Physics : Part 2 : Video 8 : Reverse Questioning

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Science is a dialogue : between Nature & Mind

Although observation (data) is the beginning of the scientific process, a catalog of observed facts (data) does not add up to an understanding of nature, any more than a telephone book adds up to an understanding of a city.

To understand – literally, to "*stand beneath*" – means to perceive a framework. A framework of scientific ideas is called a Theory. In the development of astronomy, observations stimulated speculations that led to theories, and these theories in turn suggested new observations to check the theories and suggest new speculations. This interplay between observations and theories is the essence of science.

A. Hobson, *Physics, Concepts and Connections*, 2010 Addison-Wesley.

Science is a dialogue : between Nature & Mind

Observation refers to the data-gathering process. A measurement is a quantitative observation, and an experiment is an observation that is designed and controlled by humans (involves error analysis), perhaps in a laboratory.

A scientific theory is a well-confirmed framework of ideas that explains (or describes) what we observe. A model is a theory that can be "visualized", and a principle or law may be one idea within a more general theory.

The word "Law" can be misleading because it sounds so certain. As you will see, scientific ideas are never absolutely certain.

A. Hobson, *Physics, Concepts and Connections*, 2010 Addison-Wesley.

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Can we Reverse the Process of Questioning?

We start with :

- We want a certain desired conclusion.
- Find evidence that supports the conclusion.
- Ignoring evidence and arguments that may contradict the conclusion.

A. Hobson, *Physics, Concepts and Connections*, 2010 Addison-Wesley.

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What is Pseudoscience ?

Pseudoscientists reverse the scientific process.

By assuming their desired conclusion at the outset and then searching for evidence that supports that conclusion while ignoring evidence and arguments to the contrary.

Using such a biased and backward approach, it is possible to "prove" anything, including some of the most absurd nonsense imaginable.

A. Hobson, *Physics, Concepts and Connections*, 2010 Addison-Wesley.

Some examples of Pseudosciences

Ancient astronauts	Extrasensory perception	Spoon bending
Pyramid power	Flying saucers	Parapsychology
Astrology	Fortune-telling	Crystal Powers
Bermuda Triangle	Holocaust denial	Phrenology
Big Foot	Homeopathy	Psychic surgery
Creation Science	Intelligent Design	Psychokinesis
Crop Circles	Kirlian aura	Pyramid power
Crystal healing	Levitation	Quantum mysticism
Occult chemistry	Lost continent of Atlantis	Remote viewing
Dowsing	Noah's flood	Seances
Emotions in plants	Occult chemistry	Extra-terrestrial visitations

A. Hobson, *Physics, Concepts and Connections*, 2010 Addison-Wesley.

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- No scientific theory, no matter how strongly supported by available evidence, is final and unchallengeable; any good theory is always exposed to the possibility of being modified or even overthrown by new evidence. That is at the very heart of the process of science. However, biological and cosmological evolution are theories as strongly supported and interwoven into the fabric of science as any other essential underpinnings of modern science and technology.

Statement adopted by the American Association of Physics Teachers, 2005.

The Teaching of Evolution and Cosmology 2

- To deny Children exposure to the evidence in support of biological and cosmological evolution is akin to allowing them to believe that atoms do not exist or that the Sun goes around the Earth.
- We believe in teaching that science is a process that examines all of the evidence relevant to an issue and tests alternative hypotheses. For this reason, we do not endorse teaching the "evidence against evolution,"

Statement adopted by the American Association of Physics Teachers, 2005.

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- because currently no such scientific evidence exists. Nor can we condone teaching "scientific creationism," "intelligent design," or other non-scientific viewpoints as valid scientific theories. These beliefs ignore the important connections among empirical data and fail to provide testable hypotheses. They should not be a part of the science curriculum.

Statement adopted by the American Association of Physics Teachers, 2005.

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Science is compatible with a belief in God

- It is important to note that science is compatible with a belief in God and with many other religious beliefs.
- Many scientists are Christians while many others believe in God.
- Science has nothing to say about the existence or nonexistence of God because it studies only natural processes, not supernatural processes.
- In fact, scientists harbour a deep conviction that both science and religion are part of a single large truth.

A. Hobson, *Physics, Concepts and Connections*, 2010 Addison-Wesley.

Well known Scientists who also believe in God

Well known Physicists

Isaac Newton (Exp. & Theo. Physics)	(1642-1726)
Michael Faraday (Exp. Physics)	(179-1867)
James Clerk Maxwell (Exp. & Theo, Physics)	(1831-1879)
Sir Arthur S. Eddington (Quaker & Cosmology)	(1882-1944)
Gregor Mendel (Priest & Exp. Biology)	(1822-1884)
Georges Lemaitre (Priest & Cosmologist)	(1894-1966)
Sir John Polkinghorne (Rev. & Theo. Physics)	(1930 -)
Dame Jocelyn Bell Burnell (Quaker & Astrophysics)	(1943 -)
George Ellis (Quaker & Cosmology)	(1939 -)

D. Graves, *Scientists of Faith*, 1996 Kregel Resources.

C. V. Raman

From Wikipedia, the free encyclopedia

In this Indian name, the name Chandrasekhara *is a patronymic, not a family name, and the person should be referred to by the given name,* Raman.

Sir Chandrasekhara Venkata Raman[2] (7 November 1888 – 21 November 1970) was an Indian physicist born in the former Madras Province in India, who carried out ground-breaking work in the field of light scattering, which earned him the 1930 Nobel Prize for Physics. He discovered that when light traverses a transparent material, some of the deflected light changes in wavelength. This phenomenon, subsequently known as Raman scattering, results from the Raman effect.[3] In 1954, India honoured him with its highest civilian award, the Bharat Ratna.[4][5]

Raman's father initially taught in a school in Thiruvanaikaval, became a lecturer of mathematics and physics in Mrs. A.V. Narasimha Rao College, Visakhapatnam (then Vishakapatnam) in the Indian state of Andhra Pradesh, and later joined Presidency College in Madras (now Chennai).[1][6]

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Sir C.V. Raman (Chandrasekhara Venkata Raman)
FRS

Born 7 November 1888

D. Graves, *Scientists of Faith*, 1996 Kregel Resources.

Francis Collins

From Wikipedia, the free encyclopedia

For other people named Francis Collins, see Francis Collins (disambiguation).

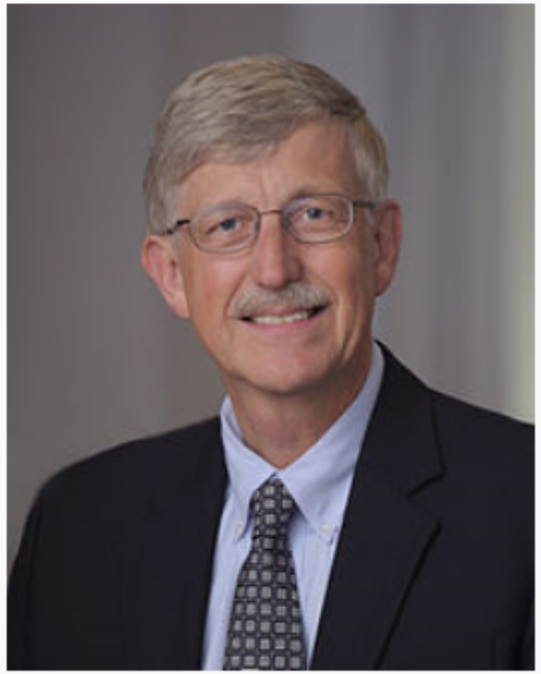
Francis Sellers Collins (born April 14, 1950) is an American physician-geneticist noted for his discoveries of disease genes and his leadership of the Human Genome Project. He is director of the National Institutes of Health (NIH) in Bethesda, Maryland, USA.

Before being appointed director of the NIH, Collins led the Human Genome Project and other genomics research initiatives as director of the National Human Genome Research Institute (NHGRI), one of the 27 institutes and centers at NIH. Before joining NHGRI, he earned a reputation as a gene hunter at the University of Michigan. He has been elected to the Institute of Medicine and the National Academy of Sciences, and has received the Presidential Medal of Freedom and the National Medal of Science.

Collins also has written a number of books on science, medicine, and religion, including the *New York Times* bestseller, *The Language of God: A Scientist Presents Evidence for Belief*.

After leaving the helm of NHGRI and before becoming director of the NIH, he founded and served as president of The BioLogos Foundation, which promotes discourse on the relationship between science and religion and advocates the perspective that belief in Christianity can be reconciled with acceptance of evolution and science, especially through the advancement of evolutionary creation.[3] In 2009, Pope Benedict XVI appointed Collins to the Pontifical Academy of Sciences.

Francis Collins



Collins in 2009

Director of the National Institutes of Health

https://en.wikipedia.org/wiki/Francis_Collins

Abdus Salam

From Wikipedia, the free encyclopedia

For other people with the name, see Abdus Salam (name).

Mohammad Abdus Salam[2][3] NI, SPk, KBE[4] (Punjabi, Urdu: محمد عبد السلام; pronounced [əbd̪us səlɑm]; 29 January 1926 – 21 November 1996),[1] was a Pakistani theoretical physicist. A major figure in 20th century theoretical physics, he shared the 1979 Nobel Prize in Physics with Sheldon Glashow and Steven Weinberg for his contribution to the electroweak unification theory.[5] He was the first Pakistani and first Muslim to receive a Nobel Prize in science and the second from an Islamic country to receive any Nobel Prize (after Anwar Sadat of Egypt).[6]

Salam was a top level science advisor to the Government of Pakistan from 1960 to 1974, a position from which he played a major and influential role in the development of the country's science infrastructure.[6][7] Salam was responsible not only for contributing to major developments in theoretical and particle physics, but also for promoting the broadening and deepening of high calibre scientific research in his country.[7] He was the founding director of the Space and Upper Atmosphere Research Commission (SUPARCO), and responsible for the establishment of the Theoretical Physics Group (TPG) in the Pakistan Atomic Energy Commission (PAEC).[8] As Science Advisor, Salam played an integral role in Pakistan's development of the peaceful use of nuclear energy, and may have contributed as well to development of atomic bomb project of Pakistan in 1972;[9] for this, he is viewed as the "scientific father"[3][10] of this programme.[11][12][13] In 1974, Abdus Salam departed from his country, in protest, after the Pakistan Parliament passed a controversial parliamentary bill declaring the Ahmadiyya movement, to which Salam belonged, as not-Islamic. In 1998, following the country's nuclear tests, the Government of Pakistan issued a commemorative stamp, as a part of "Scientists of Pakistan", to honour the services of Salam.[14]

Mohammad Abdus Salam
محمد عبد السلام

Abdus Salam in 1987

Born	29 January 1926

https://en.wikipedia.org/wiki/Abdus_Salam

Don Page (physicist)

From Wikipedia, the free encyclopedia

Donald Nelson Page (born December 31, 1948) is an American-born Canadian theoretical physicist at the University of Alberta, Canada.[1][2][3]

His work focuses on quantum cosmology and theoretical gravitational physics, and he is noted for being a doctoral student of the eminent Professor Stephen Hawking, in addition to publishing several journal articles with him.[4][5] He is an Evangelical Christian.[6]

Don Page got his BA at William Jewell College in the United States in 1971, attaining an MS in 1972 and a PhD in 1976 at Caltech. He followed this with an MA at Cambridge, which he received in 1978.[1]

His professional career started as a research assistant in Cambridge from 1976-1979, followed by an assistant professorship at Penn State from 1979-1983, and then an associate professor at Penn State until 1986 before taking on the title of professor in 1986. Page spent four more years at Penn State before moving to become a professor at the University of Alberta in Canada in 1990.

References [edit]

1. ^ a b http://www.physics.ualberta.ca/Faculty/DonPage
2. ^ http://www.jewell.edu/gen/media/achieve/fall2005/foundInTheCosmos.html
3. ^ [1]
4. ^ Spectrum of wormholes Hawking, S.W. (Inst. for Theor. Phys., California Univ., Santa Barbara, CA, USA); Page, D.N. Source: Physical Review D (Particles and Fields), v 42, n 8, p 2655-63, 15 Oct. 1990
5. ^ Thermodynamics of black holes in anti-de Sitter space Hawking, S.W. (Univ. of Cambridge, Dept. of Appl. Math. &

Don N. Page

Don Page at Department of Physics, National Taiwan University.

Born	December 31, 1948 (age 67) Bethel, Alaska, United States
Residence	Edmonton, Alberta Canada
Fields	Theoretical physicist
Institutions	University of Alberta
Alma mater	California Institute of Technology
Doctoral advisor	Kip Thorne and Stephen W. Hawking
Known for	Page time

D. Graves, *Scientists of Faith*, 1996 Kregel Resources.

John Polkinghorne

From Wikipedia, the free encyclopedia

John Charlton Polkinghorne, KBE, FRS (born 16 October 1930) is an English theoretical physicist, theologian, writer and Anglican priest. A prominent and leading voice explaining the relationship between science and religion, he was professor of Mathematical physics at the University of Cambridge from 1968 to 1979, when he resigned his chair to study for the priesthood, becoming an ordained Anglican priest in 1982. He served as the president of Queens' College, Cambridge from 1988 until 1996.

Polkinghorne is the author of five books on physics, and 26 on the relationship between science and religion; his publications include *The Quantum World* (1989), *Quantum Physics and Theology: An Unexpected Kinship* (2005), *Exploring Reality: The Intertwining of Science and Religion* (2007), and *Questions of Truth* (2009).[1] *The Polkinghorne Reader* (edited by Thomas Jay Oord) provides key excerpts from Polkinghorne's most influential books. He was knighted in 1997 and in 2002 received the £1 million Templeton Prize, awarded for exceptional contributions to affirming life's spiritual dimension.[2]

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The Revd Canon
John Polkinghorne
KBE FRS

In 2007

Born	16 October 1930 (age 85) Weston-super-Mare, England, UK
Nationality	United Kingdom

https://en.wikipedia.org/wiki/John_Polkinghorne

Summary :

When approaching scientific issues, we have to be conscientious in asking ourselves whether we are reversing the process of science.