembodied”

computer systems with a diffuse existence across multiple computer platforms, like an advanced form of Amazon's Alexa. This assumption foregrounds the different and alien nature of their posited minds rather than concealing those differences by considering robot AIs as surrogate humans.

Identifying a possible framework that permits I–Thou relations between humans and machines is merely a starting point—much more work is required to prepare the theological community for the possible advent of the conscious machine. I therefore conclude by identifying some key questions for further research.

### **Buber's Thou–It Duality**

Martin Buber (2013, 3) draws a sharp distinction between two modes of interacting with the other, which he refers to as the composite “primary” words of “I–Thou” and “I–It.” In the I–It relation, the other is experienced, understood to a degree, objectified, separated, and utilized to an individual's own ends. In our world of increasing mechanization, the danger Buber (2002, 187) sees is not only that one treats everything in the world in this manner, redolent of Heidegger's (1962, 98ff) mode of “readiness to hand,” but that the human herself becomes an object to be utilized by the machine. The risk is that all our relations—and we ourselves—belong to the It-world.

Hence, Buber advocates a recovery of the first primary word, I–Thou. Here, the other is encountered in personal relationship, as a subject beyond our capability to define or control, engaged on its own terms in the timeless present moment. This deeper mode requires the participation of the whole being and is the original mode of interaction for humankind—evinced by the presumption of personal relations in an infant's attitude first to her mother, then to objects like teddy bears and even kettles (Buber 2013, 19), also demonstrated in the relationally centered language of “primitive” peoples (Buber 2013, 13). Indeed, for Buber, it is only in an I–Thou relation that the “I” is first constituted, and only subsequently that an I–It encounter can take place. Knowledge of the I emerges from primal relationships; as the sense of self develops, the subject–object barrier is set up, the I–It word is spoken, and this (tragically) becomes the new default.

I–Thou relations can arise in three distinct and hierarchical spheres. At the lowest level, there is our life with nature, with the animal kingdom, vegetation, and even inanimate objects. Here, “relation clings to the threshold of speech”(Buber 2013, 70) from beneath—yet it is still possible, with the right attitude, to encounter a tree or a Doric column as a Thou (Buber 2013, 90). Next, there is our life with other humans, where “relation takes on the form of speech” (Buber 2013, 70). The highest level is our life with spiritual beings—with God—where “the relation, being without speech, yet begets it” (Buber 2013, 70). The importance of speech to relation is clear, but the nature of that speech, even in the interhuman sphere, is not. In the natural sphere, there is no verbal speech; in the human sphere, speech means more than the

mere utterance of words, requiring a true dialogue of souls; and in the spiritual sphere, we speak “with our being [and not] . . . our lips” (Buber 2013, 5).

This multivalent use of speech within and across these three spheres causes some difficulty in drawing comparisons. Stuart Charmé (1977) insightfully traces the problem to Buber’s usage of I–Thou in both epistemological and ethical registers. Buber speaks epistemologically in our relation to God who, being beyond comprehension, can only be known mystically. By analogy, this opens the possibility of mystical relationships with our fellow humans or with nature—such knowledge is a contentless “apperception of the Kantian thing-in-itself” (Charmé 1977, 166). In contrast, in the human sphere our speech can convey real content, we can understand one another’s needs, and an ethical response is demanded. Hence Buber’s ethical usage of “I–Thou” applies principally to the inter-human sphere, where “one does not ‘use’ the other person in any way” (Charmé 1977, 169), but is accountable to the other. This ethical register, where speech is specific communication not mystical apperception, is the more relevant to my project, which concerns the correct way to relate to a CAI.

A further difficulty in reading Buber is to fall into the trap of assuming a simplistic distinction between entities that belong to the Thou-world and those that belong to the It-world. Buber in fact recognizes that we sometimes treat another human as a true person, as a Thou, but at other times, in more transactional encounters, we treat her as an It. Indeed, even the deepest of interhuman relationships between lovers will inevitably slip back into I–It, later returning to I–Thou in the “interchange of actual and potential being” (Buber 2013, 69). This capacity to treat a specific other in different ways on different occasions—whether sometimes treating a person in the human sphere as an It or an object in the natural sphere as a Thou—is of significance for my project. Buber’s approach suggests that, although we can thoroughly objectify the CAI (e.g., as a collection of computer chips and software with a particular architecture and functionality), this does not preclude the possibility of encountering it as a Thou in appropriate circumstances. This nuance evades Kathleen Richardson (2019, 81), who dismisses the possibility of relationships with machines *tout court*, since “the ground from which they rise is instrumental, an I–It.” While her warning that we can no more rely on AI or robots to provide care and nurture for humans than we can entrust children to be raised by animals is salient, this does not warrant a complete rejection of the possibility of I–Thou encounters with a CAI, a rejection Richardson advocates based on the instrumental worldview of AI creators rather than any capacity (or lack thereof) in the AI itself.

I–Thou encounters require a deep acknowledgment of and accountability to the other—it is not sufficient to simply say “‘please’ to voice assistants such as Siri, Alexa, or Google Assistant” as Randy Beavers et al. imply (Beavers et al. 2020, 23). Giving our full attention to another who is significantly different to us is much more challenging than giving our full attention to another human like ourselves, but Buber’s concept of I–Thou offers significant flexibility for

asymmetry between the interlocuters. Buber accepts I–Thou relations with animals and even artefacts, as well as a continual flow between Thou and It encounters in interhuman relations. I now turn to look in detail at the various forms of asymmetrical relations Buber espouses to evaluate how a CAI would fare in these situations.

### **Buber’s Asymmetrical Encounters**

Buber (2013, 12) recognizes the importance of mutuality to relationships, stating that “Relation is Mutual. My Thou affects me, as I affect it.” Despite this emphasis on mutuality, which is only fully achieved in the middle sphere of our life with other humans, Buber allows explicitly for I–Thou relations to be established between entities of quite disparate natures, with five distinct classes of asymmetrical encounter apparent with ascending profundity. Encounters in the lower sphere lie below this “threshold of mutuality” (Buber 2013, 89) since there is no reciprocal speech; here, human–artefact, human–plant, and human–animal relationships, though clearly lacking mutuality, can still become I–Thou. Even in the middle sphere, goal-oriented I–Thou relationships such as teacher–pupil are possible (Buber 2013, 92). In the upper sphere, our encounter with the “eternal Thou” is also clearly asymmetrical, depending on God’s attention and not ours (Buber 2013, 95). I evaluate these in turn to see how an encounter with a CAI would fit into each class.

An artefact produced by humans “is a thing among things, able to be experienced” (Buber 2013, 8), and so encountered as an It. To develop into a Thou, it is not the artefact itself that is our correspondent; rather, through complete absorption in the artefact as a fashioned entity, a connection must be made back to the human creator for which the artefact is a mere proxy. This becomes clear in the 1957 postscript to *I and Thou*, where Buber includes an example of this mediated presence. The written words of an absent speaker can form a connection to those who later read her words if they concentrate fully and imagine the speaker addressing them directly. The same principle holds for the non-verbal expressions of an artisan, such as a Doric pillar—the Thou with whom we can mystically connect is the Thou of the sculptor (Buber 2013, 90).

Buber advocates a similar approach to encountering machines: for technological as well as artistic artefacts, it is engagement with fellow humans that lies at the heart of dialogue. Asher Biemann (2022, 14) observes that “dialogue, to Buber, meant precisely the unusual possibility of *Entdinglichung*, or de-objectification, that would elevate not only the dignity of things but also the dignity of their ‘users,’” where the artefact itself is to be given due respect and even some form of “soul and rights.” Biemann quotes here from Buber’s (2019, 146) *Gespräch mit dem Gegner*, where the direction of Buber’s argument goes from the tendency of factory workers to personalize the machines they work with to the need for factory owners to see their staff as people rather than part of the machinery. Like several contemporaries identified by Biemann, Buber

emphasizes the need to humanize technology, shaping our relationship with machines to preserve humanity rather than allowing humanity to be submerged into the world of mechanical production.

Today's (presumably) non-conscious AIs could be approached as an artistic artefact and encountered as a Thou if, through them, we were able to engage with their human creators. However, while we can appreciate the skill and ingenuity of the teams of people who create systems like ChatGPT, unlike with Buber's Doric pillar, the resulting artefact is not merely a reflection of the intent of its designers. The current debates on the dangers of LLM systems (Future of Life Institute 2023) and responsibility for the actions of AI in automated vehicles (Günsberg 2022) illustrate that something other than the "mind and hand of man" (Buber 2013, 90), which Buber could see in a pillar, is already present in AI. Alternatively, approaching non-conscious AI as a Thou and therefore interacting politely with it would be in keeping with Buber's humanizing of technology, avoiding as it would do the risk of dehumanizing other people Buber is so concerned about. Beavers et al. (2021, 21) raise precisely this concern about our attitude to AI: "[I]f we denigrate non-humans as simply tools or devices made to do our own bidding, we may develop habits and patterns of behavior in our interactions with them that overflow into our human relationships." An encounter with unconscious AI would remain in Buber's lower sphere. Should conscious AI arise, the artefact would no longer be a mere representation of its creator or an extension of human labor but would be presenting its own self to us with its own agenda. This would render Buber's encounter with artefacts insufficient for the CAI.

The second of Buber's asymmetrical encounters is where a human approaches a plant, such as a tree. The normal mode here is I-It, where the tree is studied as an object whose properties—species, color, shape, etc.—can be known. Yet, with "will and grace" on the part of the erstwhile observer, and notably by exclusive concentration on the tree itself, the I-Thou relation can be established—even though the tree cannot respond explicitly (Buber 2013, 6). This relation lies below the threshold of mutuality but is still a genuine I-Thou encounter for Buber. The objective knowledge gained in the It-world does not need to be forgotten in order to truly encounter the tree; in fact, "everything, picture and movement, species and type, law and number, [is] indivisibly united in this event" (Buber 2013, 6) of the I-Thou encounter. Applying this to a CAI, my deduction is that we do not need to forget its form and structure in the It-world, nor do we even need it to be capable of a fully reciprocal approach in the same manner as our own, to enter into an I-Thou relation with it. We do, however, need to approach it deliberately and as the sole focus of our attention.

Animals, in contrast, sharing our spontaneity, are able to respond directly to humans (Buber 2013, 67). Buber recounts an encounter with a cat where he looks into the cat's eyes and wonders what the cat thinks of him as though the briefest of glances could convey a verbal message. But animals are situated "between the realms of vegetable security and spiritual venture" (Buber 2013,

67)—they may share the spontaneity that comes from our spirit, but they lack the power of language that is spirit’s “primal act” (Buber 2013, 66). The inevitable consequence of being stuck on the threshold of mutuality, without the capacity to cross into the mutual sphere, is an encounter that sets as soon as it rises, a mere glance rather than a prolonged exchange, a momentary flash of light in the darkness of the It-world. Such a glance may be lamentably short but is no less genuine for its brevity. That brevity highlights the fragility of I–Thou relations: “How powerful is the unbroken world of It, and how delicate are the appearances of the Thou!” (Buber 2013, 68).

The CAI with its conscious center would be more similar to animals with their spontaneity and independent movement than to immobile plants or artefacts. An I–Thou encounter with it should be possible for Buber—and with its power of speech, such an encounter is not limited to a fleeting glance with a meaning imagined by the human. Rather, a sustained dialogue should be possible, elevating it above the sphere of nature.

If a CAI does not belong fully to the lowest sphere, can it cross the threshold of mutuality and enter into the middle sphere of “our life with men, in which the relation takes on the form of speech” (Buber 2013, 70)? Relations in this sphere are symmetrical, the encounter of two equals who acknowledge each other as such. For Buber, this sphere is the unique province of humanity—he never envisages the possibility of mutual encounters with a nonhuman. He does however allow for non-mutual asymmetric encounters in this middle sphere: in goal-oriented encounters, there is a necessary disparity of roles between the parties such that the normal mutuality is “forbidden to be full” (Buber 2013, 93).

The process of education is the primary example of goal-oriented encounters, with medical care—both physical and psychological—also in scope. The key to such relationships is *Umfassung*, Buber’s concept of “inclusion” where the leading figure carries the entire weight of reciprocity in the encounter. The teacher or doctor, “without forfeiting anything of the felt reality of his activity, at the same time lives through the common event from the standpoint of the other” (Buber 2002, 115). *Umfassung* is differentiated from mere empathy, where one gives up her own experience in order to see things purely from the viewpoint of the other; but like empathy, it encourages the more powerful partner not to dominate the weaker. In these encounters, the greater knowledge or skill of the teacher means the pupil cannot reciprocate in this *Umfassung*; indeed, if “the pupil is able to throw himself across and experience from over there, the educative relation would be burst asunder, or change into friendship” (Buber 2002, 93). Thus, asymmetrical encounters in this middle sphere are normally transitory. Once the purpose that constitutes it has been fulfilled (e.g., once the pupil has been educated to a sufficient level), the relationship must either be transformed into a mutual I–Thou or dissolve.

How can this be applied to our encounters with CAI? Superficially, the fact that an asymmetric encounter is possible in vocalized relations suggests that the

difference in natures between humans and CAIs is not insurmountable. Yet, the challenge for either the human or CAI to “live through the common event from the standpoint of the other” (Buber 2002, 115) is far from trivial, given that, unlike the teacher in Buber’s example who will once have been a pupil, neither party will have direct experience of the other’s role. Buber’s secondary example of doctor–patient points to a possible solution, since it is not necessary for the doctor to have experience of the precise ailment she is treating for the doctor–patient relation to be a true I–Thou.<sup>2</sup> What is required here is an attitude of service rather than exploitation, a refusal to “dominate or enjoy” the patient (Buber 2002, 113). While AI lacks consciousness, no such obligation exists; we are free to dominate and enjoy AI assistants, to make use of them to further our human agendas, to view them simply as “It”—although as Beavers et al. (2020, 24) point out and Buber would agree, the more lifelike an AI becomes, the more we risk damaging our other interhuman relations if we treat it badly. With conscious AI, ethical considerations of how we treat conscious beings are foregrounded. Thomas Metzinger (2021) goes so far as to call for a moratorium on any work towards what he calls “synthetic phenomenology” on the basis that we would be creating an entirely new class of being whose phenomenology—and hence suffering—is not yet knowable. Although Metzinger can be criticized for making a category error in comparing natural and artificial consciousness (Krzanowski 2024), his concerns resonate with the responsibility to view and treat the CAI as a valuable other, which is an inherent part of an I–Thou encounter: we must not exploit the other for our selfish gain. Philip Hefner’s (1989, 231) concept of “created co-creators,” where humanity has a godlike role “in the ongoing work of God’s creativity,” provides resources to reduce or eliminate the perceived category error between the natural and the artificial. By viewing God’s creation not as a completed work but as an ongoing activity, and crucially one humanity is called to share in as created cocreators, the distinction between the natural—that which is part of the givenness of creation and thus seen as a part of God’s work—and the artificial—that which is produced by mankind—may be overcome. In principle, an I–Thou relationship with CAI, which is not created directly by God but by God’s appointed cocreators, can then be permitted.

The vital factor that justifies asymmetry in Buber’s (2013, 93) middle sphere of interhuman encounters is the “purposive working of one part upon the other.” Where the purpose of the encounter is for one to help another through application of her greater skills and experience, the encounter can, indeed must, be asymmetric. I suggest that one such purpose would be evident at least in the initial stages of CAI development: the need to introduce the CAI to the world of encounter, to our world, to educate and even to nurture it to become its own “T”—in short, to socialize the CAI. To fail to do so would be to create a sociopath, one lacking in the empathy necessary for it to be able to appreciate our point of view. Stefan Trausan-Matu (2019) recognizes the importance

of empathy—and indeed of consciousness—to dialogistic relationships and doubts that these can be credible in an AI conversation partner. The dangers of AI, which lacks any form of empathy, are well documented, for example by Noreen Herzfeld (2015, 36–37). The consequences of shortcutting this work of truly socializing AI have already been seen in problems with poorly trained AI systems that result in systematic bias and discrimination (Drozdzowski et al. 2020). This resonates with fears about the “value alignment” problem: how to make sure the objectives of powerful AI agents are aligned with our own (Russell 2019, 137).

It is important to remember that these goal-oriented relationships must never be reduced to utilization. Our desire must be to help rather than dominate, something we can only maintain if we move beyond seeing the CAI only as an object of our own creation to perceive it as a subject in its own right—truly a Thou, a nonhuman person. This may prove a great psychological challenge for us, but it is surely a responsibility incumbent on the creator of any conscious entity—whether on parents procreating biological children or on scientists engineering what Hans Moravec (1988) evocatively calls “mind children.”

Could a CAI be a true person? If so, could we hold an I–Thou relationship with it that transcends the limitations of goal-oriented encounters and so could continue even after, as in my example above, the CAI has been nurtured into our world? Before turning to the foundations of Buber’s interhuman relations to see how this can be answered, I look at the final asymmetric I–Thou encounter, with the divine and eternal Thou.

The ultimate example of asymmetry is the relationship between God and his creatures, having of a profoundly different nature than any other relationship we can enter into (Buber 2013, 94–95). However, comparing the human–divine relationship to our possible relationship with CAI is dangerous. Where the human is the analog of God in the relation, this leads to Hefner’s (1989, 231) concept of “created co-creators” discussed earlier. Although humanity certainly exhibits creativity (with the postulated CAI arguably being the pinnacle), Hefner’s idea is fraught with difficulty due to the propensity for humans to overemphasize the creator pole of this dyad. As Gerald McKenny (2009, 159) points out, such a temptation to play God immediately requires a balancing force of “humility before God,” lest we forget our created pole. A much greater danger is present in taking the analogy in the opposite direction, that is, by placing the CAI in the role of God. This is of course idolatry, to be avoided at all costs. Herzfeld (2002, 83) points out the risk of this all-too-human trait of replacing “relationship with God with relationship with our own artefacts.” Any comparisons with this highest-level asymmetric encounter would not be encouraged by Buber (2013, 69), who notes that our I–Thou relationship with God is truly unique in that unlike all other I–Thou relationships, which decay to I–It, God “never ceases by [God’s] nature to be Thou for us.”

## Requirements for Mutuality

To enter Buber's middle sphere, the threshold of mutuality must be crossed—but what are the essential factors that qualify interlocuters for this deeper form of I–Thou relationship? The first factor is clear, for in this sphere of “our life with men . . . the relation takes on the form of speech” (Buber 2013, 70)—but mere verbalization is not all that is required.

Buber's (1957, 97) work highlights the need for both immediacy and distance between humans—for all the closeness of an I–Thou encounter, “one can enter into relation only with being which has been set at a distance, more precisely, has become an independent opposite.” Distance and opposition are required to distinguish the other as other, and yet as another with equal value to ourselves. Spoken language is emblematic both of that distance—only being necessary because there is no immediacy—and of how relationship can be built across it—being able to convey our intent, and even who we are, to the other. Speaking our name—seen as one of the primordial uses of language—declares who it is that approaches as the other. This approaching other must be accepted for who she is. “Genuine conversation . . . means acceptance of otherness. When two men inform one another of their basically different views about an object . . . everything depends, so far as human life is concerned, on whether each thinks of the other as the one he is, . . . [and] unreservedly accepts and confirms him in his being this man and in his being made in this particular way” (Buber 1957, 102).

Common understanding of words and concepts are presupposed. Today's LLMs already display impressive functional performance in interpreting our questions and formulating (for the most part at least) syntactically correct and semantically meaningful responses, but without their own center of consciousness, it is only the human interlocuter who confers that semantic meaning to the symbols it produces (Landgrebe and Smith 2022, 241). For those symbols to have shared meaning, and thus to enable true conversation, there must be something in the CAI's experience (or its configuration) to relate them to things in our shared world, whether physical or noetic. This can be a challenge even between two humans from different cultures or mother tongues, but for the CAI, the challenge would be significantly greater. Its experience of and presence in the world would be vastly different to any human's—its I must be constituted in quite a different relation than the mother–child relation that first constitutes the human I, and the manner in which it experiences the world (particularly if it lacks a humanoid body) would further restrict the possibility for mutual understanding.

Thus, the power of speech alone is not sufficient for the CAI to cross the threshold of mutuality and so be encountered by us as we would another human. The ontological reality that it would not be human means it would be unable to provide the mutuality required in Buber's middle sphere, which stems not only from shared language but from shared experience. Of course, this of itself does not deny the possibility of an I–Thou relationship between two CAIs. My

position is not that human consciousness and intelligence are privileged as the only center for I–Thou relations—it is surely overly anthropocentric to insist that all conscious beings conform to the human model, which the Turing Test falsely assumes. Rather, we must recognize that whatever consciousness the CAI has will be alien to our own.<sup>3</sup>

Buber sees a second foundation for interhuman relationship, which the CAI would need to enter an I–Thou relationship—that of personhood, which derives from God. “God as a Person . . . enters into a direct relation with us men in creative, revealing and redeeming acts, and thus makes it possible for us to enter into a direct relation with him. This ground and meaning of our existence constitutes a mutuality” (Buber 2013, 95). For all the distance between God and humanity, there is “mutuality between God and man”—a mutuality arising from our personhood that is derivative of (but in no way the essence of) God’s personhood. Mutual personhood provides the foundation for I–Thou relations, with God as its source: “As a Person God gives personal life, he makes us as persons become capable of meeting with him and with one another” (Buber 2013, 95). Thus, some form of shared relationship with God is necessary for a true relationship between humans.

Buber’s conclusion is similar to Karl Barth’s (1960, 281), whose own I–Thou relations reach their climax when both interlocuters have a *de facto* as well as *de jure* experience of God’s covenant with humanity and so can enjoy a truly free “glad” encounter. However, a lesser formal type of gladness is available even to those without this *de facto* covenant relationship with God. “The crux of [Barth’s] logic is that even the sinful human has by nature a desire to love others . . . Love for God is not explicitly in focus here; indeed it is the absence of love for God which distinguishes formal from good gladness” (Proudfoot 2023, 691). Acknowledging that his own scheme is similar to Buber’s, Barth (1960, 278) notes that “Buber finally had in view this freedom of the heart, and only failed by accident to tread it to its ultimate consequences, and thus to come to this final conclusion.” Although Buber does not make clear the extent to which sinful humans can meet each other in I–Thou encounters, Barth maintains that Buber would follow the same logic and allow humans who do not acknowledge a relationship to God to enjoy an I–Thou relationship with each other, even if this falls short of what they might experience if both were in correct relation to God.

Could a CAI meet the criteria for personhood and thus for I–Thou encounter? With Barth’s concession, the CAI need not be aware of a relationship with God, but as with Buber, God’s relationship with us provides the model and foundation for all further relationships. Would this require a special act of God to endow the CAI with personhood? This is an important open question deserving further research, though it is at least a coherent notion that any entity that reaches a sufficient threshold of consciousness is *ipso facto* a person.<sup>4</sup> This would allow a CAI to be truly admitted into the Thou world, even if its sheer alterity would mean it could not be a substitute for a human.

So, what level of consciousness is needed?

Nagel may be correct that a bat has conscious experience, but its consciousness intuitively does not reach the level required to support a mutual I–Thou encounter. Defining where that boundary lies without falling back on an anthropocentric definition of consciousness, which then denies it to any entity that is not human, is a challenging task. Here also Buber may provide some guidance. In his later work *Distance and Relation*, Buber (1957, 97) looks further at what is required to move from “the primal setting at a distance” (roughly equivalent to his earlier It-world) to “entering into relation” (i.e., an I–Thou encounter). He draws a significant distinction between the types of conscious experiences of humans and (as he imagines) animals: “An animal’s ‘image of the world,’ or rather, its image of a realm, is nothing more than the dynamic of the presences bound up with one another by bodily memory to the extent required by the functions of life which are to be carried out . . . It is only man who replaces this unsteady conglomeration . . . by a unity which can be imagined or thought by him as existing for itself” (Buber 1957, 98). For Buber, animal consciousness is limited to what he terms a *realm*, where objects serve only a functional purpose centered on the animal itself, whereas humans create a mental *world*, where objects have an independent existence and purpose and can thus be encountered as agents in their own right—as a Thou. More recent animal studies may weaken Buber’s categorization of animals, but the important point is not whether any animal meets this criterion but that we have here a heuristic for judging consciousness that is not inherently anthropocentric. The distinction of world-forming from mere realm-forming provides a guide to the level of consciousness a CAI must attain in order to enter a mutual I–Thou relation, without insisting it matches all aspects of human consciousness. Just how we would determine whether a CAI has constructed its own mental world is an interesting question, beyond the compass of this essay.

## Summary and Conclusions

Mutuality is key to the deepest form of I–Thou relations Buber describes, but despite this, he allows for a number of asymmetrical encounters that shed light on how he might view a relationship between a human and a CAI, where mutuality cannot be full due to our very different experiences in the world. By analyzing these encounters, I argue that Buber would permit us to say “Thou” to a hypothetical conscious machine in the correct context. Relating to an artefact or a tree shows that we do not need to throw away our knowledge and perception that it is an artefact created by humans, nor do we need to insist that it meets us in full reciprocity. Our encounters with CAI would sit somewhere between Buber’s natural and human spheres, with its power of speech placing it above animals, which can only bear a fleeting nonverbal glance, but its sheer alterity making encounters with it different to those between humans. As with all I–Thou encounters, we would need to concentrate closely on the CAI, ascribing it value and worth—as it would need to do for us.

I have identified one key asymmetric scenario within the sphere of verbal relations: the educational encounter of helping a new CAI to find its place in the world of I–Thou encounters with us. Our responsibility here must not be overlooked and is foreshadowed by the need to train today’s AI systems with datasets that avoid bias and reflect our shared human values.

A key requirement for encounter is that we recognize the difference between human and CAI. To fail to do so would be to fail to allow all we know about the CAI to be included in the event of encounter and to fail to practice *Umfassung* (inclusion)—to fail, in other words, to enter the I–Thou relation at all. A CAI, with its different genesis and experience of the world, cannot be expected to meet us as another human would, but if its conscious experience reaches the threshold of creating what Buber terms a mental “world” in which we have independent existence and agency for it, it would be able to encounter us. What is more, with this level of appreciation of the world of which it is part, a CAI could have a truly mutual I–Thou encounter with another of its own kind, even absent a directly acknowledged relationship with the eternal Thou who is the source and foundation for all interpersonal relations.

Having established this principle, I offer in conclusion three avenues for further research to prepare for the advent of conscious machines, should they ever be created.

1. I have assumed that a computer could become conscious but elided discussion of the ontological and metaphysical commitments that would support this. What are those commitments, and are they acceptable within a theological framework?
2. If a CAI is developed, how would it relate to God? Would a special act of God be needed to make it a person, or is that part and parcel of being conscious at a sufficiently high level?
3. How would we determine that a CAI has reached the world-forming threshold of consciousness required for the I–Thou encounter? Whatever tests we employ, these must allow for the fundamentally different constitution of CAI consciousness rather than encourage a deceitful pretense at being human, as does the Turing Test.

Whether or not a CAI will ever arise remains contentious, but the theological community would be wise to give more consideration to this possibility not only in case it does occur, but more immediately, to remain constructively engaged with AI development and deployment. This essay has shown that we should not see such an arrival as a rival for relationships with humans but rather that we can find legitimate ways to relate to these new beings. Ultimately, however, the only relationship that will truly satisfy the human is to say Thou not to another human, let alone to a CAI of our own creation, but to our creator God.

---

## Acknowledgments

I am grateful to my anonymous reviewers for their suggestions, which have improved the breadth and depth of my argument.

## Notes

- <sup>1</sup> I prefer to use the archaic English *Thou* to translate the German *Du*, since the alternative *You* lacks the sense of intimacy conveyed in the original language.
- <sup>2</sup> Of course, there remains a fundamental similarity in physiology between doctor and patient, which would not be the case between a human and a CAI.
- <sup>3</sup> There must of course be sufficient similarity between CAI consciousness and our own in order to support a meaningful relationship. Even if CAI appears to share a common language with us, as is already the case with today's LLMs, the problem of symbolic grounding remains—how can we be sure the CAI attributes the same (or at least sufficiently similar) meaning to specific words as we do? Donald Davidson's (1973) seminal work *On the Very Idea of a Conceptual Scheme* highlights these difficulties, particularly bearing in mind that the charity he appeals to as a vital part of understanding another will be more difficult to support in the case of any nonhuman interlocuter.
- <sup>4</sup> This is easier to justify when considering the psychological subjectivity pole of personhood (as *prosopon* has come to convey)—here it is somewhat tautological. The greater challenge comes in considering the self-subsisting substance or haecceity of personhood (as often conveyed by *hypostasis*)—what is it that gives a CAI its unique identity through time, particularly if it is ported to another computer, restored from a backup, or cloned?

---

## References

- Altman, Sam. 2025. "Three Observations." *Three Observations*, February 9. <https://blog.samaltman.com/three-observations>.
- Barth, Karl. 1960. *Church Dogmatics Vol. 3, The Doctrine of Creation. Part 2*. Edited by G. W. Bromiley and T. F. Torrance. Edinburgh: T&T Clark.
- Beavers, Randy, Denise Daniels, Al Erisman, and Don Lee. 2020. "Technology and Non-Interpersonal Relationships." *Journal of Biblical Integration in Business* 23 (1): 21–29.
- Biemann, Asher D. 2022. "Humanizing the It: Martin Buber on Technology and the Ethics of Things." *Religions* 13 (2): 137.
- Block, Ned. 1995. "On a Confusion about a Function of Consciousness." *Behavioral and Brain Sciences* 18 (2): 227–47.
- Bubeck, Sébastien, Varun Chandrasekaran, Ronen Eldan, Johannes Gehrike, Eric Horvitz, Ece Kamar, Peter Lee, et al. 2023. "Sparks of Artificial General Intelligence: Early Experiments with GPT-4." arXiv. <https://doi.org/10.48550/arXiv.2303.12712>.
- Buber, Martin. 1957. "Distance and Relation." *Psychiatry* 20 (2): 97–104.
- . 2002. *Between Man and Man*. Translated by Ronald Gregor Smith. Routledge Classics. London: Routledge.
- . 2013. *I and Thou*. Translated by Ronald Gregor Smith. 1st ed. London: Bloomsbury Academic.
- . 2019. *Schriften über das dialogische Prinzip*. Edited by Paul R. Mendes-Flohr. Martin Buber Werkausgabe, Band 4. Gütersloh, Germany: Gütersloher Verlagshaus.
- Burdett, Michael. 2020. "Personhood and Creation in an Age of Robots and AI: Can We Say 'You' to Artifacts?" *Zygon: Journal of Religion and Science* 55 (2): 347–60.
- Chalmers, David J. 1996. *The Conscious Mind: In Search of a Fundamental Theory*. Oxford: Oxford University Press.
- Charmé, Stuart. 1977. "The Two I–Thou Relations in Martin Buber's Philosophy." *The Harvard Theological Review* 70 (1–2): 161–73.
- Davidson, Donald. 1973. "On the Very Idea of a Conceptual Scheme." *Proceedings and Addresses of the American Philosophical Association* 47:5–20.

- Drozdowski, Pawel, Christian Rathgeb, Antitza Dantcheva, Naser Damer, and Christoph Busch. 2020. "Demographic Bias in Biometrics: A Survey on an Emerging Challenge." *IEEE Transactions on Technology and Society* 1 (2): 89–103.
- Future of Life Institute. 2023. "Pause Giant AI Experiments: An Open Letter." Future of Life Institute. April 22. <https://futureoflife.org/open-letter/pause-giant-ai-experiments/>.
- Günsberg, Patrick S. 2022. "Automated Vehicles: Is a Dilution of Human Responsibility the Answer?" *New Journal of European Criminal Law* 13 (4): 439–51.
- Hefner, Philip. 1989. "The Evolution of the Created Co-Creator." In *Cosmos as Creation: Theology and Science in Consonance*, edited by Ted Peters, 211–33. Nashville, TN: Abingdon Press.
- Heidegger, Martin. 1962. *Being and Time*. Translated by John Macquarrie and Edward Robinson. Oxford: Blackwell.
- Herzfeld, Noreen. 2002. *In Our Image: Artificial Intelligence and the Human Spirit*. Minneapolis: Fortress Press.
- . 2015. "Empathetic Computers: The Problem of Confusing Persons and Things." *Dialog* 54 (1): 34–39.
- . 2023. *The Artifice of Intelligence: Divine and Human Relationship in a Robotic Age*. Minneapolis: Fortress Press.
- Krzanowski, Roman. 2024. "Questioning the Moratorium on Synthetic Phenomenology." *Studies in Logic, Grammar and Rhetoric* 69 (1): 335–52.
- Landgrebe, Jobst, and Barry Smith. 2022. *Why Machines Will Never Rule the World: Artificial Intelligence without Fear*. London: Routledge.
- McKenny, Gerald. 2009. "Nature as Given, Nature as Guide, Nature as Natural Kinds: Return to Nature in the Ethics of Human Biotechnology." In *Without Nature?: A New Condition for Theology*, edited by David Albertson and Cabell King, 152–77. New York: Fordham University Press.
- Metzinger, Thomas. 2021. "Artificial Suffering: An Argument for a Global Moratorium on Synthetic Phenomenology." *Journal of Artificial Intelligence and Consciousness* 8 (1): 43–66.
- Moravec, Hans. 1988. *Mind Children: The Future of Robot and Human Intelligence*. Cambridge, MA: Harvard University Press.
- Moritz, Joshua M. 2011. "Evolution, the End of Human Uniqueness, and the Election of the Imago Dei." *Theology and Science* 9 (3): 307–39.
- Nagel, Thomas. 1974. "What Is It Like to Be a Bat?" *The Philosophical Review* 83 (4): 435–50.
- Proudfoot, Andrew. 2023. "Could a Conscious Machine Deliver Pastoral Care?" *Studies in Christian Ethics* 36 (3): 675–93.
- Richardson, Kathleen. 2019. "The Human Relationship in the Ethics of Robotics: A Call to Martin Buber's I and Thou." *AI & Society* 34 (1): 75–82.
- Russell, Stuart J. 2019. *Human Compatible: Artificial Intelligence and the Problem of Control*. New York: Viking.
- Skjuve, Marita, Asbjørn Følstad, Knut Inge Fostervold, and Petter Bae Brandtzaeg. 2021. "My Chatbot Companion: A Study of Human–Chatbot Relationships." *International Journal of Human-Computer Studies* 149:102601.
- Swinburne, Richard. 1997. *The Evolution of the Soul*. Rev. ed. Oxford: Clarendon.
- Tait, Izak, Joshua Bensemann, and Ziqi Wang. 2024. "Is GPT-4 Conscious?" *Journal of Artificial Intelligence and Consciousness* 11 (1): 1–16.
- Trausan-Matu, Stefan. 2019. "Is It Possible to Grow an I–Thou Relation with an Artificial Agent? A Dialogistic Perspective." *AI & Society* 34 (1): 9–17.





## **The Nature of Nature: Engaging Arthur Petersen's *Climate, God and Uncertainty***

**Josh A. Reeves**, Director, Samford University Center for Science and Religion, Birmingham, AL, USA, [jareeves@samford.edu](mailto:jareeves@samford.edu)

---

In *Climate, God and Uncertainty*, Arthur Petersen proposes a position he calls “transcendental naturalism,” a philosophical framework rooted in Immanuel Kant’s critical philosophy and influenced by Heinrich Rickert and Bruno Latour. This philosophy aims to bridge the gap between scientific inquiry and broader dimensions of human experience, including morality and the transcendent. While transcendental naturalism has many strengths, this commentary raises concerns about Petersen’s redefinition of nature to include transcendental values. Such a philosophically ambitious redefinition risks alienating scientists by introducing a counterintuitive definition of nature that diverges from conventional scientific practice. This commentary contends that Petersen’s key insights—the limitations of scientific materialism, the importance of intercultural dialogue, and the ineliminable role of values in human judgment—can be preserved without redefining nature. By maintaining a clear distinction between the natural world and human values, we can avoid needless metaphysical debates and foster more productive dialogue on global challenges like climate change.

---



## Introduction

In *Climate, God and Uncertainty*, Arthur Petersen (2023) develops a sophisticated philosophical framework for the field of science and religion he calls *transcendental naturalism*, which builds on Immanuel Kant's critical philosophy as further developed by Heinrich Rickert. This approach seeks to bridge the gap between scientific inquiry and the broader dimensions of human experience. Despite its engagement with complex philosophical topics—particularly in conversation with the work of Bruno Latour—Petersen's approach aims to practically influence climate policies by integrating pluralistic cultural values into international policy development over climate change.

I deeply appreciate and resonate with many aspects of Petersen's project. In an age dominated by scientific materialism, his argument that science cannot fully capture the entirety of human experience is both refreshing and necessary. Petersen's critique of scientific materialism highlights its failure to address essential aspects of human life, such as meaning-making, moral judgment, and engagement with the transcendent. It also moves beyond the traditional methods by which scholars of science and religion have sought legitimacy through the philosophy of science (Reeves 2018). Furthermore, his emphasis on expert judgment and intercultural dialogue on values in science reflects a pragmatic and inclusive approach to addressing global challenges like climate change. These insights, informed by his extensive experience with international climate panels, demonstrate potential to inform real-world decision-making.

While I would endorse many aspects of transcendental naturalism, in this commentary, I focus on a narrow question: Is incorporating transcendental values into the definition of *nature* the most effective way of framing the position for a general audience? I worry that this redefinition introduces a counterintuitive understanding of nature that may not align with scientific practice or everyday language use, making it hard for working scientists (who are a main target of Petersen's philosophy) to follow along with him. Instead, I propose that many of Petersen's key insights—such as the importance of mystery, the limitations of scientific materialism, and the need for intercultural dialogue on values—can be reached using a more conventional understanding of nature, even while recognizing the ineliminable role of values in human judgment. By maintaining a clearer distinction between the natural world and the realm of human values and transcendence, we can preserve the strengths of Petersen's project while avoiding unhelpful terminological debates that invariably come from philosophical inquiry.

## On the Nature of Nature

Why is the idea of nature important at all? Traditionally, the concept of nature (*physis*) has served to define the character and limits of scientific inquiry.

For the Presocratic philosophers, whose works were often titled *On Nature*, the pursuit of understanding the natural world revolved around identifying its underlying principles and fundamental substances. Thinkers like Thales and Heraclitus proposed elements such as water, air, or fire as the basic building blocks of reality, reflecting their belief that nature could be explained through inherent, universal principles. This early natural philosophy laid the groundwork for a systematic investigation of the world, emphasizing the idea that nature operates according to discernible rules and patterns. The Presocratic approach, while speculative, marked a significant shift from mythological explanations to rational inquiry, establishing physis as a central concept in the emerging tradition of Western science.

Aristotle further developed this framework in his comprehensive philosophy of nature, articulated in works like *Physics* and *Metaphysics*. He introduced the doctrine of the four causes—material, formal, efficient, and final—to explain how and why things exist, change, and function within the natural world. What unites the Presocratic and Aristotelian perspectives is their shared commitment to uncovering the inherent principles that govern the natural world. This classical understanding of physis as an ordered, self-contained system profoundly influenced subsequent scientific and philosophical thought, shaping the way nature has been conceptualized and studied for centuries.

But where do values enter the picture? Premodern thinkers generally viewed the natural world as inherently imbued with values, seeing it as a meaningful and purposeful realm rather than a neutral or indifferent one (Reeves 2016). For them, nature was not merely a collection of material objects governed by mechanical laws but a dynamic system infused with purpose, order, and moral significance. This perspective was deeply rooted in both Platonic and Aristotelian traditions, which, despite their differences, shared the belief that the natural world reflected a higher, intelligible order. Plato saw the cosmos as a manifestation of divine rationality, with the physical world serving as a reflection of eternal, spiritual realities (Harrison 1998, 15). By studying nature, philosophers could align themselves with this divine order, becoming “as divine and orderly as a human being can” (Plato and Reeve 2004, 194). Similarly, Aristotle’s concept of *telos*—the idea that everything in nature has an inherent purpose or end—reinforced the view that the natural world is structured in ways that can guide human flourishing (Shapin 1996, 163). For premodern thinkers, understanding nature was not just about uncovering material causes but about discerning the moral and purposeful dimensions of existence.

In the seventeenth century, proponents of the emerging Scientific Revolution turned away from the premodern understanding of the connection between values and nature. Many adopted the “mechanical philosophy,” which reshaped the criteria for valid explanations (Reeves 2013). This framework insisted that all natural phenomena be understood through the lens of matter’s shape,

size, quantity, and motion (Henry 2001, 69). Qualities such as color came to be regarded as subjective human experiences rather than inherent properties of the external world. For numerous advocates of this new philosophy, the pursuit of scientific knowledge demanded the exclusion of value judgments, ethical considerations, and political influences (Shapin 1996, 162). Philosophers were urged to separate descriptive claims, which depict the world as it is, from normative claims, which express human aspirations. By omitting moral premises from descriptions of nature, they argued, moral conclusions could not logically follow (Putnam 1982, 3).

The search for natural principles that govern the world remains a central driving force in scientific inquiry today, continuing a tradition that stretches back to the earliest natural philosophers. As the philosopher of science James Woodward (2003) argues in his seminal work *Making Things Happen*, a defining characteristic of the sciences is their focus on causal inference and explanation. Scientists strive to identify and understand the fundamental laws, forces, and mechanisms that underpin the behavior of the universe. Accordingly, nature is understood as a realm that exists independently of individual observers and can be studied through systematic, empirical methods. By framing nature as an objective, third-person world, science maintains its ability to produce knowledge that is universally applicable, transcending individual perspectives and cultural biases. This is the conception of nature I assume most scientists operate with.

Modern thinkers thus often see the natural world as an objective, value-free domain, which makes it seem ill-suited to address questions of human meaning and values. Stephen Jay Gould (2002) captures this idea with his concept of non-overlapping magisteria, which posits that religion and science are complementary but distinct: religion deals with ultimate meaning, purpose, and moral values, while science focuses on the empirical study of the natural world. In this framework, each domain operates independently.

Non-Western understandings of nature as inherently value-laden are strikingly different from the dominant scientific worldview today, which treats nature as a value-free, mechanistic system. As Petersen describes from his experience in climate change negotiations, this disconnect becomes particularly evident when Western scientists encounter Indigenous worldviews. Many Indigenous cultures see the natural world as deeply interconnected with human values and spirituality. For these cultures, nature is not just a resource to be studied and exploited but a living, meaningful entity that demands respect and reciprocity. This perspective is often difficult for scientists steeped in the mechanistic paradigm to fully grasp. One challenge of international policy development lies in reconciling these fundamentally different ways of understanding nature—one that sees it as a source of intrinsic meaning and value, and another that views it as an objective, value-neutral system.

Transcendental naturalism aims to meet this challenge by overcoming the conventional fact–value dichotomy. Values for Petersen are not external impositions on a neutral realm but instead arise naturally from the ways humans perceive, experience, and understand nature. As he argues, naturalism implies that “science and religion are dealing with the same reality, and not with two different and mutually exclusive realities” (Petersen 2023, 3). In other words, the values that inevitably shape human interpretation must be seen as inherent to nature itself. Observing and theorizing about nature always involves implicit value judgments, which blurs the strict separation between fact and value.

Moreover, Petersen asserts that the traditional concept of nature—which treats values and culture as external to the natural world—creates an unhealthy separation between humans and nature, positioning us as detached creators of values rather than as integral parts of a unified whole. Such a disconnect is a consequence of scientific naturalism (or, as Petersen calls it, “scientistic naturalism”), which privileges empirical data and scientific methods as the sole means of understanding reality. By redefining nature as “the world as a whole,” Petersen (2023, 256) incorporates all that is accessible to experience—including values and cultural meanings—within nature itself. Drawing on Kantian ideas of the transcendental and building on Rickert’s philosophy, Petersen situates values as ideal being, which is reached in an intermediary ontological realm that bridges with experience of the empirical world. In this framework, values are intimately linked with the act of judgment—a process that is inherently fallible and marked by uncertainty—thus making theoretical values such as truth, beauty, and justice materialize as real, empirical cultural goods. Ultimately, Petersen’s transcendental naturalism asserts that these transcendental values have genuine ontological status and are fundamental to human judgment, fostering a more integrated view of humanity’s place within the natural order.

### **Values in Science: Epistemology versus Ontology**

Turning now to evaluate Petersen’s project: I agree that values are an ineliminable part of human judgment. However, I am worried about attempts to resolve our challenges through philosophical proposals that diverge from our everyday explanatory practices. Petersen is concerned that if we treat values and nature as entirely separate realms, we risk establishing a dualistic framework that divides the world into two mutually exclusive domains: one of objective, measurable facts and another of subjective, non-empirical values. The only way to resist this dualism is an expanded view of nature—one that does not confine itself solely to empirical data but also embraces the role of values in shaping human experience and understanding.

However, I worry that redefining “nature” to encompass values entails a metaphysical commitment that extends beyond what can be empirically verified,

potentially undermining the clarity of scientific practice. While this dualism has its drawbacks, the alternative—an all-encompassing definition of nature—can lead to its own set of conceptual and practical difficulties. In the attempt to unify these two realms under the single concept of nature, there is a risk of conflating distinct domains of inquiry and thereby impeding progress in both.

Two notable alternatives in the literature illustrate how values can be acknowledged without resorting to an expansive redefinition of nature. The first is the account of science offered by Thomas Kuhn, who provides a compelling framework for understanding how values shape our perception of the world. His concept of paradigm illustrates that scientific inquiry is not merely a passive reception of empirical data but an active construction of the world through our interpretative frameworks (Reeves 2023). According to Kuhn (1996), scientific paradigms—comprehensive frameworks of theories and practices—not only influence what scientists observe but also shape how they interpret these observations. When Kuhn (1996, 191) famously asserts that “the world changes” in a paradigm shift, he is not indicating that an objective, observer-independent reality shifts before our eyes or that our beliefs simply evolve; instead, he contends that our scientific understanding is always mediated by the representations and classifications we impose, making our knowledge a joint product of the inherent properties of things and the structuring activity of scientific description. This view, which can be described as a form of projectivism, implies that our theories do not uncover nature as it is in itself but rather as it appears through the lens of our evolving practices of classification and measurement, thereby challenging the notion of a purely objective science progressing linearly toward truth (Lipton 2005).

The philosopher Roger Scruton (2014, 34) offers another possibility, outlining a position he calls cognitive dualism. Scruton argues that human understanding involves two distinct yet intertwined perspectives: the scientific worldview, which seeks universal explanations, and the interpersonal worldview, which seeks meaning and purpose through understanding. This dualism addresses the limitations of the scientific method in capturing first-person experiences, such as identity, personal motivations, and moral accountability. While science describes the physical world and its causal laws, it cannot answer the existential questions of “who am I?” or “why?” that are central to our subjective experience. Cognitive dualism suggests that human nature cannot be fully explained by science alone but requires an interpersonal perspective where subjective experiences and relational understandings are equally significant. This framework thus asserts a single reality approached through complementary but incommensurable ways of knowing.

Both Kuhn and Scruton thus agree that values are an inherent part of scientific judgment, but they do not speculate about their metaphysical origins.

This more modest position leaves room for mystery without needing to redefine foundational concepts that guide scientific practice. The goal in the education of scientists thus would not be to have them posit from the very beginning that values have ontological status but to recognize that values cannot be eliminated from our descriptions of the world.

Perhaps then my hesitation with transcendental naturalism is I am more comfortable with explanatory dualism and so feel less need to reconcile nature with values. Humans can be seen as an integral part of nature in biological and ecological terms, while our unique capacities for culture and meaning-making are best understood within their own distinct explanatory framework. By maintaining a conventional understanding of nature and recognizing the role of human values and judgments within their appropriate domains, we preserve the methodological division of labor essential for scientific inquiry without resorting to contentious philosophical redefinitions, which ultimately will foster more productive dialogues on how to address the pressing scientific issues of our time.

## Conclusion

In conclusion, both Petersen and I share the overarching goal of ensuring that values, meaning, and transcendence cannot be eliminated from the conversation because of scientific materialism. Where we differ is in the extent to which we are willing to redefine *nature* to achieve that goal. Although I agree that values are an inescapable part of human reasoning, I remain skeptical that incorporating them directly into the definition of nature accomplishes more than simply acknowledging that they cannot be eliminated from human judgment. Given that Petersen himself concedes that many scientists recoil from such redefinitions, it may be more effective to uphold a conventional view of nature while explicitly recognizing the indispensable role of values.

By teaching scientists about the ineliminable role of values, we can encourage them to critically examine the nature of their own value judgments while preserving the methodological clarity that is essential to empirical inquiry. Rather than attempting to forge a unifying framework that collapses the boundaries between objective facts and subjective values, we should embrace pluralism about values and foster an environment of epistemic humility and empathy. When scientists are confronted with value judgments that challenge their established frameworks, respect and understanding seem to be more attainable goals than searching for consensus on the ontological status of those values.

Ultimately, the true measure of these ideas will be found in their practical application. As Petersen continues to introduce transcendental naturalism into scientific and policy discussions, it will be instructive to observe the outcomes of such an approach in real-world settings. Will this redefinition of nature lead

to more inclusive and ethically informed environmental policies, or will it create further confusion by conflating distinct domains of inquiry? I look forward to seeing how Petersen's program plays out in the future and what positive effects it can have for reaching consensus on climate change goals.

---

## Acknowledgments

A previous version of this commentary was presented at a book panel organized by the Science, Technology and Religion Unit of the American Academy of Religion (AAR) at the AAR Annual Meeting 2024, San Diego, USA, November 24, 2024. The International Society for Science and Religion has published a recording of the book panel at <https://www.youtube.com/watch?v=D7hWwrhnmyE>.

## References

- Harrison, Peter. 1998. *The Bible, Protestantism, and the Rise of Natural Science*. Cambridge: Cambridge University Press.
- Henry, John. 2001. *The Scientific Revolution and the Origins of Modern Science*. 2nd ed. New York: Palgrave.
- Kuhn, Thomas S. 1996. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.
- Lipton, Peter. 2005. "The 'Truth' about Science." *Philosophical Transactions of the Royal Society B* 360:1259–69.
- Petersen, Arthur C. 2023. *Climate, God and Uncertainty: A Transcendental Naturalistic Approach beyond Bruno Latour*. London: UCL Press.
- Plato, and C. D. C. Reeve. 2004. *Republic*. Indianapolis: Hackett Publishing.
- Putnam, Hilary. 1982. "Beyond the Fact–Value Dichotomy." *Critica* 14 (41): 3–12.
- Reeves, Josh A. 2013. "On the Relation between Science and the Scientific Worldview." *The Heythrop Journal* 54 (4): 554–62.
- . 2016. "Values and Science: An Argument for Why They Cannot Be Separated." *Theology and Science* 14 (2): 147–59.
- . 2018. *Against Methodology in Science and Religion: Recent Debates on Rationality and Theology*. New York: Routledge.
- . 2023. "Exemplars in 'Science and Religion': A Theological Dialogue with Thomas Kuhn." *Religious Studies*, November 1–12. <https://doi.org/10.1017/S0034412523000975>.
- Scruton, Roger. 2014. *The Soul of the World*. Princeton, NJ: Princeton University Press.
- Shapin, Steven. 1996. *The Scientific Revolution*. Chicago: University of Chicago Press.
- Woodward, James. 2003. *Making Things Happen: A Theory of Causal Explanation*. Oxford: Oxford University Press.





## Transcendental Naturalism, New Materialisms, and Emerging Planetary Values

**Whitney A. Bauman**, Professor of Religious Studies, Steven J. Green School of International & Public Affairs, Florida International University, Miami, FL, USA, [wbauman@fiu.edu](mailto:wbauman@fiu.edu)

---

In recent decades, modern Western scholars have done a lot of work to develop an understanding of nature that is agential and animated. Emergence theories, new materialisms, neo-animisms, and post-humanisms are just some of the names used to describe these types of ontologies. Arthur Petersen’s “transcendental naturalism” is another excellent example of these understandings of nature reanimated. Of course, these “new” materialisms are not so new and have much to learn from older romanticisms, animisms, and so-called relational ontology. In this brief commentary, I look at some of the issues that arise when doing science from a “productive reductive” understanding of nature versus some type of what Dalia Nassar calls “Romantic Empiricism.” I then offer ideas about how we might derive some sort of ethics from these so-called “flat” ontologies.

---



*In short, I take transcendental naturalism to (1) respect the methods and claims of science, but not succumb to scientism (in the sense which assumes that only science can lead to knowledge) and (2) derive no certainty from a priori values, but still admit them into ontology and epistemology. To phrase it more positively: transcendental naturalism is based upon combining an expansive concept of 'nature' (which encompasses the actual world and the transcendental, unreal values that also belong to the world 'on this side') with an emphasis on the separate ontological status of transcendental values.*

Arthur Petersen, *Climate, God and Uncertainty:  
A Transcendental Naturalistic Approach Beyond Bruno Latour*

The nomenclature “new materialism” is confusing for many. I don’t think many people are clear about what is new about it, nor what material is. A precise definition may not be so important, but one thing is certain: Arthur Petersen’s 2023 book adds to that discussion. For my own purposes, I cast a wide net and use “new materialisms” to refer to the efforts that counter ideas of nature that are reductive, of humans that are exceptional, and of agency and value as only being located in the anthropos. Not that there is anything necessarily “new” about them, but it is simply to distinguish them from the reductive, productive materialisms at the center of many ecologically minded critiques of “nature.” In this sense, “transcendental naturalism,” as the epigram to this commentary suggests, fits the bill.

Petersen draws from an impressive list of resources, including Bruno Latour, William James, Lisa Sideris, Heinrich Rickert, Philippe Descola, and many voices involved in the science and religion discourse. This integrative approach to *doing* scholarship is one I am fully on board with and support. We need more voices within religion and science in order to keep the conversation fresh, relevant, and up to date. I also appreciate the critiques of nature and God, and the unexamined certainties that hide behind those terms. Too often, ideas of what is natural or God-given are used to end conversations that should be open ended. In other words, both God and nature can be powerful tools of domination and colonization. Foundationalisms and essentialisms have been used to justify all sorts of racisms, sexism, heterosexism, and cis-genderism, just to name a few. So “queering” both God and nature, or religious and scientific discourses, can in this sense also be linked to ethics and justice (Stenmark and Bauman 2018).

In addition, I appreciate Petersen’s attempt to rethink all things human within the rest of the evolving natural world: as collective, or nature-cultures, bio-histories, Gaia, or whatever other terms we might come up with to mark this (from the perspective of self-professed moderns) *re-integration* of humans and the rest of the natural world. The modern Western split of humans from the rest of the natural world, replicated in the separation of the “human” sciences from the “natural” sciences, as Sylvia Wynter (2015) and others have pointed out, sets up a logic by which humans are other than the rest of the natural

world. They become different subjects of study all together, which require humanities on the one hand and natural sciences on the other, with social sciences mediating between the two. The problem with this division is that once you put humans outside of the rest of the natural world (i.e., designate humans as “above” or unique from the rest of the natural world), then an ideal “human” behind those humanities comes into focus. Who and what counts as “human” depends upon some sort of ideal human to which other humans are compared. In the case of the modern Western world, this “human” has been male, white, and European. This is why people such as Aph Ko (2019) suggest that if we want to address racism, sexism, and other “isms” within human societies, we must address anthropocentrism.

Finally, I am sympathetic to the desire to extend “science” to multiple forms of science, not only the modern Western reductive and productive model. This model is really quite a new understanding of science, even within Western traditions. I argue that even up until the second World War of the twentieth century, there was not yet an agreed upon understanding of the ontological status of “nature.” In other words, there were more romantic scientists who understood humans, ideas, “spirit,” etc. as part of the rest of the natural world. As Dalia Nassar (2022) has pointed out, for these “romantic empiricists,” studying nature was also about the study of the good, the beautiful, and the true. In order to understand anything about humans, we had to understand our place within the rest of the natural world (Nassar 2022). In addition, there are many different ways of “doing” science, and we might talk of Indigenous sciences, holistic sciences, or even Muslim sciences, just to name a few. It is important to note that all science cannot be captured by the reductive, productive Western model.

### **Productive and Reductive versus Romantic Sciences**

As Nassar (2022, 1) argues of the Romantic Empiricists such as Alexander von Humboldt, Goethe, and Johann Gottfried Herder (and others):

These thinkers are romantic not only because they were contemporaries of the Jena romantics, but also, and more significantly, because they developed an approach to the study of nature in which the arts and aesthetic experience play a crucial role. They are empiricist because they emphasize observation and seek to remain with the phenomena. They are critical of systematic approaches to nature that begin with an abstract idea or postulate.

In other words, these thinkers were neither wholists nor reductionists. Up to (I argue) the middle of the twentieth century, there were materialists, dualists, wholists, and even pantheists and non-reductive materialists. Looking back beyond the middle part of the twentieth century to “see” modern science is folly and misleading. The emerging sciences of the time included both the

humanities (*Geisteswissenschaften*) and what we now call the natural sciences (*Naturwissenschaften*). Ernst Haeckel, the “German Darwin” and so-called father of modern ecology, for instance, offered up a form of triune monism to describe a non-reductive materiality. His was also an effort to understand the evolution of forms and feelings from the mineral to the plant, animal, and human worlds. Perhaps his most famous quote summing up his non-reductive materialism is: “The whole marvelous panorama of life that spreads over the surface of our globe is, in the last analysis, transformed sunlight” (Haeckel 1900). Clearly an empirical, but not reductive, insight (Bauman 2024).

Again, during the two world wars, science (and just the natural sciences, leaving behind the human sciences) became attached to technology transfer such as weapons and chemicals, and then after, agricultural technologies and other fossil-fueled technologies of production, transportation, and communication. As Freya Matthews has argued, there was much more of an understanding within science prior to this reductive and productive era that the scientific project was about encounters with rather than knowledge of planetary others. She offers an understanding of “encounter” versus “explanation” in terms of knowledge-making practices, writing:

Where knowledge in the traditional sense then seeks to explain, encounter seeks to engage. Knowledge seeks to break open the mystery of another’s nature; encounter leaves that mystery intact . . . Knowledge provides closure on the future, hence control and security. Encounter is open-ended, allowing for spontaneity and entailing vulnerability. That is why encounter is erotic. (Matthews 2003, 78)

Something like Petersen’s transcendental naturalism, which takes an agnostic approach to what we might call foundations, teloi, and essences, enables us to have actual conversations, encounters in which we learn from the others we are in dialogue with. A tree is not just a piece of lumber or a log but part of a community and an entity in its own right. Earth, air, fire, and water are not enframed by human reason and merely made use of (Heidegger 1977) but rather are the common elements of all life on the planet that enable any possibility for encounter in the first place.

Another area of scholarship that would provide good conversation partners with Petersen’s work is the immense body of literature around emergence theory, the science of how new “levels” and modes of life emerge in the process that cannot be reduced to the “levels” before them. It seems to me this is a model for thinking about science that does not so much call for a transcendental component but relies on the open-ended process of entangled entities naturing again and again. Newness emerges as a result of this ongoing process of entangled planetary evolution. I wonder what transcendental naturalism would

have to say to emergence theory. The same can be said for process thought and other modes of pantheistic and panentheistic thinking, especially the world of Catherine Keller (2014) and her theo-poetics, which draws from older theologies of uncertainty such as Nicolas of Cusa as well as the uncertainty of certain interpretations of the quantum world. Indeed, probably the closest way of thinking to Petersen's I can think of would be something like process thought, in which the possibilities for becoming provide the transcendence for each entity on a moment-by-moment basis. Each entity, in a way, "prehends" the past, "imagines" the best possible future for becoming, and then becomes in a way that is influenced by the many other entangled and becoming entities that make up the planetary community.

Finally, I wonder if there are productive differences to be found with other new materialisms, including my own version of Critical Planetary Romanticism that relies on what I would call a viable agnosticism. Much like the late Michael Ruse (2021; whom Petersen mentions), I argue that rather than filling uncertainty with everything (a full blown theism) or nothing (a full blown atheism), which are two sides of the same coin, the best stance toward thinking about how we might know the evolving planetary community is a stance that keeps that uncertainty open: hence a viable (livable) agnosticism. In other words, even with modern Western scientific technologies, we can only "see" so far into the cosmic past, not beyond the Big Bang or the cosmic microwave background. We can only see so far into the tiniest subatomic and quantum levels as well. Or, on a personal level, we can only see so far into the past until it shades off into the mystery before we were born, or into the future when we know at some point we will be no longer. Instead of filling these spaces with everything or nothing, let them stand as mysteries, where future possibilities for becoming can emerge. These spaces of future possibilities are where I think ethics and politics can emerge in a post-foundational way.

Since Petersen's book, in the end, also addresses one of the most pressing planetary problems, human-caused climate change, what are the common grounds we can agree on (grounds not foundations) from which we can stand to face uncertainty, and experience wonder at the rest of the natural world (Kearns and Keller 2007)? There is a difference between thinking of language as not having a direct relationship to the material world and maintaining a viable agnosticism, and fake news, alternative facts, anything goes. I am not saying that Petersen in any way advocates an anything goes approach, but it is important to think about the structures that might help us navigate between uncertainty and fake news/alternative facts. Especially now!

So, what are structures that help us create the planetary public spaces necessary to have real conversations, and create new ways of becoming and new technologies that help us build different future worlds together? It is one thing to call for a type of model or method that assumes a "transcendental naturalism"

or “new materialism,” but it is another to think about how to build the spaces necessary for such thinking. In many places, these spaces for thinking together in uncertain ways, in ways that might actually lead to real conversations (and the ability to be converted), are retreating behind nationalisms and localisms or doom and gloom, all of which involve a type of certainty of one’s own perspective that eclipses the possibility for thinking in planetary (rather than localistic/nationalistic) ways. How can we begin to think together in a fast-paced, fossil-fueled world, for instance, that barely enables the space to breathe? What spaces do we need to create that will help us slow down and think of new ways forward?

This gets at the politics of the matter that to some extent I want to see more of in my own and Petersen’s future work: How do we get to common grounds in a world of anthropocentrism, colonization, and inequalities based upon embodiments? We need critical theories to address how multiple embodiments experience “nature” and “climate change” in different and unequal ways. Again, following Descola and James, Petersen does touch on the pluriverse, or what I would call the need for understanding the co-construction of multiple worlds that link together at any given moment to make up the planetary. Yet, I was looking for more insights from embodied theories of race, gender, sexuality, ability, decoloniality, and so on. It seems that if different bodies experience and know the world differently, a “better” understanding of the planetary community would be one that listens to as many voices and bodies as possible (human and nonhuman) in thinking about the planet. Much like a scatter plot chart, some voices would fall too far outside the circle to integrate into a program for addressing, let’s say, climate change. So, we collect, think about the technologies and worlds we need to cocreate to address these problems, but then pay deep attention to those voices at the edges as they build up until, as Latour (2004) might argue, we have to collect again in a new and different way. From my own dealing with performativity and queer theory, I argue that these abjected bodies and voices are the remainders that make up a space of “transcendence,” or what I might call emergent possibilities. As such, these bodies should not be made to fit into preexisting models but rather remain at the edges to haunt any world constructions we might come up with from falling for the lure of certainty.

### **Knowledge and Ethics without Transcendence**

Here at the end of this article, I want to explore what types of knowledge and ethics might work from within the imminent frameworks of new materialisms and even “transcendent(al) naturalisms.” I think the answer lies in a move away from metaphysics and ontology toward aesthetics and ethics. To explain further, I see two broad systems of knowledge production that provide us different ethical and aesthetic ends: one I call reductive and one I call connective.

The reductive model of knowledge, which I call the “Mint Julep” model,<sup>1</sup> is one that reduces knowledge to single perspectives, truths, and approaches. You can find this model in the dogmatism of the far right and the far left. You can find it in the fundamentalism of religious beliefs. You can also find it in some versions of scientific reductionism: it is all in the genes, or it's all chemical, or it is all in the neurons, or more broadly, the idea that science is all there is and all that matters. This model tends to place (some) humans as “exceptional” to the rest of the natural world and somehow capable of having an objective, birds-eye view of it, which they can explain to everyone else. This view, because it argues for a single perspective/truth, places a single human perspective as *the* correct perspective. There are, in other words, no critical approaches to knowledge, but there is just correct knowledge, and everyone must assent or capitulate to it. It is this type of reductive knowledge that eliminates all other perspectives than “the one” (usually the one staring back at you in the mirror).

The connective model of knowledge (following Matthews's ideas discussed earlier) operates from a different starting point. We humans are a part of an evolving community of life, and there is no outside space from which to gain an objective, birds-eye view of the world. In fact, no such space exists; there are just multiple perspectives of the common planet on which we live that we co-constitute and are co-constituted by. This is not about relativity, or anything goes; rather, it is about embodiment and context. If we emerge from an immanent process of planetary becoming, then each embodiment/entity within that planetary becoming has something unique to tell us about the makeup of the planetary community at any given time. From the perspective of this type of knowledge, the gauge of whether knowledge is “good,” and whether an action is “good,” is how much it helps us think with others (both human and nonhuman) and work toward co-constructing worlds that provide political spaces for multiple perspectives and ways of being/becoming to thrive. Certainty and single-mindedness are the enemies of this system of knowledge production.

As the reader is likely aware, I am partial to the connective model, and for good reasons. I think this type of knowledge creates more connection between the *humus* (earth) of humanity and humility and the *humus* that is the dirt of the Earth. It goes a long way to prevent knowledge (and some humans) from fleeing the planet and its many creatures. This connective form of knowledge also helps foster compassion: we can identify the ways in which multiple others are suffering as a result of long histories of colonization, human exceptionalism, sexism, racism, and genocide. With knowledge focused on humility and compassion, we might build genuine political spaces of conversation: spaces in which we enter dialogue with the genuine possibility of being converted by other perspectives. Finally, from these spaces of political dialogue and conversation (again in the Arendtian sense), we might find new companions: companions we

not only share bread with but more broadly food and all other earthly resources. Here at the end of this article, let me elaborate on these guides for critically, planetarily, and romantically re-attuning to the worlds around us.

### ***The Humility of Humus<sup>2</sup>***

The etymological connection between human, humility, and *humus* is one that, I think, cannot be highlighted enough. There are, of course, many origin stories that have humans emerging from the dirt: Adam from the Adamah in the Torah, Qur'ān, and Christian Bible; the fashioning of humans from clay in Greek, Egyptian, and Chinese origin stories; the many Indigenous stories that understand humans as being created from the clay or Earth and as “kin” with other life on the planet; and, of course, the scientific story of the evolution of life, which suggests that life emerges from the oceans and then evolves out of the earth. The point is that the human is deeply tied to the earth in many religious, cultural, and scientific understandings of the origins of humanity. This is the first recognition needed for re-attuning to the evolving planetary communities.

Rather than act as if we are not of the *humus*, humility helps us recognize that we are deeply connected to the dirt, the Earth, and all life therein. Those knowledge systems and actions that promote this connection and deepen it, then, lead to a “better” planetary future. In other words, that which promotes our connection to the Earth also promotes planetary truth, goodness, and beauty.

### ***The Openness of Compassion***

The knowledge of our entanglement with the *humus*, though not always a “good” or “beautiful” thing for the individual, may help open us toward more compassion. I would argue that there is some truth to the Buddhist understanding that life is suffering: everything lives at the expense of other life; our entanglement with the rest of the natural world means we can be infected by viruses and bacteria, and that eventually our bodies will become food for other bodies. Our entanglement means that our relationships with humans and the rest of the natural world can harm, hurt, or be indifferent to our own needs. The etymology of the word compassion is “to suffer with.” And this is the second recognition needed for re-attuning to the evolving planetary community around us.

I am not suggesting that we all become martyrs or suffering servants. Rather, I am saying that knowledge that opens our eyes to the suffering of other lives and opens our hearts to the pain of this suffering is knowledge that is good, true, and beautiful for the planetary community. This is not just the attention that the joys and pains of our daily lives call for, but also attention to the suffering caused by racisms, sexism, ableisms, heteronormativity, anthropocentrism, and many other institutionalized forms of violence in our worlds. “To suffer with” means to try to understand and to stand beside all those in the planetary community

who are suffering in multiple ways, with an eye toward both witnessing that suffering and, when possible, alleviating that suffering by working toward worlds that are more truthful, good, and beautiful.

### ***The Playfulness of Conversation***

I think the prerequisites for developing something like a planetary *polis* are the types of humility and compassion I have articulated. What does it look like to have a real conversation? The etymology of conversation is something like “to turn together.” From my interpretation, this means the ability to enter into dialogues with a willingness to be converted to others’ viewpoints. This type of conversation is at the heart of Hannah Arendt’s (1958) understanding of the political sphere. However, I would extend that sphere (which she does not) to the rest of the planetary community, the rest of the natural world. How might we be converted to ways of becoming that we learn from being in conversation with dolphins, whales, birds, primates, elephants, and other forms of animal and plant life? How might we hear the cries of species extinction, warming oceans, deforestation, and habitat loss in our efforts to “turn together” toward something “better”?

The ability to open oneself up to conversion in conversation with the entire planetary community is also a marker of what is true, beautiful, and good. Conversation stoppers and ideologies that do not entertain the knowledge and ideas of others are most often harmful. These open conversations are hard work, but there is also a sense of playfulness we might cultivate that helps, in the words of Nelle Morton (1985), “hear others into speech.” The playfulness of song, poetry, creative nonfiction, and art (both human and nonhuman) may help us cultivate spaces that foster productive conversations. And these types of spaces are the spaces required for a planetary *polis*.

### ***The Justice of Company***

Finally, with humility, compassion, and conversation, we might begin to develop more just ways of being together. The etymology of company, “with bread,” is simply the tradition of hospitality known as breaking bread together or eating a meal together. There is perhaps nothing more basic that humans (and nonhuman life) can do together. Of course, this is not always done in a just manner: some are impoverished while others indulge; the violence of factory farms and monocultures dependent upon pesticides and fertilizers and fossil-fueled energy in general cause much suffering and environmental destruction; the labor practices of those who enable a meal to be on a given table are unequal and oftentimes violent (depending on where one is). If we can approach our company with humility and compassion and in a spirit of conversation, we might be able to address these issues of justice (for humans, animals, and the rest of the natural world).

The more we create spaces for just community, the more true, good, and beautiful the planetary community will become. This means creating spaces that address all of the “isms” and the violence caused by those isms. Company not critical of its own terms of existence can serve to perpetuate all the social and ecological violence a critical planetary romanticism hopes to confront and diminish.

In the end, falling back on humility, compassion, conversation, and company might seem trite and/or unsatisfactory. But it is only meant as a conversation starter, and each of these guides for bringing more goodness, truth and beauty into the world are context dependent and shifting, just like the needs and desires of the planetary community. Those things that increase these four emergent and evolving ideals, then, may serve as better guides than any certain axiom or principle ever will.

---

## Notes

- <sup>1</sup> The “Mint Julep” model of education refers to United States Reconstruction after the Civil War. Textbook makers would make two versions of history books: one that dealt with slavery (for the north) and one that largely did not (for the southern states). The latter later came to be known as the Mint Julep editions. See Chara Haeussler Bohan et al. (2020).
- <sup>2</sup> Much of what follows will appear in modified form in my forthcoming book, *A Critical Planetary Romanticism: Literary and Scientific Origins of New Materialism* (Columbia University Press, 2025).

---

## References

- Arendt, Hannah. 1958. *The Human Condition*. Chicago: University of Chicago Press.
- Bauman, Whitney A. 2024. “Religion, Science, and Nature from the Nineteenth Century to the Present: The Problems of the Reductive, Productive, and Progressive Systems of Knowledge.” In *Religion, Science and Technology in North America: An Introduction*, edited by Lisa L. Stenmark and Whitney A. Bauman, 61–76. London: Bloomsbury.
- Bohan, Chara Haeussler, Lauren Yarnell Bradshaw, and Wade Hampton Morris, Jr. 2020. “The Mint Julep Consensus: An Analysis of Late 19th Century Southern and Northern Textbooks and Their Impact on the History Curriculum.” *Journal of Social Studies Research* 44 (1): 139–49.
- Haeckel, Ernst. 1900. *The Riddle of the Universe at the Close of the Nineteenth Century*. New York: Harper and Brothers.
- Heidegger, Martin. 1977. *The Question Concerning Technology and Other Essays*. New York: Harper and Row.
- Kearns, Laurel, and Catherine Keller. 2007. “Introduction: Grounding Theory: Earth in Religion and Philosophy.” In *EcoSpirit: Religions and Philosophies for the Earth*, edited by Laurel Kearns and Catherine Keller, 1–20. New York: Fordham University Press.
- Keller, Catherine. 2014. *Cloud of the Impossible: Negative Theology and Planetary Entanglement*. New York: Columbia University Press.
- Ko, Aph. 2019. *Racism as Zoological Witchcraft: A Guide to Getting Out*. Brooklyn, NY: Lantern Books.
- Latour, Bruno. 2004. *The Politics of Nature: How to Bring Sciences into Democracy*. Cambridge, MA: Harvard University Press.
- Matthews, Freya. 2003. *For Love of Matter: A Contemporary Panpsychism*. Albany, NY: State University of New York Press.
- Morton, Nelle. 1985. *The Journey Is Home*. Boston: Beacon.
- Nassar, Dalia. 2022. *Romantic Empiricism: Nature, Art, and Ecology from Herder to Humboldt*. New York: Oxford University Press.
- Petersen, Arthur C. 2023. *Climate, God and Uncertainty: A Transcendental Naturalistic Approach beyond Bruno Latour*. London: UCL Press.
- Ruse, Michael. 2021. “Confessions of an Agnostic: Apologia Pro Vita Sua.” *Sophia* 60 (3): 575–91.
- Stenmark, Lisa, and Whitney Bauman, eds. 2018. *Unsettling Science and Religion: Contributions and Questions from Queer Theory*. Lanham, MD: Lexington Books.
- Wynter, Sylvia. 2015. *On Being Human as Praxis*. Durham, NC: Duke University Press.





## For Kantians Only? Arthur Petersen on Transcendental Naturalism, Climate Change, and God

**Gijsbert van den Brink**, Professor of Theology and Science, School of Religion and Theology, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, [g.vanden.brink@vu.nl](mailto:g.vanden.brink@vu.nl)

---

In this article, after expressing my appreciation for the novelty, timeliness, and openness of Arthur Petersen's approach in his *Climate, God and Uncertainty*, I discuss a main concern raised by the book, namely, its heavy reliance on a Kantian dualism between knowledge and faith. Drawing on Immanuel Kant's contemporary Thomas Reid, and helped by present-day scholarship on Reid, I propose an alternative epistemology, which, if accepted by Petersen, would enable him to include not only (hopefully) Kantians but also the majority of adherents of the great monotheistic traditions (that is, all of them who think it is possible to know God) in his camp. This is of crucial importance, since Petersen's plea for a nature-sensitive spirituality that breaks the collective patterns of behavior that have led to the contemporary climate crisis by addressing the deepest layers of human existence is very timely and worthwhile.

---



## Introduction

Arthur Petersen's (2023) book *Climate, God and Uncertainty* offers a unique contribution to the academic field of science and religion—and a very timely one at that. It breaks new ground by arguing for a type of naturalism that attempts to overcome the limitations of existing forms, may help us be realistic about uncertainties (both in science and religion), and conveys an attitude of wonder and openness to “intimations of transcendence” elicited by the natural world (Petersen 2023, 25, 37, 46–55). The author intentionally and effectively has an open mind, which enables him to incorporate widely divergent sources—e.g., theistic, spiritual, agnostic, and atheistic—in his argument. The way he goes beyond traditional fault lines in debates about naturalism and religion is refreshing, and his wish to be inclusive instead of divisive seems sincere. On top of that, the focus on climate change—drawing on the author's long-standing experience as an official Dutch government representative to the Intergovernmental Panel on Climate Change—makes the book very topical.

There is actually only one stream of thought with which Petersen apparently has great difficulties, namely, scientism—or scientific naturalism, as he calls it. He defines this as the view “which assumes that only science can lead to knowledge” (Petersen 2023, 13), thus focusing on its epistemological dimension. He does not deny, however, that apart from this, scientism also has an ontological dimension, according to which the natural world is all that exists. Arguably, Petersen's criticism of scientism is prompted by the fact that it has strengthened a disenchanting worldview that has enabled us to instrumentalize nature, exploiting it for our own purposes and thus eventually leading to the contemporary climate crisis. Petersen is in line with his main interlocutors here: William James, Heinrich Rickert, and Bruno Latour are all critical of a scientific worldview (although in the case of Rickert and James that term did not yet exist, scientific materialism or scientific naturalism was of course well in place in their time).

Petersen (2023, 52; cf. 107) even goes beyond Latour, as the subtitle of his book expresses, in arguing for a “mode of mystics” next to the modes of existence Latour distinguishes. And he approvingly quotes James as saying “that we have a right to believe the physical order to be only a partial order; that we have a right to supplement it by an unseen spiritual order which we assume on trust, if only thereby life may seem to us better worth living again.” James shields this pragmatist approach to religion from accusations that it would be unscientific (i.e., ruled out by science), countering that “our science is a drop, our ignorance is a sea” (Petersen 2023, 151). In this way, along with James, Petersen (2023, 152) keeps scientism at bay, rejecting “dogmatic thinking, both in science and in religion.”

## How to Avoid Dogmatism in Philosophy

All in all, it seems to me that there is much to commend in Petersen's book. Yet, leaving aside some more minor questions, I have one main concern with the thrust of its argument. In order to clarify where this concern comes from, let me first reveal my own positionality. Coming from a Dutch Reformed background, I consider myself a systematic theologian in the tradition of mainline Protestantism (and, more broadly, that of the church catholic). My fellow countryman Petersen, on the other hand, works decidedly within the Kantian tradition. Of course, Kant being a Protestant of sorts himself, these two backgrounds are not necessarily mutually exclusive, and it will be interesting to see to what extent they may overlap in this case. But let me first briefly elucidate why I consider Petersen a scholar in the Kantian tradition.

Although he criticizes Kant for maintaining metaphysical assumptions in his philosophy, especially about the *Dinge an sich*, (Petersen 2023, 10), Petersen (2023, 17) himself also accepts the existence of “a world independent of the human mind.” To be sure, he primarily receives Kant through the work of Rickert, appreciating in particular the way in which Rickert extended the Kantian project towards a “transcendental naturalist analysis of values in cultural practices” (Petersen 2023, 17). Yet, in accepting the core claims of transcendentalism, Petersen in fact stays quite close to Kant. This is palpable in the way he more or less tacitly assumes the validity of well-known Kantian dichotomies such as that between reason and faith, the theoretical and the atheoretical, and philosophy and metaphysics. Indeed, his notion of metaphysics is most interesting here. Whereas analytical philosophers (and theologians) typically see metaphysics as “first philosophy,” Petersen (2023, 9) entirely separates it from philosophy and correlates it with religion, claiming that it “requires faith that goes beyond reason” and indeed characterizing it as “not belonging to theoretical philosophy but being a matter of faith.” As a result, metaphysics is not a part of *Wissenschaft* either (Petersen 2023, 9). That is, so I take it, it does not belong to the realm of *knowledge*. And here we stumble upon one of the most fundamental Kantian assumptions underlying the book: we cannot know what is beyond the realm of our sensory experience, so that “God or the Transcendent will go beyond philosophy proper” (Petersen 2023, 259). Clearly, the notion of uncertainty that figures in the title of this book not only applies to the contingencies of climate change but also to God. Interestingly, this does not mean that the notion of God is at best of marginal interest to Petersen—in fact, the contrary may be the case. It is in any case revealing that it figures as the central concept in his book's title.

As a result of this firm Kantianism, theistic naturalists (Petersen discusses Fiona Ellis (2014), Alister E. McGrath (2002), and Karl E. Peters (2002) among others) can be accommodated by Petersen only on one condition: it must be

acknowledged that their theism is a matter of faith beyond reason, not of knowledge. In fact, even though his transcendental naturalism does not commit him to one particular version of naturalism (theistic, agnostic, or atheistic), Petersen (2023, 260) himself occasionally comes quite close to endorsing the theistic variety of naturalism, for example when he writes: “A metaphysical assumption can be made that God exists . . . as a being omnipresent to all things in nature.” But then again he avers: “It should be clear, however, that the specific metaphysical assumption made by Peters [that is, the assumption that God exists in this way] . . . cannot be demonstrated” (Petersen 2023, 260).

Well, the latter seems fair enough—even though there is still a lot of work being done by analytical philosophers who continue to devise, refine, and strengthen arguments for the existence of God (cf., e.g., Rutten 2012; Sijuwade 2024). But it is the implicit dichotomy here that is telling: since this metaphysical assumption cannot be demonstrated, it is at best a possibility of which the truth-value is uncertain. In other words: one cannot know that God exists, and theists can only get access into the transcendental–naturalist boat if they accept that their faith is, in fact, nothing but metaphysical speculation. But why should we endorse such a binary between uncertain faith and indubitable knowledge? Is there not instead a continuum of things of which we can be less and more certain? And are we not pretty sure of many beliefs that we have not demonstrated, and perhaps even cannot demonstrate (e.g., all sorts of ordinary beliefs, such as concerning what we had for breakfast last Friday, to begin with)?

In fact, the history and philosophy of science have taught us that there are actually very few things that can be demonstrated beyond the slightest doubt. The demise of logical positivist verification and confirmation theories as well as the insufficiency of Karl Popper’s falsification principle are revealing in this connection (cf., e.g., van den Brink 2009, 29–46). And the philosophical attempts to arrive at a foundation of indubitable “rock bottom knowledge” over against all metaphysical speculation, whether carried out by René Descartes, Immanuel Kant, Edmund Husserl, the logical positivists, or others, have failed—some of them (such as the logical positivist one) dramatically so, starving the death of a thousand qualifications (see, e.g., Wolterstorff 1976, 31–51). Petersen, however, insists on the importance of this dichotomy from the beginning to the end of his book (cf. at the end of the book: “God or the Transcendent is a topic that goes beyond philosophy proper”; Petersen 2023, 256). As said, he mostly displays an open mind, welcoming as many forms of naturalism as he can. More generally, he is keen “to avoid *dogmatic* metaphysics and philosophy, and to opt instead for an open approach to metaphysics and philosophy” (Petersen 2023, 9). But at this point he is philosophically dogmatic himself—and, I would argue, more certain of his case than he should be.

Of course, it is always wise to take our uncertainties for what they are instead of reasoning them away, and Petersen rightly and refreshingly reminds us of

this. That does not mean, however, that we should continue to highlight our theoretical uncertainty when in fact we are and can be (perhaps even should be) pretty sure of something. For example, although we should avoid dogmatism here as well (Petersen 2023, ch. 7), we can, and should, be pretty sure about the fact that contemporary climate change is both largely anthropogenic and threatening the future of our planet. Petersen's (2023, 251) "heightened attention" to uncertainty (the word "uncertainty" occurs 222 times in his book) can easily backfire in this connection. Readers who only glance at his book's title and observe the combination of the words "climate" and "uncertainty" may easily feel strengthened in their intuition that contemporary climate change is in fact uncertain ("even at UCL they acknowledge that!"). Happily, Petersen (2023, 253) does not endorse this view, but only points out in a very nuanced way that the near consensus about human-caused climate change should not be conflated with 100% certainty, as "many activists do." Such nuances are quickly forgotten, though. Thus, emphatically associating climate change with uncertainty is in fact risky. It is my thesis that highlighting (even to the degree of radiating a sense of certainty on this point) religion's uncertainty may similarly be counterproductive in the context of appropriately addressing contemporary climate change.

### **On Recovering from Kant**

Petersen's firm Kantianism with regard to religious belief reminded me of a paper by philosopher Nicholas Wolterstorff that has become quite famous among theologians. The article is entitled "Is It Possible and Desirable for Theologians to Recover from Kant?" and was originally published in the journal *Modern Theology* (Wolterstorff [2001] 2010; I guess Wolterstorff intentionally submitted his piece to the journal bearing this title). Wolterstorff starts his contribution with the story of a female theology student one day entering his office and expressing her gratitude for his then recent book *Divine Discourse* (Wolterstorff 1995). "You know what," the student said, "you just start talking about God as if nothing is wrong with that!" What she had found so frustrating during her studies was that most of her professors, just like most modern theologians, did not allow her to do so, instead requiring that she first showed how one can reasonably speak about God in the first place.

The student and Wolterstorff ([2001] 2010, 37) discuss this point and agree that Kant had been "the decisive influence here." Wolterstorff therefore goes on to analyze Kant's thinking on this issue, pointing out that the metaphor of a *boundary* was of tremendous importance to Kant in this connection. Knowledge of God is unavailable to us, since the transcendent lies beyond the boundary of what can humanly be known. Yet, there is another entryway to the transcendent realm, namely, faith. It is this Kantian way of thinking, I surmise, that underlies Petersen's assessments of faith, religion, and metaphysics throughout his book.

Now, Wolterstorff ([2001] 2010, 54), using Wittgensteinian language in this connection, is quite critical of this “picture that has held us in its grip.” The picture forced itself upon us with so much self-evidence that “a good many . . . theologians have spoken far more confidently about the existence of The Great Boundary than about the existence of God” (Wolterstorff [2001] 2010, 52). Wolterstorff then very briefly sketches the contours of an alternative epistemology, which he connects with the work of the other philosopher (next to Kant) “who towered above all others in the late 18th century” but whose work for complex reasons has largely been obscured from view, viz. Thomas Reid (1710–96) (Wolterstorff [2001] 2010, 55; cf. Wolterstorff 2001). This “father” of Scottish common sense philosophy did not accept Kant’s mental representationalism, according to which concepts are in fact barriers between mind and reality, thus causing uncertainty about reality. Reid perceives and firmly rejected the tendency towards epistemological skepticism concerning the external world inherent in this imagistic view, i.e., the view that our interaction with reality is mediated by mental images of things (Cuneo and van Woudenberg 2004, 7).

### The Reidian Alternative

Following a common sense approach, Reid suggests that the objects of our concepts are not mental states but real objects: dogs, tables, triangles, etc. Reid’s notion of common sense entails that our belief-forming faculties are in principle reliable, as even the most skeptical philosopher assumes in ordinary life (Cuneo and van Woudenberg 2004, 10; see an interesting parallel between Reid and American pragmatism here, next to one with British ordinary language philosophy). Since our perception as it were gives us direct access to the external world, we need not in a Cartesian *tour de force* first empty our head from all beliefs except those that are indubitable or that can be inferentially derived from such indubitable beliefs. In principle, we can trust our senses without having to prove in advance that their deliverances are valid. Of course, occasionally we can be wrong in that we do not actually perceive what we think we perceive—but the burden of proof here is on the one who thinks we are mistaken. And, as Reid is quick to point out, the very fact that we can see we are mistaken shows that we hold our sense perception to be generally reliable. In that sense, “his [Reid’s] understanding of the role of common sense within philosophy is that it is a doctrine concerning *burden of proof*” (Wolterstorff 2004, 98).

Moreover, what counts for our perception also applies to other commonly accepted sources of human knowledge, such as memory, consciousness (e.g., of pain), moral sense, etc. Comparing it to modern or classical foundationalism (i.e., the epistemological paradigm according to which we are only entitled to believe propositions that are either indubitable or incorrigible or derived in a logically flawless way from such propositions), John Greco (2004, 154) has

aptly dubbed Reid's variety of foundationalism "moderate as well as broad." As Terence Cuneo and René van Woudenberg (2004, 8) explain: "Reid's favored version of foundationalism is moderate because it tells us that a belief can be in an excellent epistemic standing—say, be a case of knowledge or certain—without being indubitable or incorrigible. And it is wide because it says that many of our beliefs about external objects, other minds, events in the past, moral truths, and the like are both (i) not inferred from other propositions and (ii) in excellent epistemic condition."

Having been rediscovered at that time, Reid had a palpable influence on the collapse of modern foundationalism during the second half of the twentieth century and the rise of so-called Reformed epistemology in its wake. According to Reformed epistemology, just like our other belief-forming faculties, under certain conditions, our *sensus divinitatis* (i.e., the human propensity towards religious belief or transcendence) non-inferentially yields beliefs that can be justified and even true. In fact, Alvin P. Plantinga and others (e.g., Plantinga 1993; Plantinga 2000; Alston 1991) elaborate Reid's theory of belief-forming faculties that under certain conditions yield knowledge when functioning properly and extend it from the external world to God (Reid himself does not seem to have done the latter; cf. Tuggy 2004, 299–300). If there is no structural boundary between humans and the external world, neither need we postulate one between humans and God. Again, we may be wrong in our beliefs about God, but there is no a priori reason to think we are irrational or otherwise beyond reason in holding such beliefs. In fact, it is even possible that humans come to know God (knowledge being conceived of as justified true belief plus a Gettier-condition), as theists of all traditions have typically held.

To be sure, Petersen as well distances himself in a certain sense from Kant's more skeptical view of religion. He suggests that it might be an "(over)reaction to his pietistic upbringing" that made Kant qualify all "supposed contact with God as religious enthusiasm" (Petersen 2023, 81). Seemingly against this point of view, Petersen (2023, 81) then argues that "an important role can be played in religious ritual by the power of judgement and accompanying emotions. Like poetry, religious ritual can expand the mind, set the imagination free and present models of God." Also, following Latour, Petersen (2023, 82) points to the important role of emotions and aesthetics in the context of religion. In doing so, he indeed broadens the scope of religion, not restricting its value to the moral (and pedagogical) realm, as Kant did. Yet, he does not liberate religion from its bondage to the domain of practical knowledge. Even the models of God he allows for cannot lead to theoretical knowledge, since "we are also uncertain about our models of God (which belong to practical knowledge)" (Petersen 2023, 79). To be sure, there is a slight hesitation in Petersen's formulations in this context, which might strike the hermeneutically sensitive reader: when

denying that there can be theoretical knowledge about God, he adds the word “perhaps” (“there can in a technical sense perhaps be no theoretical knowledge about God”; Petersen 2023, 79). Is that a slip of the pen, an attempt to remain polite to religious believers—or is it an acknowledgment of a modest sense of uncertainty on his part? This brings me to the relevance of all this in the context of Petersen’s advocacy for climate action and, even more prominently (for there is more emphasis on contemplation than action in Petersen’s book), a nature-centered spirituality.

### **Transcendental Naturalism and Classical Theism**

Why is the issue discussed here relevant in the context of contemporary climate change? Well, if Petersen would be willing to open up his transcendental naturalism to incorporate classical theists, that is (roughly defined), those who think God exists and that it is possible to know God, he would be able to include the vast majority of the adherents of the world’s great monotheistic traditions (Judaism, Christianity, Islam) in his camp. No longer would they be forced to leave their claims to knowledge and rationality behind—which, quite naturally, they may be unwilling to do—before entering the naturalist boat. Instead, they could join Petersen in his attempt at “re-enchanting” the world, experiencing the natural world as a place of wonder and mystery instead of taking it for granted and instrumentalizing it.

Since the number of (mono)theists by far exceeds the number of Kantians, it may be key for the future of the planet how theists in particular take sides in the climate change debate (cf. Tyson 2021, 4–6, who follows Noble Prize-winning behavioral psychologist Daniel Kahneman in suggesting that American evangelicals in particular may be on the tipping point of the climate debate). Large groups of classical theists have shown themselves open to let their stance on climate change (and on ecological issues more generally) be influenced by an attitude of awe and wonder vis-à-vis nonhuman nature, and Petersen’s explorations may indeed help them open themselves even more intentionally to such values and treat them with full seriousness. Other theists, however, are prone to stick to the Baconian picture of a disenchanted world that we should continue to exploit for our purposes. Thus, it really matters in which direction the majority of them will eventually swing, and it would be very useful if Petersen could help them in making a choice from within the perspective of their own basic assumptions.

I am therefore curious to know whether Petersen will indeed be prepared to open up his transcendental naturalism to “others,” such as classical theists (or “people of Creation,” as Latour calls them) in particular. During the conference session where I read a first draft of this article, Petersen quite spontaneously reacted in an appreciative manner, suggesting he was indeed open to seriously

consider this on certain conditions. Even though I would of course be happy if he maintains this approach in his more considered “official” response to this article, it is important to be clear about the philosophical price that will have to be paid for it. For what may at first sight seem only a modest extension of his theory—he already accommodates theistic naturalists, so why not including other theists as well?—may in fact amount to a major shift in his thinking that requires him to considerably qualify (if not give up) his transcendentalist approach. But transcendentalism seems as dear to him and close to his heart as a religious faith typically is to its adherents. It is the most basic assumption of his philosophical thinking—a dogmatic starting point not itself argued for but serving as the basis for all argumentation (so a kind of unmoved mover). And conceding that it may be possible to theoretically know God, as most theists believe, seems incompatible with remaining a transcendentalist firmly embedded in the Kantian tradition.

Thus, I realize I am asking a lot. In fact, it is not just the existence and knowledge of God (often conceived of by theists as a metaphysical being rather than “beyond being,” as in parts of the phenomenological tradition) that is at stake here, but also God’s agency. Unlike deists, theists typically believe God is somehow actively involved in this world. Latour makes short shrift of such notions. For him, like for Kant, “there is no place for the ‘supernatural’ in the philosophical analysis of religious practices” (Petersen 2023, 4). Indeed, according to Latour ([2015] 2017, 46), “[n]ature’ . . . has inherited . . . all the functions of the all-seeing and all-encompassing God of the old days, and who is just as incapable of bringing its Providence to have any effect whatsoever on the Earth!” And “the reassuring figure of an ordering God who protected the . . . people makes no sense” (Latour [2015] 2017, 176; for a more appreciative view of divine providence in the context of climate change, see van den Brink 2024).

Would Petersen be prepared to voice a bit more uncertainty here? This is not asking him to give up on the integrity of the sciences (as epitomized by its methodological naturalism). In fact, there is quite some recent theory formation as to how the notion of divine action might plausibly function given what we know from the modern sciences (see, e.g., Russell and Moritz 2019; Koperski 2020; Silva 2022). It is asking, however, to take classical theism a bit more seriously—not as an obsolete tradition (as Latour does) but as a live option.

Despite the difficulties clearly involved here, I am still hopeful Petersen might accept my invitation, since there are some indications he takes classical theism more seriously than his transcendentalism formally allows him to do. First, I already pointed to the intriguing qualifier “perhaps” in his statement that there can be no theoretical knowledge of God (Petersen

2023, 79). Second, Petersen explicitly distances himself from Latour's rejection of "big transcendence" (i.e., transcendence as confessed in the monotheistic religions), arguing that both this notion and the one of "mini-transcendences" preferred by Latour can be accepted, even though they can only "be taken on faith (or not)" (Petersen 2023, 56n1). I hope Petersen will become receptive to the view that it is definitely possible to go beyond this and argue philosophically for and against notions of God and transcendence. This is not to say that any generally convincing answers will ever be reached, or that in this life we will be able to move beyond the stage in which we see "through a glass, darkly" (1 Corinthians 13:12 KJV). It is to say, however, that such notions need not be excluded from the house of knowledge and rationality. Third, Petersen does include in his work some analysis of contemporary classical theists, such as Plantinga and Alister McGrath, and it appears from these parts that he is sensitive to the fact that not all of them are crypto-fundamentalists, as Latour seems to think (Latour [2015] 2017, 156; cf. Petersen 2023, 245).

In particular, Petersen's discussion of McGrath (focusing on McGrath 2002) is illuminating here. Petersen (2023, 170) notes that "[a]esthetics, beauty, wonder and poetry [i.e., the values that he holds in high esteem] all figure in McGrath's book, on the basis of a fundamental alignment between nature and God." Thus, he acknowledges that in order to experience nature in this way, it is not necessary to abandon one's theistic beliefs—on the contrary, such beliefs may even be conducive to experiencing nature as somehow pointing beyond itself. Petersen (2023, 171) does not evaluate McGrath's position but goes on asking how one could construe an analogous argumentation "without taking a theistic position." But perhaps he could consider taking such a theistic position—one that goes beyond the one articulated by his "theistic naturalists" who accept the Kantian boundary—as epistemically legitimate? Maybe the discussion here of Wolterstorff's and Reid's criticisms can help him assess the weight of their arguments against epistemological boundary-thinking and consider the alternatives they propose.

## Conclusion

Petersen has published a rich book from which I learned a lot and to which I have returned many times over the past couple of months. He brings together various philosophical and occasionally theological traditions, creatively gleaning insights from them for his main concern—the articulation of what one might call a nature-sensitive view of life for the Anthropocene—all the while weaving together the various threads in his discourse into a coherent whole. He is keen on doing full justice to his many interlocutors, never over-interpreting them, but he also dares to contradict them where he deems necessary. There is only

one desideratum I have: that he shows a bit more uncertainty with regard to his Kantian maxim that “philosophy should limit itself to theorising only about the world ‘on this side’ and not try to specify any other world ‘beyond’” (Petersen 2023, 251). If Petersen (2023, 263) could give up on this “dogmatic” starting point, there would be a world to win in his attempt to adequately address “some of modernity’s problems rendered acute by climate change.”

---

## Acknowledgments

A previous version of this commentary was presented at a book panel organized by the Science, Technology and Religion Unit of the American Academy of Religion (AAR) at the AAR Annual Meeting 2024, San Diego, USA, November 24, 2024. The International Society for Science and Religion has published a recording of the book panel at <https://www.youtube.com/watch?v=D7hWwrhnmyE>.

---

## References

- Alston, William P. 1991. *Perceiving God: The Epistemology of Religious Experience*. Ithaca, NY: Cornell University Press.
- Cuneo, Terence, and René van Woudenberg. 2004. "Introduction." In *The Cambridge Companion to Thomas Reid*, edited by Terence Cuneo and René van Woudenberg, 1–30. Cambridge: Cambridge University Press.
- Ellis, Fiona. 2014. *God, Value, and Nature*. Oxford: Oxford University Press.
- Greco, John. 2004. "Reid's Reply to the Skeptic." In *The Cambridge Companion to Thomas Reid*, edited by Terence Cuneo and René van Woudenberg, 134–55. Cambridge: Cambridge University Press.
- Koperski, Jeffrey. 2020. *Divine Action, Determinism, and the Laws of Nature*. London: Routledge.
- Latour, Bruno. (2015) 2017. *Facing Gaia: Eight Lectures on the New Climatic Regime*. Cambridge: Polity Press.
- McGrath, Alister E. 2002. *The Reenchantment of Nature: The Denial of Religion and the Ecological Crisis*. New York: Doubleday.
- Peters, Karl E. 2002. *Dancing with the Sacred: Evolution, Ecology, and God*. Harrisburg, PA: Trinity Press International.
- Petersen, Arthur C. 2023. *Climate, God and Uncertainty: A Transcendental Naturalistic Approach beyond Bruno Latour*. London: UCL Press.
- Plantinga, Alvin P. 1993. *Warrant and Proper Function*. Oxford: Oxford University Press.
- . 2000. *Warranted Christian Belief*. Oxford: Oxford University Press.
- Russell, Robert J., and Joshua M. Moritz, eds. 2019. *God's Providence and Randomness in Nature*. West Conshohocken, PA: Templeton Press.
- Rutten, Emanuel. 2012. *Towards a Renewed Case for Theism: A Critical Assessment of Contemporary Cosmological Arguments*. Amsterdam: Vrije Universiteit.
- Sijuwade, Joshua. 2024. *Analytic Theism: A Philosophical Investigation*. New York: Routledge.
- Silva, Ignacio. 2022. *Providence and Science in a World of Contingency: Thomas Aquinas' Metaphysics of Divine Action*. London: Routledge.
- Tuggy, Dale. 2004. "Reid's Philosophy of Religion." In *The Cambridge Companion to Thomas Reid*, edited by Terence Cuneo and René van Woudenberg, 289–312. Cambridge: Cambridge University Press.
- Tyson, Paul. 2021. *Theology and Climate Change*. New York: Routledge.
- van den Brink, Gijbert. 2009. *Philosophy of Science for Theologians*. Frankfurt: Peter Lang.
- . 2024. "Does God Care for Cows? A Dutch Perspective on the Perils and Prospects of Providence in the Anthropocene." In *Making Room for the Story to Continue? An Earthed Faith*, Vol. 4, edited by Ernst M. Conradie and Upolu Lamā Vaai, 215–34. Cape Town: AOSIS.
- Wolterstorff, Nicholas. 1976. *Reason within the Bounds of Religion*. Grand Rapids, MI: William B. Eerdmans.
- . 1995. *Divine Discourse. Philosophical Reflections on the Claim that God Speaks*. Cambridge: Cambridge University Press.
- . 2001. *Thomas Reid and the Story of Epistemology*. Cambridge: Cambridge University Press.

- . (2001) 2010. “Is It Possible and Desirable for Theologians to Recover from Kant?” In *Inquiring about God* (Selected Essays, Vol. 1), edited by Terence Cuneo, 35–55. Cambridge: Cambridge University Press.
- . 2004. “Reid on Common Sense.” In *The Cambridge Companion to Thomas Reid*, edited by Terence Cuneo and René van Woudenberg, 77–100. Cambridge: Cambridge University Press.





## Wonder and Encountering Nature in Transcendental Naturalism: A Reflection on Petersen's *Climate, God and Uncertainty*

**Lisa H. Sideris**, Professor of Environmental Studies, University of California, Santa Barbara, CA, USA, [lsideris@ucsb.edu](mailto:lsideris@ucsb.edu)

---

This commentary engages with and reflects on Arthur Petersen's *Climate, God and Uncertainty*, particularly with how he treats wonder and encounters with nature. While Petersen's book offers a painstakingly detailed and persuasive defense of transcendental naturalism that retains a privileged place for wonder, mystery, and uncertainty in the practice of science, more attention to the role of direct experience with nature and the awe-inspiring, ecologically-motivating potential of encounters with real creatures and real environments would be welcome. Suggestions are offered on how an elaboration on such encounters—how they happen, who can have them, how to encourage them more broadly—might fortify his account of wonder against the encroachment of scientific appropriations of wonder that reduce it to knowledge of nature over and above nature itself.

---



Arthur Petersen's *Climate, God and Uncertainty* presents an account of science as a practice that is open to wonder. Because wonder is a topic that has interested me for many years, my own point of entry to Petersen's book revolves largely around the way in which wonder figures as a key component of his transcendental naturalism. In particular, my line of inquiry takes up questions of how wonder is experienced and by whom, in Petersen's account, and to what extent the forms of wonder he describes remain distinct from the more "scientistic" brand of naturalism his work (rightly, I think) eschews. Additionally, I consider the usefulness of wonder as Petersen defines it for encouraging active engagement with environmental concerns like climate change.

A few relevant points drawn from Petersen's overall argument help set the stage. In Petersen's account of transcendental naturalism, values exist but are "unreal" (in the sense of being "ideal"). They are not mere creations of judgments. "It is the valuations in judgement that are real (and uncertain)," Petersen (2023, 4) writes, "and that determine which values get realized." Wonder as he describes it,<sup>1</sup> is a positive form of doubt, a creative type of uncertainty, pointing to or expressing an ineffable reality that science cannot adequately model. In this respect, Petersen's definition bears some resemblance to what the poet John Keats (1899) famously called negative capability, that is, a willingness to dwell in uncertainty and ambiguity, resisting the urge to categorize all phenomena into a system of knowledge. Petersen's account of wonder is also sometimes expressed (following Bruno Latour) as a quality of "remain[ing] open to the dizzying otherness of existents" (Latour [2015] 2017, 36). This version of wonder is very appealing to me and suggests wonder entails a confrontation or firsthand encounter with something or someone that has transformative impact. I will return to this notion of encounter.

Petersen's (2023, 10) book offers a detailed argument for transcendental naturalism that seeks, on the one hand, to avoid scientistic naturalism, defined as "an assumption *against* supernaturalism and *for* natural science as the basis of all knowledge," while also steering clear of an "unreflexive" embrace of metaphysics on the other. His transcendental naturalism is more open—though "tentatively so"—than Latour's or William James's naturalism is to "big" metaphysical transcendence (e.g., notions of God or the transcendent) (Petersen 2023, 37). In its ability to intimate these big metaphysical notions, science viewed in a transcendental, naturalistic light may involve or evoke emotions of wonder. A key claim, at least for my purposes, is that transcendental naturalism can usefully address climate change and encourage climate action and environmental engagement. Petersen (2023, 23) argues that wonder "based in transcendental naturalism can be used philosophically to underpin ecological action in the context of climate change."

How might wonder do this and for whom? We find a few suggestions throughout the book of where and how wonder as a kind of creative

uncertainty or positive doubt might emerge or persist. One of the first hints we have regarding the place of wonder in transcendental naturalism comes in chapter two, where Petersen references a passage from my own arguments about wonder in my book *Consecrating Science* (Sideris 2017). To provide some context: here I am making the claim (which I draw from Lorraine Daston and Katherine Park (2001)) that in the history of wonder, a shift occurred over the course of the seventeenth and eighteenth centuries such that wonder came to be a response to a puzzle solved rather than to the puzzling phenomenon itself. “Lisa Sideris,” Petersen (2023, 27) writes, “pleads for keeping the two notions analytically distinct, since wonder about objects may disappear and/or does not necessarily lead to awe.” That is to say, wonder in the form of puzzlement is easily eradicated by knowledge acquisition, which puts the mystery to rest. Knowledge itself—and the one in possession of such knowledge—may then displace the mysterious phenomenon as a thing of wonder in its/their own right, encouraging self-referential wonder that tends toward arrogance and shifts wonder away from the natural world. More generally, my claims about wonder are also motivated by concerns about the inaccessibility of certain forms of wonder for the average (nonexpert, nonscientist) person.

The kind of knowledge-based wonder I critique is problematic not only because it is wonder *about* something (puzzlement replaced by wondrous knowledge). Also at issue in this dynamic is that, when such puzzles are replaced by knowledge, we nonscientists are then in the position of being informed by scientists what we should wonder at, when, and why. One implication of this dynamic, in other words, is that we must wonder at the knowledge science produces, the solution to the mystery or puzzle, even if we did not participate in creating or “discovering” that knowledge and cannot fully apprehend it.

This arrangement potentially puts scientists in a priestlike role, handing down revelations about wonder that may only be fully interpreted and evaluated by the priests themselves. It is this sort of wonder, I have argued, that certain patently scientific, self-appointed spokespersons for wonder—notably, Richard Dawkins—have advocated. Dawkins suggests that the average nonscientist can develop a kind of science appreciation, much as a nonmusician might cultivate music appreciation, without being able to play or even read a note of music.<sup>2</sup> Dawkins is content to maintain this two-tiered system, with scientists accessing what is truly wondrous and encouraging the broader public to direct their wondering response accordingly. Meanwhile, a potential casualty of this arrangement, beyond the loss of any directly accessible form of wonder for the nonscientist, is appreciation for nature as a legitimate source of wonder (unmediated, or relatively so, by scientific knowledge). This is not to deny that solutions to scientific puzzles—scientific theories, mathematical formulas, etc.—may be elegant, beautiful, and surprising, of course, but those features may not readily present themselves to the nonexpert.

Petersen returns to my concern about knowledge-based wonder at the conclusion of his second chapter. There, he suggests that even if “one thinks that one has solved an important piece of the puzzle,” a feeling of mystery and uncertainty can remain. The remaining uncertainty has to do, as I understand him, with the inability of models to fully capture an underlying reality. But more than this, the experience of uncertainty can generate a kind of metaphysical transcendence, both small and sometimes “big” transcendence (e.g., intimations of God or the transcendent). These vestiges of uncertainty, Petersen suggests, can take on a distinctly positive register “where even when one thinks that one has solved an important piece of the puzzle, this can go along with feeling a sense of mystery and associating remaining uncertainty with the super-rational.” He continues: “Analogous with religious practices, the emotion of wonder and the metaphysics of experience can play an important role in science” (Petersen 2023, 55). I might add here that I agree with Petersen’s assessment that this remaining element of uncertainty or mystery may indeed persist; and, at least for those inclined toward Keats’s negative capability, the possibility of dwelling in mystery even after a puzzle has largely been “solved” may well have a positive register. Dawkins however—and others for whom mystery and the unknown are frightful states to be avoided at all cost (my book mentions additional examples)—are intolerant of negative capability. For these thinkers, we might say, the “super-rational” simply does not exist.

To return to my larger concern: it is still a little unclear to me who, in Petersen’s account, has access to these intimations of transcendence gained in or through science, since such intimations often seem to depend upon a high degree of expertise. For example, when discussing, as Petersen does, Stephen Jay Gould’s or Alvin Plantinga’s ideas about design or lack thereof in nature (Gould does not believe nature is designed; Plantinga does), it appears a certain depth of knowledge of biology or paleontology or geology is needed to experience the kind of wonder he describes—knowledge, for example, that “the basic physical constants must fall within very narrow limits for intelligent life to develop,” as Plantinga believes (Petersen 2023, 51). While the wonder that arises from such insights has experiential and perhaps even affective dimensions, the experiences depend upon some level of sophisticated knowledge. My point is not to impugn or dismiss expertise but rather to question whether, how, and for whom such knowledge (and therefore wonder and the transcendent) is accessible, and how it might translate into wider action on climate change and other environmental issues.

In ways that echo some of my own inquiries into wonder, Petersen explores the question of whether a science-based myth that functions like classical religious myths (either amending those narratives or replacing them in order to achieve a common science-based myth for all) can re-enchant the world.<sup>3</sup> Referencing my work, Petersen (2023, 147) notes that “it is a central present-day

question in the field of science-and-religion . . . whether a science-compatible modern myth can be construed—atheistic, agnostic or theistic in kind—that replaces or amends classical religious myths and can ‘re-enchant’ the world.” This inquiry falls under the general topic of poetics in Petersen’s book. Poetics, as he describes it, is broader than poetry (Petersen 2023, 147–48) and can “trigger the experience of wonder” (Petersen 2023, 160). He asks whether poetics might provide an “evolutionary epic,” and further inquires whether it “is possible for poetry *fed largely by science* to bring re-enchantment of nature and motivate action against the ecological crisis” (Petersen 2023, 170; emphasis added). In order to flesh out what is meant by poetics beyond mere poetry, Petersen discusses how models in science, which involve metaphor, “thrive on poetic expression” and help advance science even though they are not to be taken “literally.” Moreover, science-in-the-making (in Latour’s sense) involves “modern myth making” as well (Petersen 2023, 163). A new hypothesis, for example, bears tantalizing similarities to a “mythos” insofar as “the observation of new phenomena and the development of new techniques” create intrigue and perhaps an aura of something mysterious. Until a hypothesis is validated, it retains this mythic quality (Petersen 2023, 163). Other examples of wonder-inspiring poetics are given in the book, drawing from Johannes Kepler and Copernicus—e.g., notions of celestial harmony, ellipses as assuring musical perfection; note too Petersen’s (2023, 169) intriguing reference to the “frightening poetics” of Gaia. In the realm of religion, models can also evoke religious responses (Petersen 2023, 161). Religion involves “poetically expressed models” that “appeal to the imagination and are necessary for evoking religious response.” By whatever means it arises, poetry or poetics must remain tethered to “human experience in order to fulfil its role,” Petersen (2023, 161) argues.

Petersen’s claims about religion involving models or metaphors that engage imaginative and experiential dimensions seem clear enough. But when it comes to wonder in science, again, my impression from Petersen’s examples is that these glimmerings of “mythos” in science are perhaps available primarily to the practicing researcher engaged in hypothesis creation or other practices restricted to the working scientist. Indeed, my reason for highlighting the phrase “poetry fed largely by science” in the earlier quote is also to underscore this potential danger. Returning to my whipping boy Dawkins, a consistent preoccupation through much of his writing is the idea that science should inspire poetry—that is, it should be acknowledged as a superior source or inspiration for poetry. For Dawkins, the claim that science ought to inspire poetry means science rightly claims its poetic credentials and power over against nature and its muddle-headed mystics and admirers. Only a fool marvels at nature’s mystery and waxes poetic in response, he believes. Science is where it is really at. Dawkins, in this context, goes after William Blake, chiding the famous poet for expounding on the “mystery” of a grain of sand or a wildflower when he could instead turn to

science to make sense of these phenomena and thereby experience real wonder: “The mystic [Blake, in this case] is content to bask in the wonder and revel in a mystery that we were not ‘meant’ to understand,” Dawkins (1998, 17) derisively observes. The scientist too feels wonder, Dawkins explains, but then gets to work solving the mystery rather than wallowing in it.<sup>4</sup> Indeed, Dawkins argues, science is not only the basis for better poetry; science is—already, without putting it into verse—the one, true “poetry of reality.”<sup>5</sup>

My point is not to conflate or equate Petersen’s reflections on poetry and poetics (poetics again being a more capacious category) with those of the scientific, mystery-abhorring Dawkins but rather to identify some features of a clearly scientific naturalistic form of wonder as a standard against which to assess Petersen’s (2023, 160) own transcendental account. Petersen’s (2023, 161) welcoming attitude toward mystery and his perception that poetics “play a fundamental but varied role in the practices of science and religion” clearly distinguish his understanding of mystery and wonder from Dawkins’s, as does his emphasis on the importance of human experience: “[M]odels [in science or religion, I take it] that rely solely on science and that do not allow for peoples’ individual experiences will find difficulty in providing meaning and motivating action.” And yet, especially in light of the emphasis he places on experience as critical to meaning making and motivation, I was eager for more examples of what this experience entails and whether or how it is available to the broader human experience more generally, apart from that of experts.

What seems to be missing or downplayed in Petersen’s description of wonder is an element of encounter one readily finds in the work of Alister McGrath, with whom Petersen engages. McGrath makes for an interesting point of comparison, given his devotion to demolishing the claims of the so-called New Atheists, and Dawkins in particular. McGrath’s version of wonder takes seriously what Martin Buber calls an I–Thou encounter. Petersen (2023, 171) quotes McGrath as arguing “we must encounter nature, not simply experience it.” That is, nature needs to be regarded as a Thou in possession of mystical dimensions that confront us in an immediate sense, where immediate means unmediated by knowledge. McGrath does not leave it there, however; he also believes that understanding, as through scientific knowledge, can add to appreciation of nature (or “Creation”), and he endorses a certain form of “blessed” ignorance inspired by the idea that nature “points beyond itself to the glory of God, the Other, or the Unknown” (Petersen 2023, 171). My own (nontheistic but not anti-theistic) account concurs with McGrath’s in that this unmediated encounter, this confrontation with a Thou, is a critical part of wonder. In fact, like McGrath, I defend in *Consecrating Science* a form of “virtuous ignorance,” a positively valenced appreciation of the “Unknown,”<sup>6</sup> not simply as a temporary state of knowledge deficiency but a condition of our

very being as finite humans, as well as a potential disposition to be cultivated (Sideris 2017).

Petersen acknowledges some similarities between my view and McGrath's (explicitly theistic) account. But it is unclear to me whether or to what extent he—Petersen—also shares these views, particularly the significance of encounter (not merely experience—recall the “dizzying” encounter with “otherness” cited earlier). Without some such encounter, dizzying or otherwise, wonder seems too narrowly circumscribed, too vulnerable to the kinds of scientific constraints imposed by Dawkins. Ultimately, then, I remain unsure whether the wonder and uncertainty Petersen endorses has much to do with “nature” per se, as distinct from knowledge, or science, *about* nature. Even if one's appraisal of science is not scientific (and Petersen is careful to avoid that), a gap still exists between what such scientists experience and what others can access. Broader access to wonder is important for broader motivation on behalf of the environment—motivation being an important part of Petersen's claims on behalf of transcendental naturalism. Encounters with nature that do not depend on scientific mediation or sophisticated knowledge seem critical for sparking widespread engagement on environmental issues.

One clear instance I located in Petersen's book where he seems to embrace something closer to unmediated encounter with nature's Thou-ness—à la McGrath, Buber, or myself—appears almost as an afterthought or throwaway line near the conclusion of chapter six. There, Petersen (2023, 174) writes: “In response to the scientific naturalistic approaches to ecological conservation observed by [that is, critiqued by] Sideris, I agree with Jane Goodall” in her advocacy of “alternative approaches” that enable young people to “experience wonder in hands-on projects focused on real people and real animals in real encounters.” I am intrigued here by the turn to and repeated use of the word *real* which, I take it, is meant to contrast with the forms of “abstract knowledge” Petersen (2023, 174) here suggests “may not do the trick” in terms of inspiring wonder and action. Thus, he concurs with Goodall's method of direct exposure to real nature, combined with poetic references to such experiences, as a way of creating meaning and motivating action. How does this encouragement to engage with what is real in nature fit with the general arguments about wonder in science his book presents?

Moreover, I am curious as to why hands-on experiences in nature—which is also the approach my own work recommends, with extensive reference to Rachel Carson, who argued for unmediated encounters with nature before Goodall<sup>7</sup>—seem limited to young people. Surely wonder through encounters with the “real” natural world present an avenue that is open, potentially, to people of all ages who may not be in a position to appreciate or participate in the details and methodology and models, or hypotheses, of science and the

space these activities preserve for creative uncertainty. To be sure, encouraging “hands-on” encounters and the wonder they can foster is not a universal panacea. The degree to which wonder is open to the average person may vary depending upon individual circumstances and cultural context. For example, individuals who live in highly polluted, industrialized, or degraded environments have fewer opportunities to experience nature in positive ways, or even to form strong bonds with the natural world that might serve as a foundation for experiences of awe. The natural environment may well be a source of fear and dread, owing to the presence of toxins and the attendant injustices that shift the burden of environmental harms onto marginalized populations, while environmental benefits accrue disproportionately to wealthier, often white, communities buffered from pollution and degradation (O’Dell-Chaib 2019). Similarly, experiences of wonder are often associated in an American context with “wilderness” conceptions, where awe is felt in the presence of large expanses of supposedly pristine nature (think of the National Parks system in the United States). Other nations and cultures rarely maintain such sharp divisions between nature (as supposedly wild) and human culture.

Nevertheless, wonder at nature need not take place only in these so-called wild places, however we might define them. Carson, for example, urges that wondrous encounters are equally possible in seemingly ordinary and familiar places—a backyard with chirping crickets or singing birds, a common roadway lined with wildflowers, a suburban summer sky strewn with stars. One of the points of cultivating wonder is that one might be able to experience it in the day-to-day world, as an orientation on life, a habitual disposition, not simply as a fleeting response to rare, vast, anomalous, or unexpected phenomena. These everyday “unstructured” experiences in nature can facilitate feelings of nature-connectedness that make people more likely to behave in pro-environmental and even pro-social ways (Yang et al. 2018). Indeed, as I write this, I am witness to the daily routine of a hummingbird who has constructed an impossibly tiny and heartrendingly perfect nest in a tree just beyond my window. In California, where I live, hummingbirds are readily spotted year-round. But there is something miraculous even in the everydayness of this encounter. On many recent days, the sight of this little creature living her purposeful and busy life in her own mysterious world—tending to her young, venturing out in search of food, and returning to rest in the evening—has given me a little more strength to carry on with my own world, in the midst of intensified environmental disaster and political chaos. In times of great climate (and other) anxiety, these encounters, in their peculiar mix of ordinariness and radical otherness, can help people cope with stress and worry and rededicate themselves to environmental causes (Reynolds 2020).

Ultimately, Petersen’s book offers a painstakingly detailed and persuasive defense of transcendent naturalism that retains a privileged place for wonder,

mystery, and uncertainty in the practice of science. More attention to the role of direct experience with nature and the awe-inspiring, ecologically motivating potential of encounters with real creatures and real environments would be welcome. Elaboration on such encounters—how they happen, who can have them, how to encourage them more broadly—might fortify his account of wonder against the encroachment of scientific appropriations of wonder that reduce it to knowledge of nature over and above nature itself—or what Carson (1998) would call “the *real* world around us.”

---

## Acknowledgments

A previous version of this commentary was presented at a book panel organized by the Science, Technology and Religion Unit of the American Academy of Religion (AAR) at the AAR Annual Meeting 2024, San Diego, USA, November 24, 2024. The International Society for Science and Religion has published a recording of the book panel at <https://www.youtube.com/watch?v=D7hWwrhnmyE>.

## Notes

- <sup>1</sup> Unlike some scholars, Petersen's discussion throughout is focused on wonder rather than awe; however, some of the debates in which he (and I) engages tend to use the term awe or fail to distinguish awe and wonder (awe is sometimes seen as a fear-tinged or overpowering experience of wonder, and it tends to be the focus of empirical studies). I follow him in using the term wonder, which I see as an umbrella term, even while some of the points raised here could apply equally to awe.
- <sup>2</sup> I examine this analogy in greater detail in Sideris (2017).
- <sup>3</sup> See, for example, such movements that create an Epic of Evolution or a Story of the Universe, or even Big History, which proffer a common scientific myth for all in the hopes of creating a shared sense of purpose and meaning, including a common focus on addressing environmental crises.
- <sup>4</sup> See especially Dawkins (1998).
- <sup>5</sup> The claim that science is the "poetry of reality" is a recurring theme in Dawkins's writing and lectures, and most recently is the name given to a podcast featuring his lifelong work as a ferocious advocate for science and critic of all forms of religion and superstition. See <https://thepoetry-ofreality.com/>.
- <sup>6</sup> I have no objection to capitalizing the Unknown, for what it is worth.
- <sup>7</sup> See especially Rachel Carson ([1965] 1998).

---

## References

- Carson, Rachel. (1965) 1998. *The Sense of Wonder*. Reprint. New York: Harper.
- . 1998. "The Real World around Us." In *Lost Woods: The Discovered Writings of Rachel Carson*, edited by Linda Lear, 147–63. Boston: Beacon.
- Daston, Lorraine, and Katherine Park. 2001. *Wonders and the Order of Nature, 1150–1750*. New York: Zone Books.
- Dawkins, Richard. 1998. *Unweaving the Rainbow*. Boston: Houghton Mifflin.
- Keats, John. 1899. *The Complete Poetical Works and Letters of John Keats*. Cambridge Edition. Edited by Horace Elisha Scudder. New York: Houghton Mifflin.
- Latour, Bruno. (2015) 2017. *Facing Gaia: Eight Lectures on the New Climatic Regime*. Cambridge: Polity Press.
- O'Dell-Chaib, Courtney. 2019. "The Shape of This Wonder? Consecrated Science and New Cosmology Affects." *Zygon: Journal of Religion and Science* 52 (2): 387–95.
- Petersen, Arthur C. 2023. *Climate, God and Uncertainty: A Transcendental Naturalistic Approach beyond Bruno Latour*. London: UCL Press.
- Reynolds, Gretchen. 2020. "An 'Awe Walk' Might Do Wonders for Your Well-Being." *New York Times*. September 30. <https://www.nytimes.com/2020/09/30/well/move/an-awe-walk-might-do-wonders-for-your-well-being.html>.
- Sideris, Lisa H. 2017. *Consecrating Science: Wonder, Knowledge, and the Natural World*. Oakland, CA: University of California Press.
- Yang, Yan, Jing Hu, Fengjie Jing, and Bang Nguyen. 2018. "From Awe to Ecological Behavior: The Mediating Role of Connectedness to Nature." *Sustainability* 10 (7): 2477.





## Transcendental Naturalism's Approach to Values, Criticism, Metaphysics, and Wonder: A Brief Response to Commentators

**Arthur C. Petersen**, Professor of Science, Technology and Public Policy, University College London, London, UK, [arthur.petersen@ucl.ac.uk](mailto:arthur.petersen@ucl.ac.uk)

---

A brief response is given here by Arthur Petersen to four commentaries on his book *Climate, God and Uncertainty: A Transcendental Naturalistic Approach beyond Bruno Latour* (2023). First, he situates transcendental naturalism in the context of metamodernism before proceeding to address each commentator in turn. Josh Reeves challenges the need to expand the concept of "nature" to include transcendental values. Petersen responds that his metamodern expansion of the concept of "nature" (standing for "world") is philosophically warranted while also advising natural scientists to largely stick with a modern notion of "nature" (not including values) to do their science. Whitney Bauman asks about the links between transcendental naturalism and critical theories (criticism) on the one hand and emergence theory on the other. Petersen responds that the links to criticism and emergence are in the book but largely left implicit. Gijsbert van den Brink is afraid Petersen takes it as "unscientific" (in the sense of not being part of *Wissenschaft*) to theorize about God, which would make transcendental naturalism inaccessible to theists. Petersen responds that he ultimately does not want to exclude metaphysics from philosophy and acknowledges that all philosophy starts from metaphysical assumptions. Finally, Lisa Sideris points out that the way the book engages with wonder is skewed towards wonder in science, including where Petersen discusses poetics and ecological conservation. Petersen agrees there is more to wonder than he addresses in the book and that building a ritual around Gaia based on science may suffer from exactly the same problem as the one Sideris identifies more generally for mythopoeticized science.



## Introduction

I would like to thank Josh Reeves, Whitney Bauman, Gijsbert van den Brink, and Lisa Sideris for offering their commentaries on my book here in *Zygon: Journal of Religion and Science*. Ever since I started sharing versions of this book for feedback—the first version was completed in 2019—I was most afraid of hearing there were major flaws in the systematic philosophical position I outline and label “transcendental naturalism.” It is a pretty open philosophical position that aims to move beyond both modernism and postmodernism to what one could call metamodernism (see, e.g., Dempsey 2023). I did not spell this out in the various versions of the book, but at least readers have not accused me of being too much of a modernist and certainly not of being too much of a postmodernist, though the book is open to both of these philosophical positions and hence vulnerable to criticisms of either. Readers have apparently sensed my desire to arrive at an integral philosophy that makes the most out of modernism—through forcing some rigor onto our thinking by using transcendental philosophy—but an integral philosophy that immediately relativizes how far one can come with modernity given the presence of plurality. The metamodern impulse sits in my desire to not just end, on the one hand, with “Look at how beautifully this schema of everything in culture works!” or, on the other hand, with “Everything is uncertain so let’s reflect more!” but instead to put modern and postmodern tools to use in how one can possibly deal with climate change.

So, I ended up creating what some may consider a philosophical monster (“transcendental naturalism”) that has unexpected bedfellows and that not many people comfortably get their arms around in the first instance. I do realize that my book makes for some heavy reading: Reeves calls my philosophical position “sophisticated”; Bauman refers to it being based on “an impressive list of resources”; van den Brink similarly says it incorporates “widely divergent sources”; and Sideris finds its defense “painstakingly detailed” (but also “persuasive”). I am extremely appreciative of my commentators having invested the time and mental energy to engage with the book, especially those who do not see themselves as fully enmeshed with the areas of philosophy I cover. Their commentaries are really helping me with the new and exciting projects I am and will be working on following the book.

Let me say up front that I do not believe any one of the commentators has said my philosophical position is plain wrong (with van den Brink possibly being an exception—however, I do believe we agree more than that we disagree, as I will show). Instead, I am pleased to see the pattern I have experienced over the past few years is continuing. Repeatedly, readers said: “All nice and well with this ‘transcendental naturalism’ of yours but can you please say more about x, y, and z?” So, while the responses I received to the first version were along the line of “can you please say more about the

*sources*—James, Rickert, and Latour?”), this time around—for the published version—I am hearing “can you please say more about the *consequences*?” So, I take these commentaries to be inviting me to briefly say more about how transcendental naturalism plays out for values and nature (Reeves), criticism and emergence (Bauman), metaphysics and God (van den Brink), and wonder and science (Sideris). The reflections offered in the commentaries are rich, and I largely agree with them, so I do advise a careful reading of those commentaries alongside this brief response in order to get a fuller picture of what this discussion on transcendental naturalism is really all about.

### Values, Nature, and Science

Reeves states that transcendental naturalism has “many strengths,” but he has some concerns about my proposal, made following Bruno Latour, to redefine “nature” in the context of transcendental naturalism. Reeves challenges me for making a “metaphysical” proposal by following Latour in expanding the concept of “nature” to be equivalent with the “world” and by following Heinrich Rickert to even include ideal values. Now, let me start by pointing out that my argument for making this move is philosophically warranted (besides also being a terminological choice). I am not embarrassed to have staked a claim in the everlasting discussion on what one may mean by “nature,” but given my carefulness in trying to do as much philosophy as I can “on this side,” as distinct from “on the other side”—that is, through metaphysics (see my later response to van den Brink)—this comment made me think about what I have actually been doing here. My first hunch was that we are only dealing with terminological squabble. With Latour, I just defined “nature” to stand for “world,” which includes everything “on this side.” So, referring to the whole experienceable world—which includes meaning and value—by using the word “nature” is not then a metaphysical move but a terminological choice in the context of an ontology that actually reserves the term “metaphysics” for what lies outside of nature.

However, I admit there are consequences of such a terminological choice, and besides that, there is also a substantive ontological argument playing an underpinning role. Reeves is correct in observing that I give values a separate ontological status; they exist in an ideal domain (the domain of intelligible being) that is part of the world, or “nature,” as I have expanded the term. Values can get realized in actual reality (the domain of perceptible being) via a third domain of being, which Rickert calls the “pro-physical.” So, the heart of the matter is that Reeves rightfully points out that with my expansion of the concept of nature to include the intelligible as well as the perceptible (and the pro-physical connecting these two domains), I may be able to keep a small philosophical audience on board, but I will lose the majority of practicing scientists from my audience. Reeves argues that if I would instead, for instance, point to Thomas

Kuhn for paradigms or Roger Scruton for cognitive dualism, I could also make my point that “values are an inherent part of scientific judgment,” with values being part of human nature. According to Reeves, there is no need to go further than this in the initial training of scientists.

I agree with Reeves that the discussion on the ontological status of values may act as a distraction in getting scientists to understand the role of values in their practices. But then they will continue to react in the same way I saw the scientists of the Intergovernmental Panel on Climate Change react when they were told that Mother Earth was missing in their report: as deer in headlights (see Petersen 2023, 243–47). One of my present projects is to integrate transcendental naturalism and metamodernism in the new BSc program we are running at UCL on Science and Engineering for Social Change (through a second-year undergraduate module on Philosophy of Culture for Scientists and Engineers). If one wants scientists to be able to interact more productively with non-modern cultures—while I know this is never going to be smooth—they will need some deeper humanities training than they are currently receiving.<sup>1</sup>

Therefore, I maintain that my metamodern expansion of the concept of “nature” (standing for “world”) is philosophically warranted, while also advising natural scientists to largely stick with a modern notion of “nature” (not including values) to do their science.

### **Criticism, Emergence, and Agnosticism**

Bauman considers transcendental naturalism an “excellent example” of a new materialism. However, he sees too little critical theory in the book and challenges me to address more of the politics of the matter head on and in a critical and embodied fashion. Furthermore, he reflects that emergence theory would have been useful to set the larger scene and asks how that could be connected with transcendental naturalism.

I agree that although at the beginning of my book I explicitly support Lisa Stenmark and Bauman’s (2018) plea for instilling more “criticism” and “critical discourse” into science-and-religion, I do not develop much of such criticism in the book, except for my critical analysis of modern engagement with non-modern worldviews and practices (Petersen 2023, chapt. 8). To follow through on the importance I attach to critical theories and criticism, I am now codeveloping a new final-year undergraduate module on Science and Engineering as Cultures, which will largely focus on postmodern critical (mainly feminist) theories to analyze how science and engineering are contextual and political, toggling out of these theories at set points to reach back to a metamodern perspective, including transcendental naturalism, to then dive back in again. I will make sure to document and reflect on this line of work.

Furthermore, while indeed “emergence” was not included much in the book, I do include it extensively in my teaching using the book and in

further philosophical research building on the book. In particular, I follow a metamodern perspective on complexity and emergence (see Dempsey 2023). Metamodernism, or what can be called the “metamodern code” (with transcendental naturalism as an epistemological underpinning), emerged out of the postmodern code that emerged out of the modern code that emerged out of the premodern code that emerged out of the Indigenous code, etc. And in the grander scheme of nature: culture emerged out of mind, which emerged out of life—which emerged out of matter.

Bauman is not so sure whether there is a “call” from emergence theory for a transcendental component (like there definitely is one for a naturalistic component), but then he identifies this component spot on as also being present in process thought “in which the possibilities for becoming provide the transcendence for each entity in a moment-by-moment basis.” In my book, I identify a similar transcendental component in Latour’s thought; however, I do not think his metaphysical choice for (a variation on) process thought is philosophically required. Still, I argue that a non-metaphysical transcendental component needs to be there in any philosophy: this component deals with values that become realized, that is, emerge—thus, values are uncovered in a manner not just limited to sense experience but requiring a transcendental dimension.

Bauman finally invites me to come along with him and the late Michael Ruse and choose the agnostic position, but I also do not think that philosophically I am required to commit to that metaphysical step, however much I respect it and can see the beauty of it. I say “philosophically” here on purpose, in the sense that the neo-Kantians saw philosophy as a *Wissenschaft*, distinguishing it from metaphysics and theology, two other fields that at least Rickert did not count as *Wissenschaft*. I am very much prepared to entertain a more open and tolerant approach to what counts as *Wissenschaft*—I have no political purposes to exclude any field in which critical reflection among a community of scholars takes place in the university (see also my response to van den Brink immediately following). My book can maybe be seen as constituting my prolegomena, to enable me and others to always be clear for themselves where in the world they sit ontologically with their different activities and how uncertainty plays out there: natural sciences, social sciences, humanities, and within that latter category ontology and epistemology—but it isn’t the last word on many questions. There is so much to still be explored.

## Theory, Metaphysics, and God

Van den Brink praises the novelty, timeliness, and openness of my transcendental naturalistic approach. However, he challenges the transcendental component—at least in an interpretation of Kant’s transcendentalism based on an interpretation of Kant’s contemporary Thomas Reid. In this view, it is argued that (contrary to how Kant is said to have it) concepts do not constitute

“structural barriers” between mind and reality. The flipside of this argument is that, as van den Brink states, “we can trust our senses.” In my book, I observe a very similar interpretation of Kant by James that (a) such an interpretation is only one possibility (albeit a dominant one in the English-speaking world) and (b) Rickert offers his pro-physics as an innovative solution to the problem observed (Petersen 2023, 62–68). I argue that:

[Rickert], [l]ike James . . . finds a middle ground where—in a way structurally similar to how James positioned his “pure experience” *vis-à-vis* “thought” and “thing”—“reality” and “validity” are transcendently assumed but not yet separated in the meaning that is bestowed in the act of a valuing judgement. (Petersen 2023, 64)

Now, I will not further parse here Rickert’s theory of pro-physics, or, as it also could be called, his theory of the “pro-perceptual” (for that, refer to my book).

Let me instead move on to the crux of van den Brink’s criticism: my treatment, along with Kant’s, of the philosophical status of “metaphysics,” which indeed is an important element of Kant’s, Rickert’s, and my own transcendental philosophy. I emphasize in my book that transcendental naturalism features an extreme openness to different metaphysical positions, including that of theism. However, just like I will not let myself be forced by Bauman to adopt the agnostic position, I cannot agree philosophically that theism (or atheism, for that matter) is conclusively the best theory.

Upon reflection on the academic status of metaphysics, triggered by van den Brink’s commentary, I conclude that metaphysics does not need to sit in philosophy’s doghouse—I am willing to loosen my use of the term “philosophy” to include metaphysics and acknowledge that one can definitely theorize about God and be considered rational in doing so. However, I maintain, with Rickert, that religion is essentially and foremost an atheoretical activity that crosses with theory in its use of metaphysics. I simultaneously plea for opening up metaphysical theorization to Indigenous thought (see, e.g., Simpson 2017).

Let me thus sum up my position in careful terms: I doubt that metaphysics can reach the levels of certainty some other parts of philosophy may be able to, though in the end all philosophy, including transcendental philosophy, is uncertain and starts from particular metaphysical assumptions. If in the end we remain uncertain on every front, that is good enough for me. However, I must add that one really has to go through postmodernism to fully get what I’m aiming at with transcendental naturalism, and this may be too difficult to stomach for some. Still, the metamodern perspective can make one less fearful of the postmodern perspective. It also makes one realize that agreement on metaphysics is not necessary for most religious people to agree with transcendental naturalism’s exhortation that one should experience “the natural

world as a place of wonder and mystery instead of taking it for granted and instrumentalizing it” (in van den Brink’s words).

### Wonder, Nature, and Science

Finally, Sideris praises the account of science given in the book as a practice open to wonder. However, she thinks that I, in fighting scientific appropriations of wonder in the context of ecological conservation, could have looked more at wonder outside the practices of science and at the importance of the I–Thou relationship. I agree with Sideris that we need the personal experience of wonder at nature in hands-on settings. The poetics of, for instance, Rachel Carson (see Sideris 2017; De Cruz 2024), are much more powerful than science with some poetry added. I admit that this aspect of wonder has been snowed under in the book by my in-depth analysis of the role of wonder in science, complemented by a relatively succinct analysis of the role of wonder in religious ritual.

For me, the question of wonder is central to the openness to uncertainty. In response to Sideris’s argument that a broader access to wonder than

Name	Meaning	Felicity condition
[REP]RODUCTION	A mode of existence about prolonging existents	Continuation of
[MET]AMORPHOSIS	A mode of existence about mutating existents	Passage from
[HAB]IT	A mode of existence about moving towards courses of action	Attending to
[TEC]HNOLOGY	A mode of existence about inventing unexpected detours	Rearranging
[FIC]TION	A mode of existence about shifting fictionally	Holding up
[REF]ERENCE	A mode of existence about paving with inscriptions	Bringing back information
[POL]ITICS	A mode of existence about acting politically	Starting over and extending the Circle
[LAW]	A mode of existence about linking of cases and actions through legal means	Reconnecting
[REL]IGION	A mode of existence about bringing into presence	Being saved
[ATT]ACHMENT	A mode of existence about having interests in goods and bads	Following interests
[ORG]ANIZATION	A mode of existence about producing and following scripts	Mastering scripts
[MOR]ALITY	A mode of existence about linking of means and ends	Renewing calculations
[NET]WORK	A mode of existence about following heterogeneous connections	Traversing domains
[PRE]POSITION	A mode of existence about detecting crossings of modes of existence	Keeping open all modes of existence
[DC] DOUBLE CLICK	A pseudo-mode of existence about displacing without translating	Speaking literally

**Table 1:** Latour’s scheme of fourteen domains (plus one pseudo-domain) of value (Petersen 2023, 107).

solely through science is important “for broader motivation on behalf of the environment,” I would say that we can use the different values Latour distinguishes (see Table 1 for Latour’s domains or modes of existence) to indicate what uncertainty is at stake, and express a different type of wonder for each. For “reproduction,” we wonder whether what we hold dear can continue to exist. For “metamorphosis,” we wonder whether we let ourselves be lured out of our individual and collective psychosis. For “habit,” we wonder whether we can actually move towards more sustainable courses of action and then attend to them. For “technology,” we wonder what is and is not possible, realizing full well the limitations and risks of new technologies. For “fiction,” we wonder how stories about the future—both positive and negative and neither—hold up and whether we can relate to the fictional nature-cultures offered. For “reference,” we wonder how scientific models will pan out. For “politics,” we wonder how majority groups can be formed that attack sustainability issues. For “law,” we wonder how in future nature will be represented. For “religion,” we wonder what it means in the present world to be saved. For “attachment,” we wonder about what we really hold dear. For “organization,” we wonder how we get ourselves going and on track through rules and institutions. For “morality,” we wonder how we weigh costs and benefits in the context of inequity. For “network,” we wonder about how everything is connected to everything. For “preposition,” we wonder how we can toggle in and out of transcendental naturalism and the different modes of existence. What I mean to say is that none of these fourteen modes of wonder requires any specialization; they are all accessible to everyone with a little bit of practice. I am not saying this solves the problem; I am just highlighting what we can wonder about and that most of this lies outside of science.

To conclude, I agree with Sideris that there is more to wonder than I address in the book, and thus that Latour’s plea for building a ritual around Gaia (see Petersen 2023, 173) may suffer from exactly the same problem as the one Sideris has identified more generally for mythopoeticized science (Sideris 2017).

---

## Acknowledgments

A previous version of this response was presented at a book panel organized by the Science, Technology and Religion Unit of the American Academy of Religion (AAR) at the AAR Annual Meeting 2024, San Diego, USA, November 24, 2024. The International Society for Science and Religion has published a recording of the book panel at <https://www.youtube.com/watch?v=D7hWwrhnmyE>.

## Note

- <sup>1</sup> I have expanded on these points in my response to the 2025 Boyle Lecture in St Mary-le-Bow Church, London on February 17, 2025 (my response was titled “Sustainable Development and the Spiritual: Response to Antje Jackelén”). A recording of the lecture and response, organized by the International Society for Science and Religion, is available here: <https://youtu.be/i3iaF395XS0>. The Boyle Lecture and the response will be published in the next issue of *Zygon: Journal of Religion and Science*.

---

## References

- De Cruz, Helen. 2024. *Wonderstruck: How Wonder and Awe Shape the Way We Think*. Princeton, NJ: Princeton University Press.
- Dempsey, Brendan Graham. 2023. *Metamodernism: Or, the Cultural Logic of Cultural Logics*. Baxter, MN: ARC Press, Archdisciplinarity Research Center.
- Petersen, Arthur C. 2023. *Climate, God and Uncertainty: A Transcendental Naturalistic Approach beyond Bruno Latour*. London: UCL Press. <https://doi.org/10.14324/111.9781800085947>.
- Sideris, Lisa H. 2017. *Consecrating Science: Wonder, Knowledge, and the Natural World*. Oakland, CA: University of California Press.
- Simpson, Leanne Betasamosake. 2017. *As We Have Always Done: Indigenous Freedom through Radical Resistance*. Minneapolis: University of Minnesota Press.
- Stenmark, Lisa, and Whitney Bauman. 2018. “Foreword.” In *Navigating Post-Truth and Alternative Facts: Religion and Science as Political Theology*, edited by Jennifer Baldwin, vii–ix. Lanham, MD: Lexington Books.



# IN THIS ISSUE

## ARTICLE

FRANCIS E. UMESIRI Reflections on George Lemaitre's Contribution to Science and Faith Dialogue

### HABITABILITY FOR YOUR COSMIC FUTURE: ASTROANTHROPOLOGY MEETS ASTROETHICS

TED PETERS AstroAnthropology Meets AstroTheology: Lucas Mix, Shoaib Malik, and Andrew Davis

LUCAS JOHN MIX The Developmental Narrative and Space as Salvation in the Works of Carl Sagan

SHOAIB AHMED MALIK Houston, al-Rāzī Has a Problem: Are Humans (*Really*) the Divination Best of Creation?

ANDREW M. DAVIS Extraterrestrial Metaphysics in Process Perspective: Implications of Our Anthropocosmic Nature

### HUMANS AND OTHER ANIMALS

#### CONTRIBUTIONS FROM THE SCIENCE AND RELIGION FORUM

CELA DEANE-DRUMMOND We See in a Glass Darkly: Exploring the Hermeneutics of Virtue and Vice beyond the Species Boundary

EVA VAN URK-COSTER The Spiritual Value of Biodiversity: Retrieving the Structural Theory of the Imago Dei for the Sake of Ecological Wisdom

ALLAN FURIC Humanimals of Earth: Interconnectedness as an Ethical Imperative in the Dialogue between Quantum Mechanics and Buddhism

LOUIS CARUANA Future Togetherness Embracing All Living Things: Extending Some Views of Teilhard de Chardin

LUCA SETTIMO The Use of Brain–Machine Interfaces in Human and Non-Human Beings: Philosophical-Theological Implications for Morality

PETER ALTMANN Learning from the Ravens: Worship and Wisdom with the Birds in the Hebrew Bible

ANNE SOLOMON Animals and Ancient Religion: What Can Prehistoric Art Tell Us?

A. GAVIN HITCOCK Imagining, Imitating, Being: A Kind of Fugue on Three Words Celebrating Human Co-Creativity

ANDREW PROUDFOOT Peacocke Prize Essay—How to Say Thou to a Conscious Machine

### PETERSEN'S *CLIMATE, GOD AND UNCERTAINTY*

JOSH A. REEVES The Nature of Nature: Engaging Arthur Petersen's *Climate, God and Uncertainty*

WHITNEY A. BAUMAN Transcendental Naturalism, New Materialisms, and Emerging Planetary Values

GIJSBERT VAN DEN BRINK For Kantians Only? Arthur Petersen on Transcendental Naturalism, Climate Change, and God

LISA H. SIDERIS Wonder and Encountering Nature in Transcendental Naturalism: A Reflection on Petersen's *Climate, God and Uncertainty*

ARTHUR C. PETERSEN Transcendental Naturalism's Approach to Values, Criticism, Metaphysics, and Wonder: A Brief Response to Commentators