Modern Scientific Revolutions and The Science and Religion Field

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Quilliam Foundation

London, 19 January 2013

Modernity has given rise to a sense of disenchantment

The triple humiliation of Man

Copernicus: Man is no longer at the centre of the universe

Darwin: Man is no longer at the centre of nature

Freud: Man is no longer at the centre of himself

Francis Crick says:

"The amazing hypothesis is that 'you', your joys, your moments of sorrow, your memories and your ambitions, your sense of identity and your free will, are nothing more than the behaviour of a large assemblage of nervous system cells and associated molecules. As Lewis Caroll's Alice could have put it "you're nothing more than a package of neurones".

Michel Foucault warned us:

Man has been able to view himself as an object of science only by reference to his own destruction

During the 20th century the spread of this worldview, which came from the progress of sciences, had an profound impact in artistic, intellectual and philosophical circles.

All these areas have experienced the ‘loss of meaning’ which has had a negative influence on ethics and values.

A conceptual revolution is taking place:

Newton: Time and space are absolute

Laplace: Determinism

Hilbert: Completeness of logic

Darwin: Natural Selection

Berthelot: Analysis of equilibrium

Crick: Neuronal Man

Einstein: Space-time relativity

➔ Big Bang

Heisenberg: Uncertainty principle

➔ Non Locality

Godël: Incompleteness Theorem

➔ Transcendence of the Truth

De Duve, Conway Morris: Purpose in evolution

Prigogine: Analysis of disequilibria

Libet: Existence of free will, difference between neuronal time and mental time

Philosophical Implications of Astrophysics

➔ **Big Bang theory**

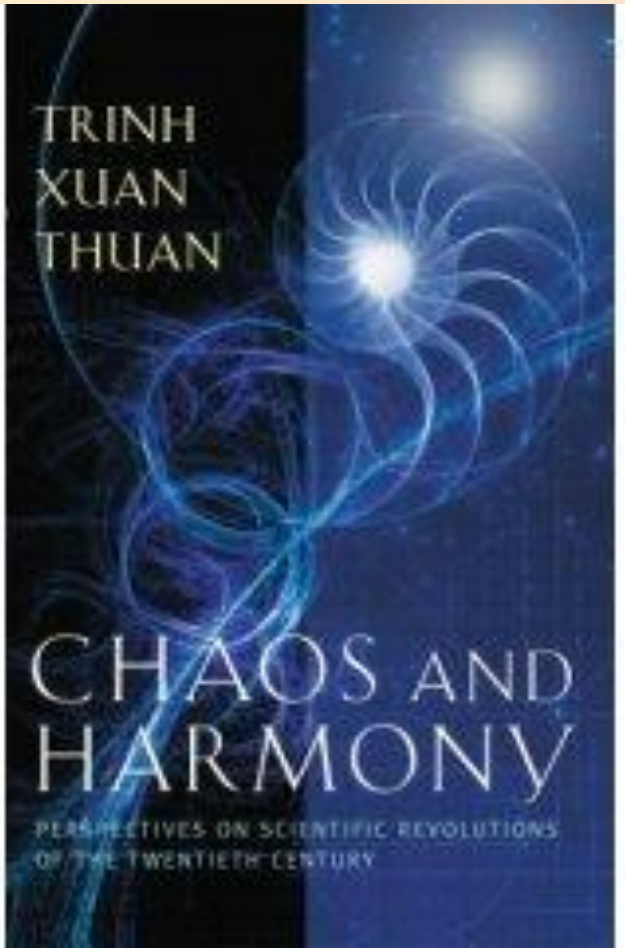
There is something beyond space and time

➔ **Anthropic principle: the "fine tuning" of the Universe**

The question of a Creator has again become a scientific one whereas the answer should be personal.

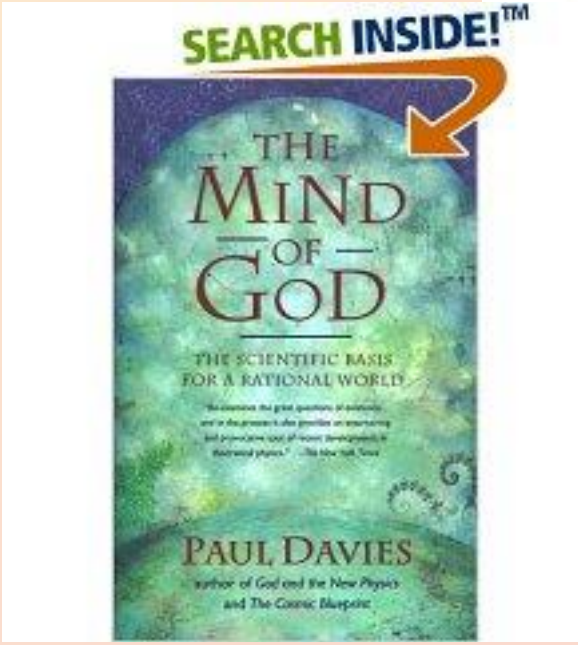
Astronomy

- Chaos and Harmony
- Trinh Xuan Thuan
- Templeton Foundation Pr
  2005 (first published Oxf
  University Press 2001)



- **The View From the Center of the Universe** de Joel Primack and Nancy Abrams Fourth Estate (September 2006)

- **The Mind of God**
- **Paul Davies**
- Simon & Schuster 1992



- The Anthropic Cosmological Principle
- John Barrow et Frank Tipler
- Oxford University Press. 1986
- (expert level)

Philosophical Implications of Mathematics

➔ **Kurt Gödel's theorem**

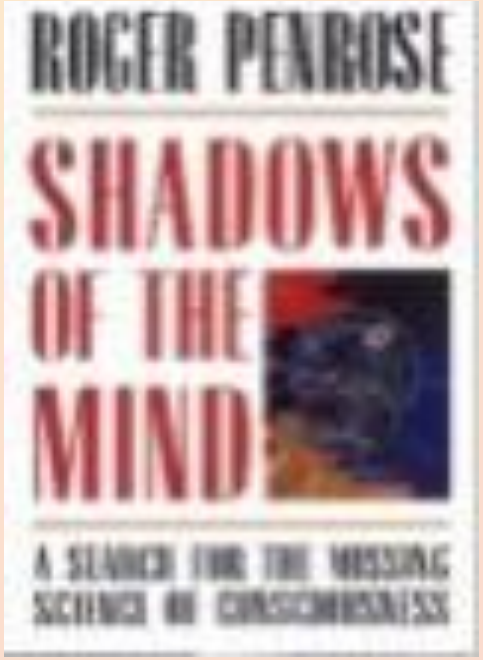
Logical system are incomplete if they are coherent.
There are truths non demonstrable.
Possibility that human reason is not only algorithmic. So the Human mind is more than a computer (Roger Penrose)

➔ **Platonism in Mathematics**

Possibility of the existence of a world of mathematical concepts which man is in contact with. (Alain Connes, Roger Penrose)

Matematics

- Shadows of the Mind
- Roger Penrose
- Oxford University Press
- 1994
- (expert level)



Philosophical Implications of Quantum Physics

➔ **Wave-particle duality**

The basis of the material word is non material

"Between the object and the idea of the object"
Werner Heisenberg

"The Universe is more like a great idea than a great machine." James Jeans

➔ **Role of the observer**

The observer plays an unclear but nonetheless central role in the appearance of our environment.

"To put the conclusion crudely - the stuff of the world is mind-stuff" Arthur Stanley Eddington

➔ **Non-locality**

The material world in which we live is not ontologically sufficient. Time and Space are not the only levels of reality.The world is more holistic than reductionist

Physics has a word for the cause of these non-local correlations: entanglement.

But physics offers no story in space and time to explain or describe how these correlations happen.

Hence, somehow, non- local correlations emerge from outside space-time.

Nicolas Gisin

Is Ultimate Reality non material?

"One of the teachings of modern science of so called "matter" is the following: the "thing" if there is one, which remains preserved is not concrete but abstract. It is not something which is close to the senses but which on the contrary is a pure mathematically abstract number such as theoretical physics has revealed to us. In other terms, compared to our senses and the concepts that are familiar to us, reality is undeniably distant. In order to do justice to this very important discovery when we speak about it, I think that it is crucial to know that the word "matter" is the wrong one and that the more appropriate word "Being" should be reintroduced".

Bernard d'Espagnat, Un atome de sagesse, p.55.

18th century science culminated in the triumph of mechanical materialism which explained everything according to the arrangement of tiny and invisible particles of matter .

This rather primitive vision to which most biologists still hold had as consequences the uselessness of the religions and philosophies which call upon the existence of intangible entities.

The fact that these particles of matter turned out to be merely non-local mathematical abstractions, i.e. being able to extend on all space and, moreover, not obeying determinism, brought a fatal blow to the classical materialism

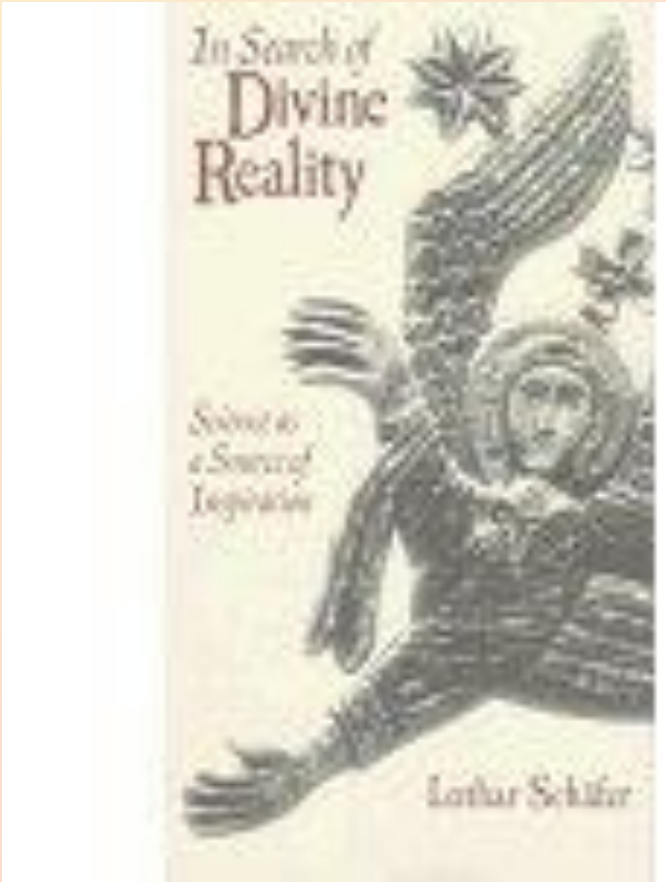
Ortoli and Pharabod

PHYSICS

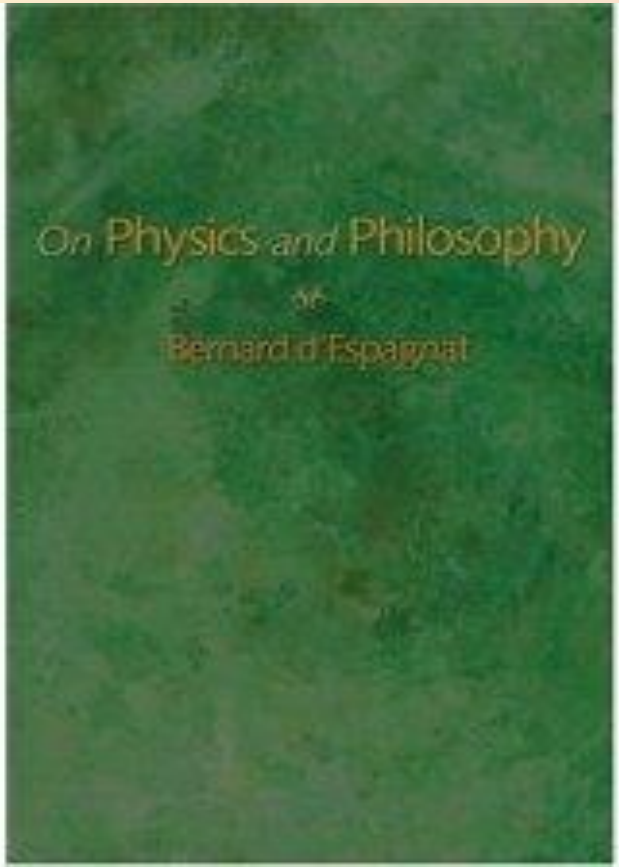
In Search of Reality by Bernard D'Espagnat

Springer (September 1983)

- In Search of Divine Reality
- Lothar Schafer
- Arkansas University Press
- 1997



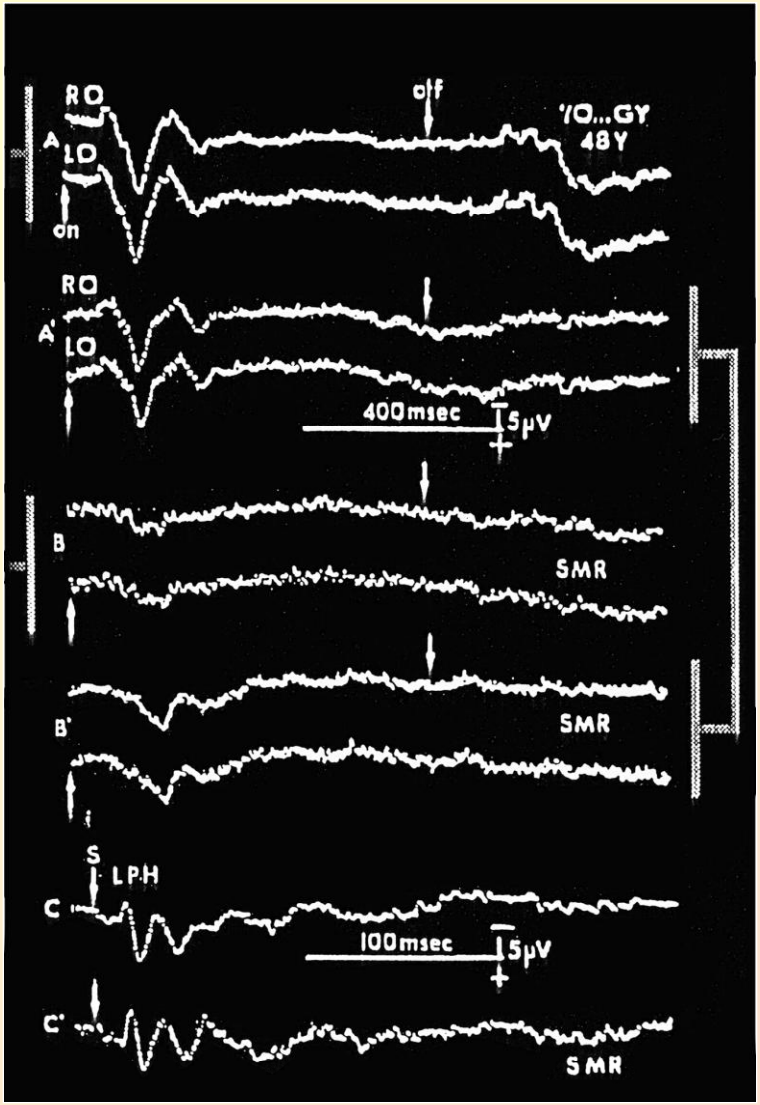
- On Physics and Philosophy
- Bernard d'Espagnat
- Princeton University Pre
  (Oct 2006)
- (expert level)



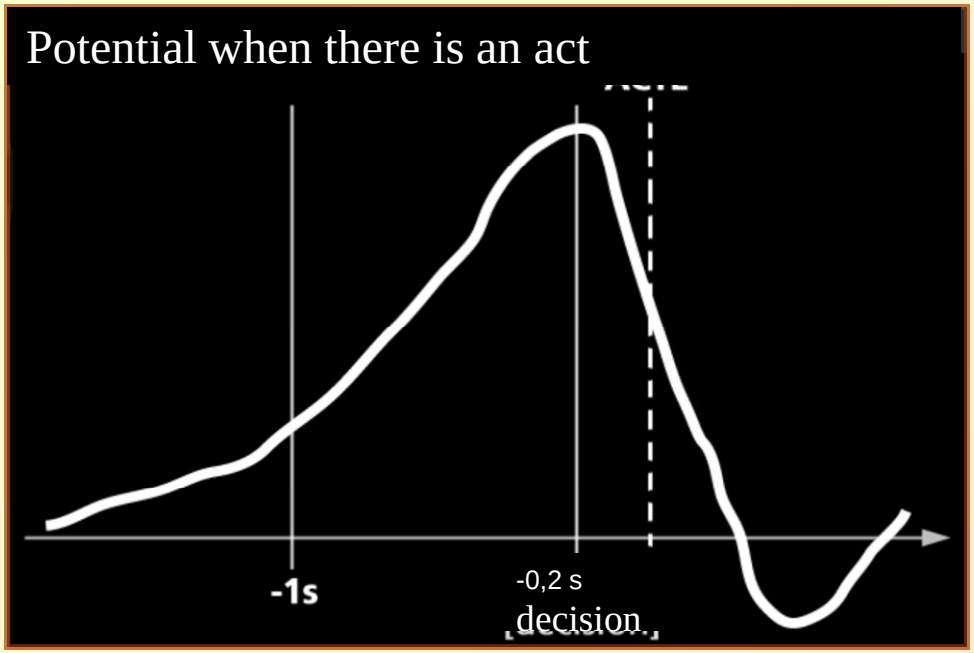
Is the brain an ipod or a radio?

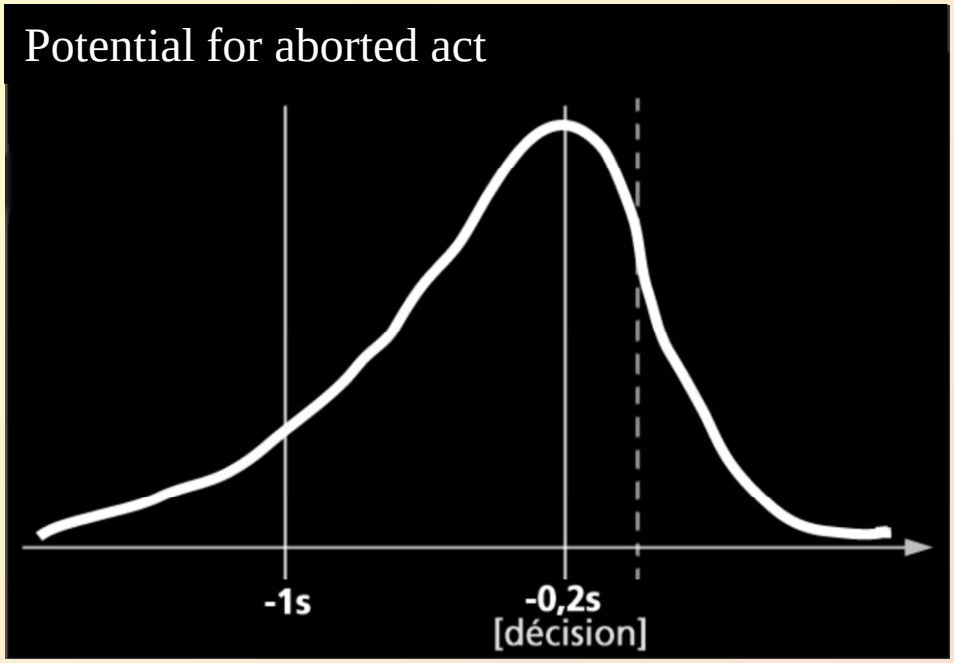
?

Experience with evoked potential



Free to say no,
A scientific demonstration of free will?





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Philosophical Implications of Neurology

➔ **Experience with evoked potential (Lambert)**

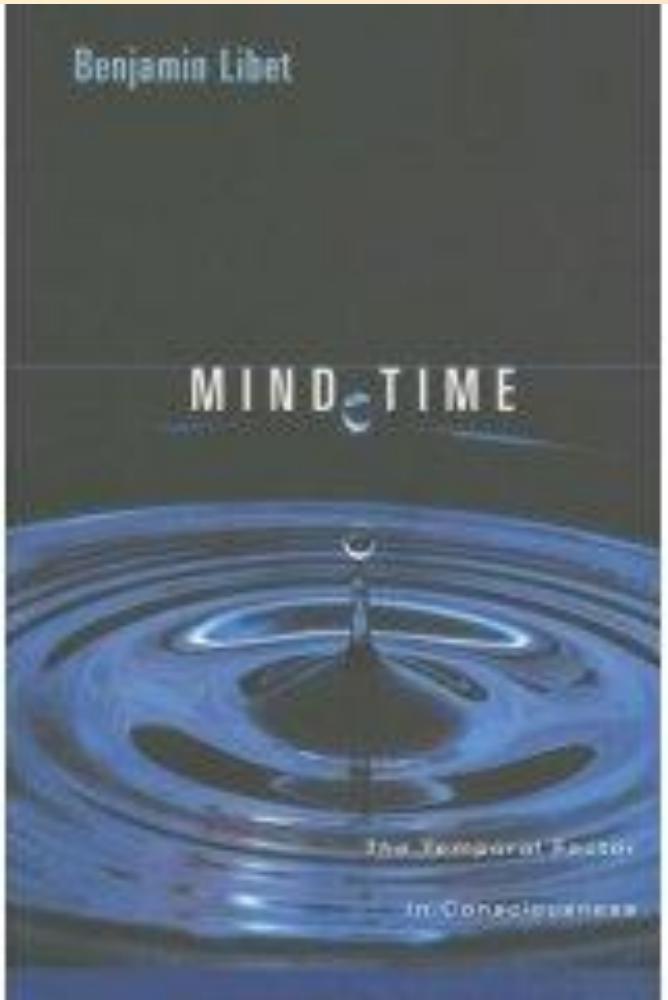
No identity between the neuronal states and mental states

➔ **Experience of preparation potential (Libet)**

Free will is real

Neurology

- Mind Time
- Benjamin Libet
- Harvard University Press 2004



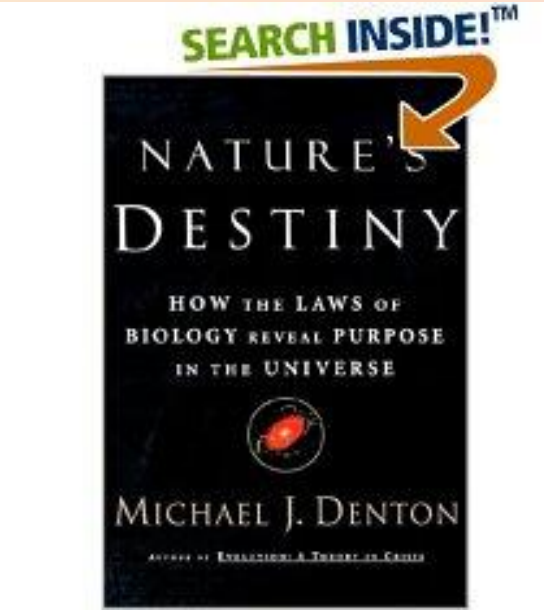
Philosophical Implications of the Biology of Evolution

➔ **Limits of Natural Selection in order to explain the existence of complex structures**

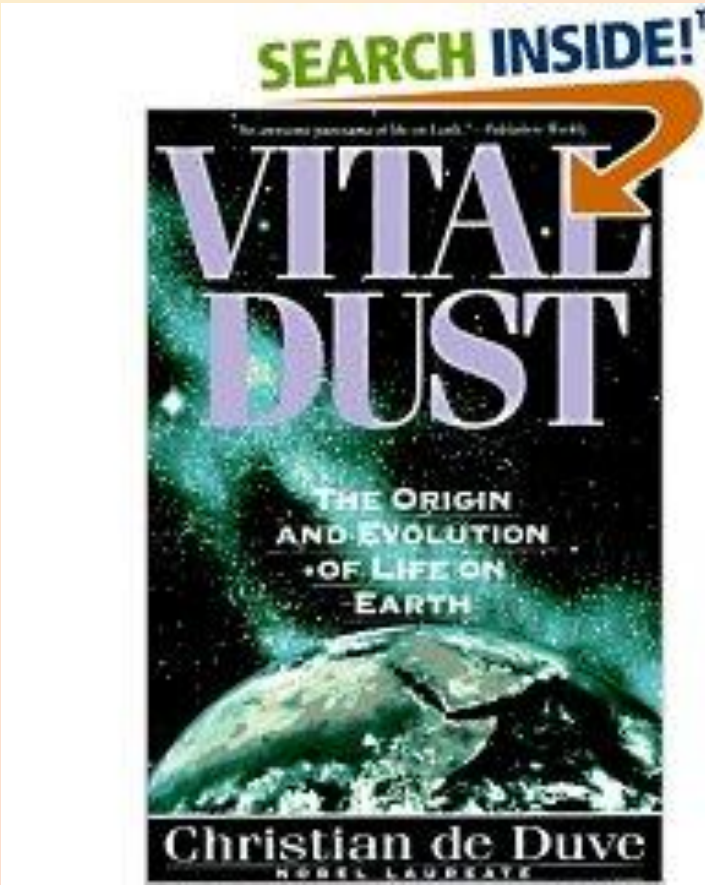
➔ **Fine tuning of biochemical laws permitting the emergence of Life and the reproducibility of evolution : Evolution is channeled**

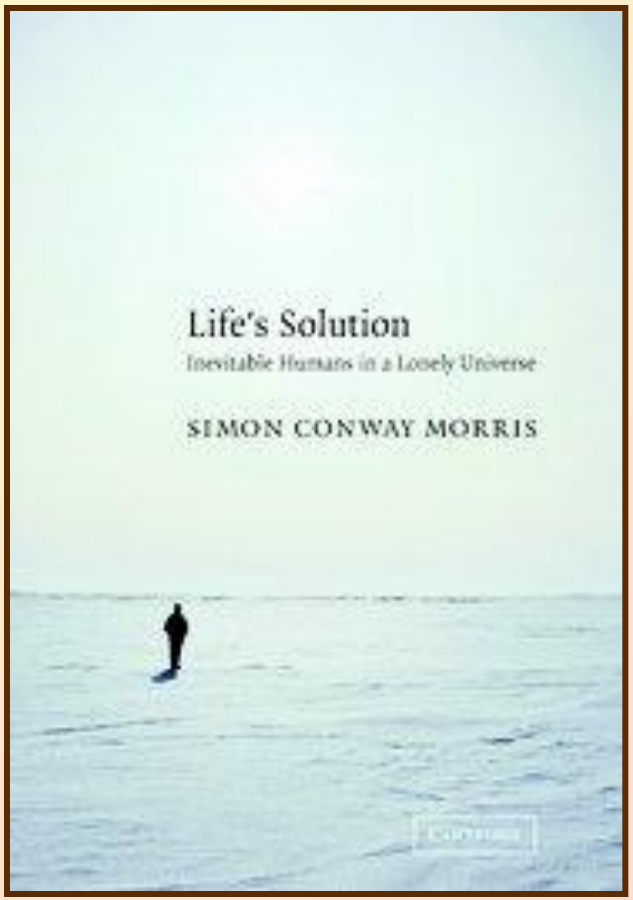
BIOLOGY

- Nature's Destiny
- Michael Denton
- Free Press 1998



- Vital Dust
- Christian De Duve
- Basic Books 1995





Simon Conway Morris, professeur de paléontologie à l'Université de Cambridge

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Links between Science & Religion

According to Ian Barbour in *Religion in an age of Science*

I/ Conflict

Scientific Materialism & Biblical Literalism

II/ Independence

Different methods and languages

III/ Dialogue

“Border questions” & Parallel methodologies

IV/ Integration

Natural Theology (part of science) William Paley
Theology of Nature (part of Revelation, reformulation due to Science) Teilhard de Chardin
Systematic synthesis - Process (Whitehead)

What sort of dialogue between Science & Religion ?

I- Epistemological Approach:

Methodological proximity between the processes in Science and in Religion (Charles Townes)

II- Apophatic (negative) Approach:

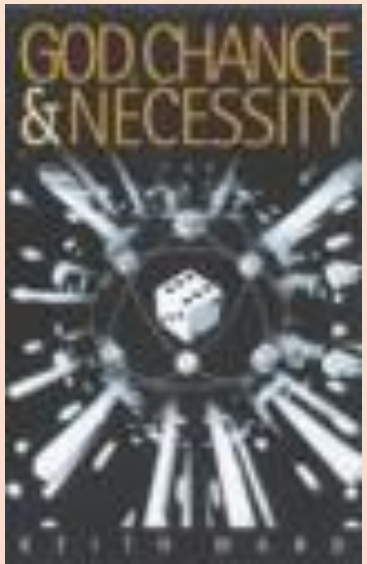
Radical and ontological incompleteness of all materialistic descriptions of reality.

III- Cataphatic (direct) Approach :

Necessity for a primary principle (Aristotle) or a creator.

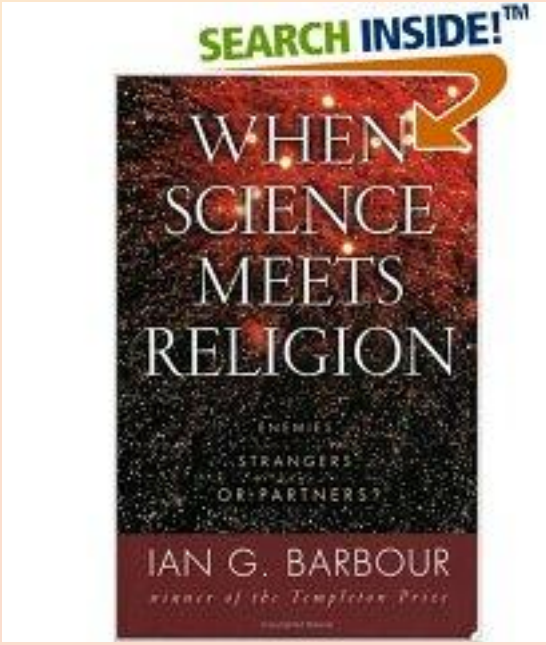
Synthesis

- God Chance and Necessity
- Keith Ward
- Oneworld, Oxford, 1996

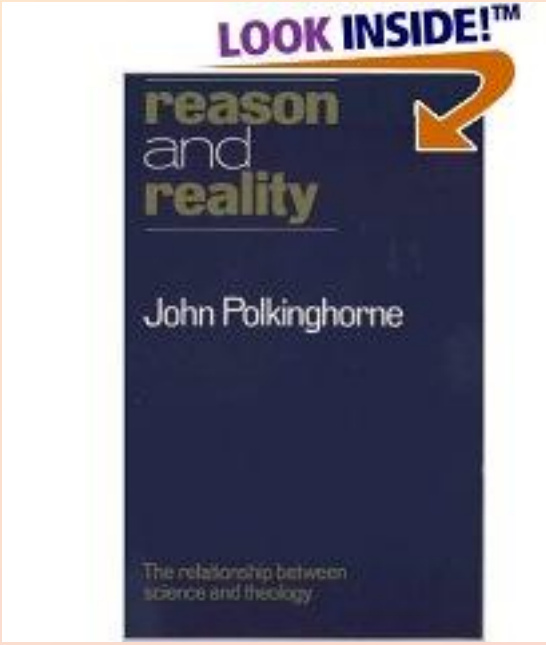


When Science Meets Religion
Ian Barbour

Harper San Franscico 2000



- Reason and Reality
- John Polkinghorne
- SPCK, 1991



Cataphatic (direct) Approach

- **Anthropic Principle : fine tuning of the Universe**
- **Evolution is channeled**

Apophatic (Negative) Approach

I know (very well) Why I will never know(the opposite of the god of the gaps!)

- **Uncertainty principle**
- **Chaos theory**
- **Gödel Theorem**

The Debates

I- Existence of God

- according to Einstein
- according to Bernard d'Espagnat
- according to Michael Heller

The debates

II- Process Theology, Panantheisme, Thomisme

Biological evolution : from classical Darwinism to intelligent design

Neurology : from materialistic monism to dualism

III- Convergence, Complexity, Emergence

MONISM

➔ **Francisco Varela : “ building a path while walking ”**

➔ **Pierre Karli : “it has been said of man that he is made of flesh and blood but he is like the tree, the wind must blow for him to come alive.”**

➔ **Dominique Laplane : “Matter and thought are two fundamental constituents on the universe in interaction.”**

➔ **Jean-François Lambert : “There is the *other* and the *other* does not equate to the *same*”**

➔ **Sir John Eccles : “The conscious spirit controls the brain: interactionist dualism”**

DUALISM

CONCLUSION 1

Most traditions affirm that there is another level of reality beyond the dimensions of Time and Space that we know, and that the human mind is linked to this other level of reality.
Astrophysics and Quantum Physics give support to the first claim, Mathematics to the second.
Free will is possible.
The concept of a creator of the Universe is credible.
All of this for SCIENTIFIC REASONS ONLY
That is very important for the dialogue between Science and religion.

CONCLUSION 2

If we consider together the main results of the XXth century in Astrophysics, Quantum Physics, Mathematics and the hints of what can be new theories in neuroscience and evolutionary biology,

we have have a scientific world view which is much more compatible with a religious worldview than the previous scientific world view.

Conclusion 3

➔ **We are experiencing an unprecedented change of paradigm which has no equivalent since the transition from Middle Ages to Modernity**

➔ **One hope for a post-modern civilization in the 21st century: to rebuild a world vision which profits from the breath transcendence gives and from the solidity which reason gives.**

The Field of Science and Religion

CAMBRIDGE :

The Faraday Institute for Science and Religion

Director Denis Alexander

http://www.st-edmunds.cam.ac.uk/faraday/index.php

Fraser Watts Reader in Theology and Science.

OXFORD :

- **IAN RAMSEY CENTRE** ***for the interdisciplinary study of religious beliefs in relation to the sciences and medicine***

http://www.ianramseycentre.info

Peter Harrison
Andreas Idreos Chair of Science and Religion

HARVARD:

- **Ahmed Ragab is the Richard T. Watson Professorship of Science and Religion at Harvard Divinity School**
- **'Disciplining and Persuading': Science, Religion, and the Making of Knowledge**
- **http://www.hds.harvard.edu/multimedia/video/lecture-to-inaugurate-watson-professorship-science-and-religion**

www.ctns.org

http://www.ctnsstars.org/

CTNS — Building Bridges for over 20 years

The mission of CTNS is to promote the creative mutual interaction between theology and the natural sciences.

CTNS is an international non-profit membership organization dedicated to research, teaching and public service. It focuses on the relation between the natural sciences including physics, cosmology, evolutionary and molecular biology, as well as technology and the environment, and Christian theology and ethics.

As an Affiliate of the Graduate Theological Union (GTU) in Berkeley, California, CTNS offers courses at the doctoral and seminary levels in order to bring future clergy and faculty to a greater awareness of this important interdisciplinary work.

You may participate in the dialog by joining the Center. As a member, you will receive the new journal, *Theology and Science*, and other benefits.

Overview

Pushing the Boundaries

www.templeton.org

There is here no knockdown argument for design and purpose, but certainly there are strong hints of ultimate realities beyond the cosmos. One of the strongest hints, in our opinion, relates to the new understanding of the creativity of the cosmos, its capacity for so-called self-organization. ... From a theological perspective it is indeed tempting to see this remarkable self-organizing tendency as an expression of the intimate nature of the Creator's activity and identification with our universe.
- Sir John Marks Templeton

In pursuing research at the boundary between science and religion, the Foundation seeks to unite credible and rigorous science with the exploration of humanity's basic spiritual and religious quests.

Working closely with scientists, theologians, medical professional, philosophers and other scholars, the Foundation encourages substantive dialogue in order to stimulate research and reflection in the relationship between science and religion.
The Foundation especially seeks to stimulate rigorous scholarly/scientific advances that increase understanding of the ultimate aspects of human purpose, and of the vast potential for creativity and progress, which can be inspired by the collaboration of science and religion.

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New Views on Complex Issues

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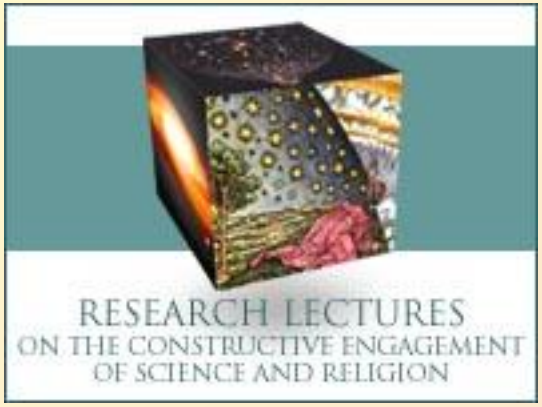
The Relation of Science & Religion

Featured Topics
John Polkinghorne: The Friendship of Science and Religion
John Brooke - The Changing Relations Between Science and Theology
Famous Conflicts Between Science and Religion
The Caricature - Darwin v. Christianity
The Scopes 'Monkey Trial'
The Separation of Science and Religion
Key Figures and Developments in the Science-Religion Debate
Typologies Relating Science and Religion
The Science of Sociobiology Critiques the Truth-Claims of Religion
Science, Religion and Values: Past Estrangement and Present Engagement
Science in Islamic History: Ancient and Modern

Related Topic Sets
Faith and Reason: An Introduction (22 topics)
Science and the Three Monotheisms: A New Partnership?
Outlines of the Debate on Science and Religion
Theology and Science: Current Issues and Future Directions (R. Russell, 69 topics)
Cosmos and Creator... (Polkinghorne et al, 6 topics)

Metanexus
INSTITUTE

Advancing the
Constructive
Engagement
of Religion
and Science



www.metanexus.org

Local Societies Initiative

For the Constructive Engagement of Science and Religion

http://www.metanexus.net/local_societies/societies_list.asp?RegionID=0

www.esssat.org

The Tenth European Conference on Science and Theology in Barcelona, April 1-6, 2004, has as its conference theme:
Streams of Wisdom? Theology and Cultural Dynamics ,and the 11Th in IASI ROMANIA

Elevent

The Eleventh European Conference on Science and Theology, organized by ESSSAT, was held from Wednesday April 5th to Monday April 10th, 2006. Since 1986 there has been a European Conference on Science and Theology every other year. The latest conference was held in Iasi, the second largest city of Romania, and was the first ESSSAT conference held in a country where Eastern Orthodox Christianity is prominent. The conference featured a combination of plenary lectures, sessions with short papers, the presentation of the ESSSAT Prizes 2006, an excursion to some of the famous painted monasteries of the Bucovina, and much more.

www.uip.edu

Organisation of some of the main meeting in Science and Religion in UNESCO headquarters in Paris 1997 et 2002.

Organisation of private workshop between the leaders of the field.

Co-organisation and co-conception of International Programs and Meetings (Asia, Eastern Europe, Italy, Morocco, Mexico, India and so on.)

Research programs

BIOLOGY

CAMBRIDGE
TEMPLETON CONSORTIUM

- http://www.cambridge-templeton-consortium.org/

- Biochemistry and Fine-Tuning

- Dr Wesley Allen, Prof Henry Schaefer **Quantum Chemistry in Counterfactual Universes** Center for Computational Chemistry, University of Georgia Research Foundation, Inc.
- Dr Matthew Carrigan, Prof Steven Benner **Purpose in the Cosmos as Indicated by Life's Origins** Foundation for Applied Molecular Evolution (FfAME), Gainesville, Florida, USA
- Prof Jeffrey Koperski, **Emergent Properties and Hierarchical Structures: Overcoming the Conceptual Challenges to Emergence** Philosophy, Saginaw Valley State University, Michigan
- Prof Andrew Pohorille **Non-genomic Origins of Metabolism**School of Pharmacy, University of California, San Francisco
- Prof Wilson Poon, Prof Tom McLeish, Prof Alexander Bird **Why "Why?" Philosophical questions at the physics-biology interface** School of Physics, The University of Edinburgh, University of Bristol
- Dr Robert Reenan, **Fine Tuning the Molecules of Behavior in Animals** Genetics and Developmental Biology, University of Connecticut Health Center

- Becoming Fully Human: Social Complexity and Human Engagement with the Natural and Supernatural World

- Dr Terence Hopkinson, Dr Mark White **Knowledgeqable knappers; the role of the purposeful agent in the emergence of prepared core stone reduction techniques and the transition from the Lower to the Middle Palaeolithic.** School of Archaeology and Ancient History, University of Leicester
- Dr Liliana Janik, Dr Pawel **NasiadkaThe origins of shamanism: Rock art and the world's 'oldest religion'** Department of Archaeology, University of Cambridge
- Mr Barry Kemp, **Investing in religion at Akhenaten's Amarna** Department of Archaeology, University of Cambridge
- Dr Caroline Malone, Mr Steven Ashley, Mr Michael Anderson, Ms Suzannah De Pasquale, Dr Simon Stoddart **Explorations into the conditions of spiritual creativity in Prehistoric Malta.**Department of Archaeology, University of Cambridge
- Dr Ryan Rabett **Regionalism in the Development of Modern Human Behaviour** Department of Archaeology, University of Cambridge Evolutionary History and Contemporary

Evolutionary History and Contemporary Life: Evolution, Ecology, Ethology

Dr Christoph Adami **Statistics of Information Acquisition in Darwinian Evolution** Computational Biology, Keck Graduate Institute of Applied Life Sciences, Claremont, LA, USA

Prof Bland Finlay, Dr Genoveva Esteban **Rationalising biological complexity using the synthesis offered by 'patterns of nature'** Dorset Laboratory, Centre for Ecology and Hydrology, NERC

Dr Matthew Gibson, Dr Norbert Perrimon **An Emergent Geometric Order in Metazoan Epithelia** Department of Genetics, Harvard Medical School, Bostom, MA, USA

Dr Daniel McShea, Dr Robert Brandon, Dr Frederick Nijhout, Dr Alex Rosenberg **Universal Principles of Social and Colonial Organization** Departments of Biology and Philosophy, Duke University, NC, USA

Dr Robert Pennock, Dr Richart Lenski, Dr Charles Ofria, **Emerging Intelligence: Contingency, Convergence and Constraints in the Evolution of Intelligent Behavior** Lyman Briggs School of Science, Michigan State University

Prof Richard Sear, Prof Tom McLeish **The Physics of Evolutionary Convergence** Department of Physics, University of Surrey

Prof Kim Sterelny, Dr Lindell Bromham, Mr Brett Calcott **General Mechanisms Underlying Transitions in Complexity: An interdisciplinary approach** Philosophy Program, Australian National University

PHYSICS

http://www.fqxi.org

Proposals should be *topical, foundational,* and *unconventional*. ◦

Topical: This Inaugural Request for Proposals is limited to research in physics (mainly quantum physics, high energy "fundamental" physics, and gravity), cosmology (mainly of the early universe) and closely related fields (such as astrophysics, astrobiology, biophysics, mathematics, complexity and emergence, and philosophy of physics), insofar as the research bears directly on questions in physics or cosmology. Although the distribution of funds across subject areas will be driven in large part by the quality of proposals received, a goal of the review process will be to fund diverse research topics that span the small and the large, and range from the elementary to the complex.◦ **Foundational:** This Inaugural Request for Proposals is limited to research with potentially significant and broad implications for our understanding of the deep or "ultimate" nature of reality.◦

Unconventional: This Inaugural Request for Proposals is intended to fill a gap, not a shortfall, in conventional funding. We wish to enable research that, because of its speculative, non-mainstream, or high-risk nature, would otherwise go unperformed due to lack of available monies. Thus, although there will be inevitable overlaps, an otherwise scientifically rigorous proposal that is a good candidate for an FQXi will generally not be a good candidate for funding by the NSF, DOE, etc. - and vice versa.

Journals

Zygon® Journal of RELIGION & SCIENCE

- http://www.blackwellpublishing.com/journal.asp?ref=0591-2385

- http://www.ctns.org/pub_articles.html