

# Science and Pseudo-Science

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-Demarcation of science from pseudo science (case studies: creationism, alternative medicine, astrology)

■ Literature: Thagard; Lakatos; Kitchner

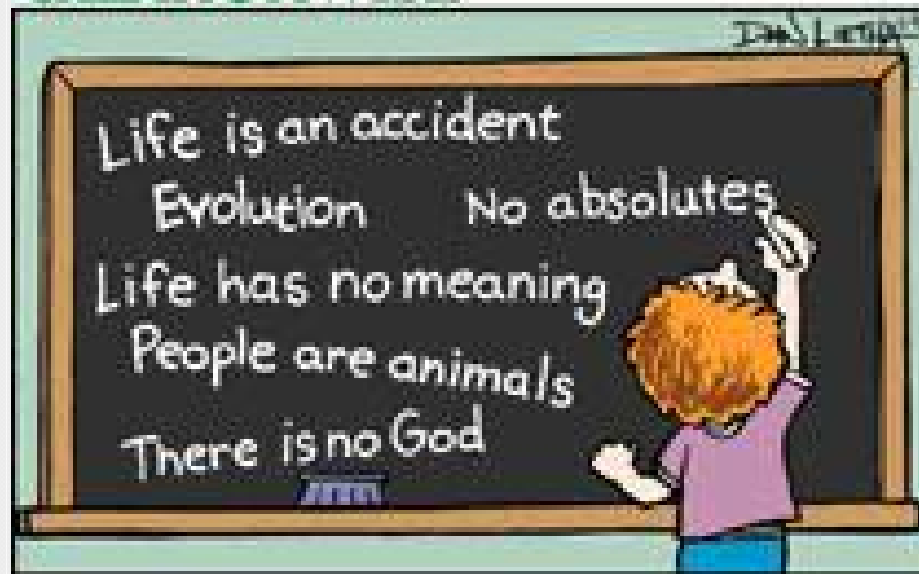




# Science and Religion: Creationists

- deny that evolutionary theory is a science
- state that evolution is just a statement of faith
- suggest that evolution theory is less well supported by evidence as compared to other scientific theories

## CREATIONWISE



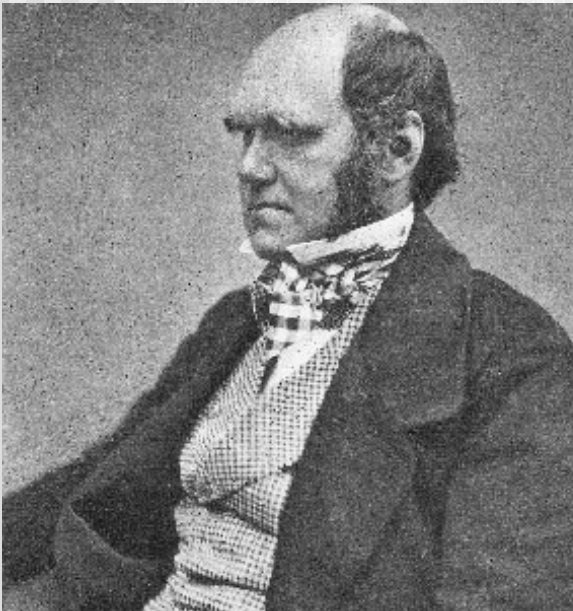
If THIS is what Johnny can read and write...



then this news shows that Johnny really understands his lessons!

# Darwin's theory of Evolution

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CHARLES DARWIN  
AND ALFRED RUSSEL WALLACE  
MADE THE FIRST COMMUNICATION  
OF THEIR VIEWS ON  
THE ORIGIN OF SPECIES  
BY NATURAL SELECTION  
AT A MEETING OF THE LINNEAN SOCIETY  
ON 1ST. JULY 1858  
1ST. JULY 1958

Michael Ruse, 1975: Darwin's Dept to Philosophy



# Darwin's theory of Evolution

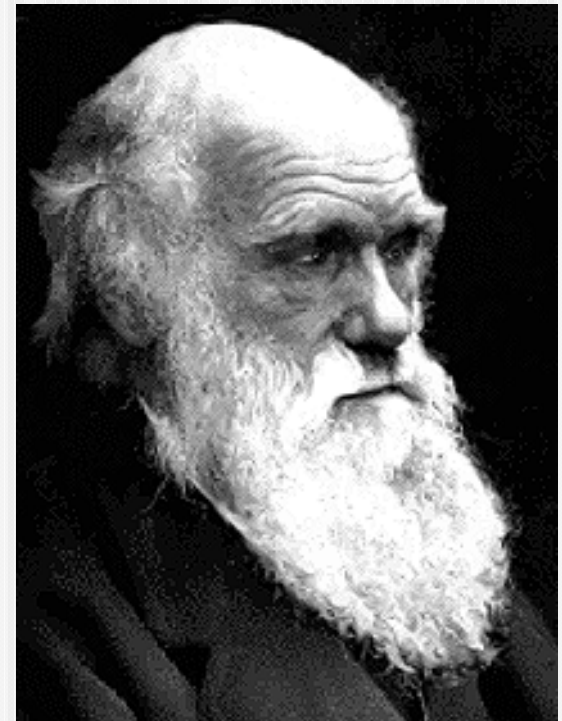
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Started his arguments from lawlike statements

- For any given species of organisms they will be found to have a tendency to increase their numbers at a geometrically high rate
- In each generation there is a differential reproduction of organisms
- The survival of the successful organisms is in part a function of the characteristics that they, unlike unsuccessful organisms, possess.

Then deduced that:

The different chances of survival of differently endowed offspring accounts for the natural evolution of species. Nature "selects" those members of a species best adapted to the environment in which they find themselves.



# Some Negative Reactions

- William Whewell:  
Refused to let it into  
the Trinity College  
Library
- John Herschel: “the  
law of higgledy-  
piggledy”
- Need to find a place  
for God, for  
«intelligent design»

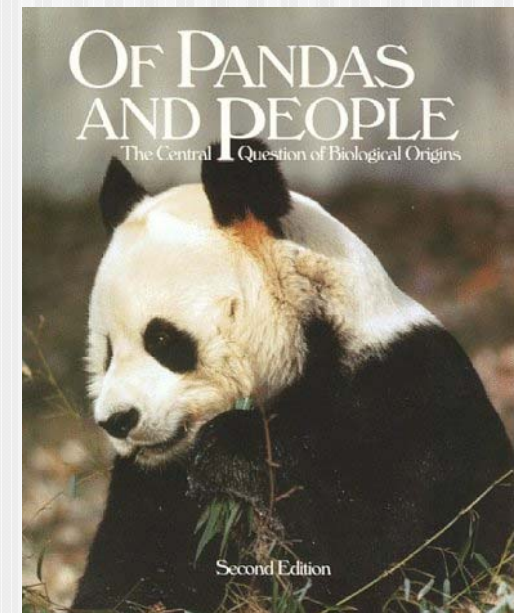




# Other cases

- *Kitzmiller and Dover* (2006). Judge Jones ruled that Dover school board's decisions to mention ID to ninth-grade biology students as an alternative to the Darwinian theory of evolution, and to refer students to the book *Of Pandas and People* as a reference source, was unconstitutional.
- In Georgia in 2005 a judge ordered a school district to remove stickers on textbooks that warned:

**"This textbook contains material on evolution. Evolution is a theory not a fact, regarding the origin of living things."**



# Ongoing debate...

- Ongoing court cases in USA
- Repercussions in other countries

From The Times

September 12, 2008

## Leading scientist urges teaching of creationism in schools



(Ian Nicholson/PA)

The education director at the Royal Society says science teachers should treat creationism as legitimate

**nature**news

Published online 17 September 2008 | Nature | doi:10.1038/news.2008.1116

News

### Creationism stir fries Reiss

Royal Society's director of education stands down.

[Daniel Cressey](#)

The director of education at the one of the world's premier scientific bodies has been forced from his job in a row over approaches to creationism in the classroom.

Michael Reiss, a professor at London's Institute of Education and an ordained minister in the Church of England, yesterday stepped down from his post as director of education at Britain's Royal Society. The move, which appears to have been forced, follows a letter to the president of the Society, Martin Rees, from three Nobel-prize winning fellows "greatly concerned" by remarks Reiss was reported to have made at the British Association for the Advancement of Science's annual "Festival of Science" on 11 September.

Reiss's remarks on the need to engage in dialogue with the creationist views some children express in science classes resurrected claims that, as a priest, Reiss should not have been appointed in the first place. "When he was appointed there were concerns that he would push a religious agenda," says Richard Roberts, chief scientific officer of New England BioLabs in Massachusetts, a fellow of the society who in 1993 won the Nobel Prize in Physiology or Medicine. The fact that "Professor Reiss is a clergyman ... in itself is very worrisome," said the letter that Roberts sent on behalf of himself, Harold Kroto, of Florida State University in Tallahassee, and John Sulston, of the University of Manchester, UK.



Professor Michael Reiss

Institute of Education



# Intelligent Design

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- Proponents assert that the workings of this planet are too complex to be ascribed to evolution. There must have been a designer working to a plan – that is, a creator



*Touched by His Noodly Appendage*  
Niklas Jansson (2005)  
Church of the Flying Spaghetti Monster

# Creationist Museums

CREATION  
MUSEUM  
Prepare to believe.



<http://creationmuseum.org>



## THE SCIENTIFIC METHOD

HERE ARE THE FACTS. WHAT CONCLUSIONS CAN WE DRAW FROM THEM?



## THE CREATIONIST METHOD

HERE'S THE CONCLUSION. WHAT FACTS CAN WE FIND TO SUPPORT IT?



# Why should we be concerned about pseudo-science? (Ziman)

- Lack of public concern with the advancement of science
- Public's "misunderstanding" of science
- Public's preoccupation with the occult, paranormal, astrology
- Use of pseudo-science in marketing: ["Detox"](#)



[www.timboucher.com](http://www.timboucher.com)

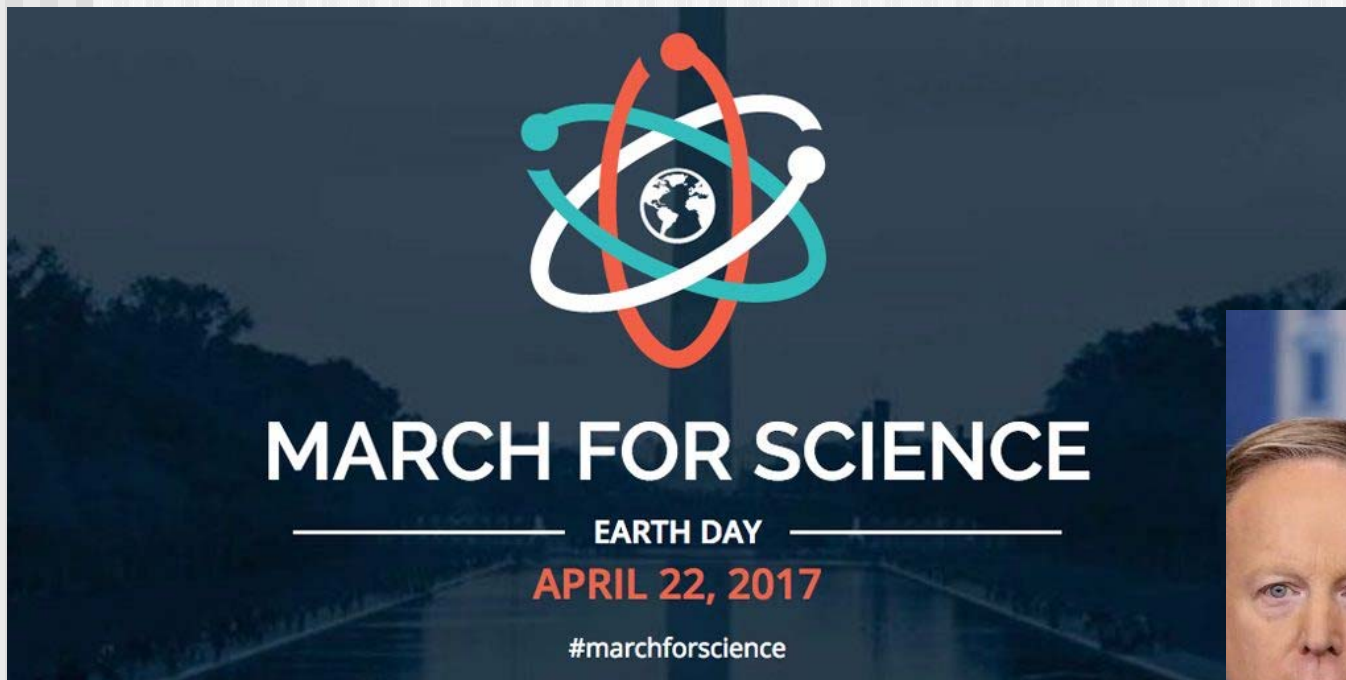


Does the cock's crow  
cause the sun to rise?



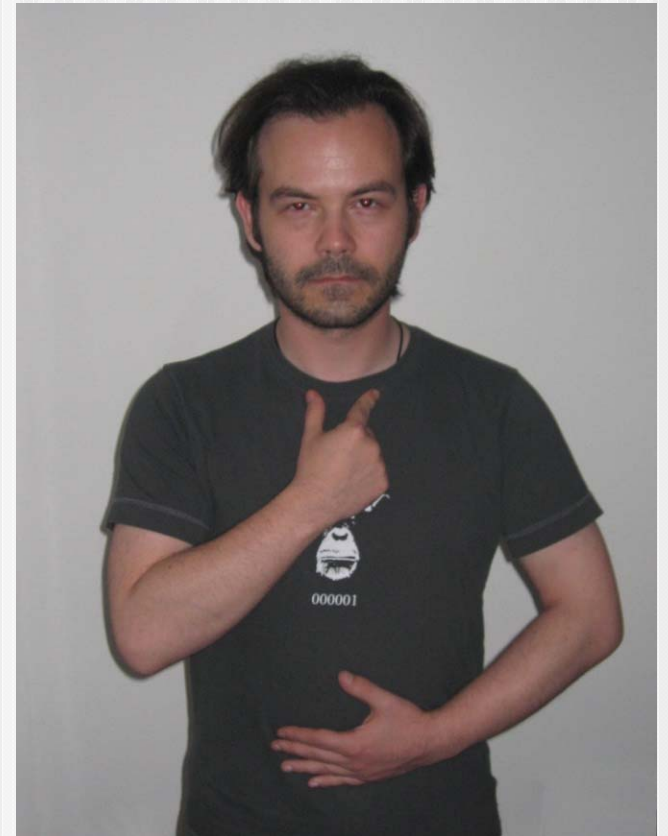
# Alternative Facts

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# "Technobabble": Brain Gym"

- Educational Kinesiology
- Used in UK schools and approved by DHE
- Based on "massaging brain buttons"



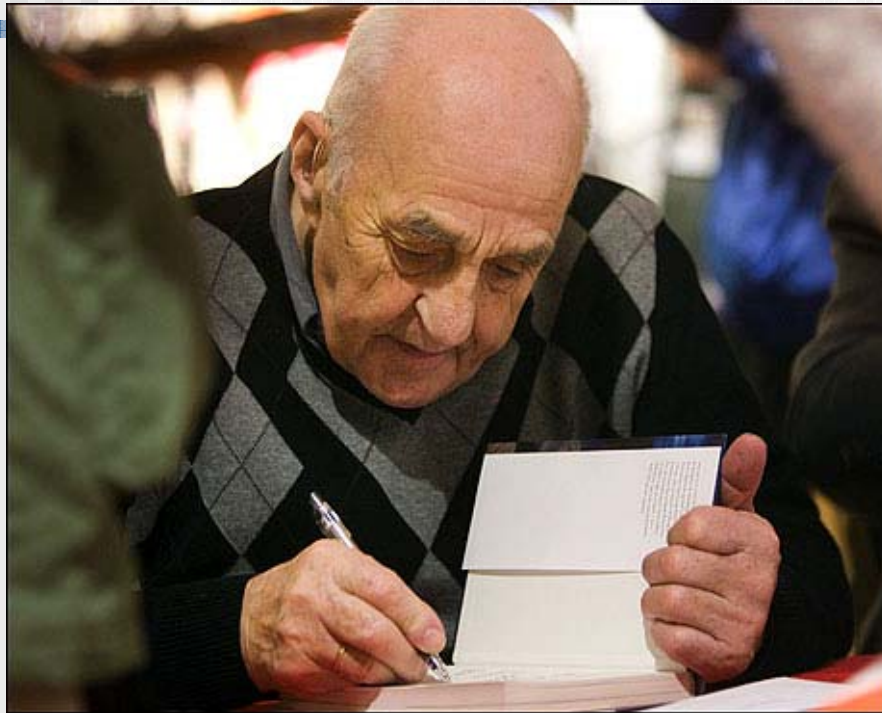
Hugh Charles Sparker

[Newsnight](#)



Threats to objectivity of science or just a matter of spiritual belief?

[www.astarte-education.com](http://www.astarte-education.com)



Jorlaf Gjerstad.  
Photo Frode Hansen



Astarte  
EDUCATION



**"Use angels and your own power to create miracles in your life"**

# Case study: Science and Astrology

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- History of astrology
- Are philosophical theories of science apply to distinguish astrology from other branches of science?
- Do they need to?





# Astrology

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- Zodiac established in 700 BC in Egypt, Chaldea
- Ptolemy (2 AD) *Tetrabiblos* and *Almagest*
- European Renaissance (14<sup>th</sup>-16<sup>th</sup> Century) – widespread rise in developments in arts
- Age of Enlightenment (17<sup>th</sup> – 18<sup>th</sup> century) – lost popularity
- Start of own renaissance in 1930's



Kepler



# 1975 statement by 192 scientists and 19 Nobel prize winners

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Called for the rejection of astrology, arguing it was a pseudo-science because:

- Astrology originated as part of a magical world view
- The planets are too distant for there to be any physical foundation for astrology
- Astrology is incapable of making precise predictions
- People believe it merely out of longing for comfort



# Counterarguments

- Origins are irrelevant to scientific status (e.g., chemistry and alchemy; medicine and witchcraft)
- Many "scientific" theories are based on a multitude of influences resting on tendencies rather than laws
- Astrology is still vaguely testable or verifiable (see Michael Gauquelin)



# Other criticisms of astrology

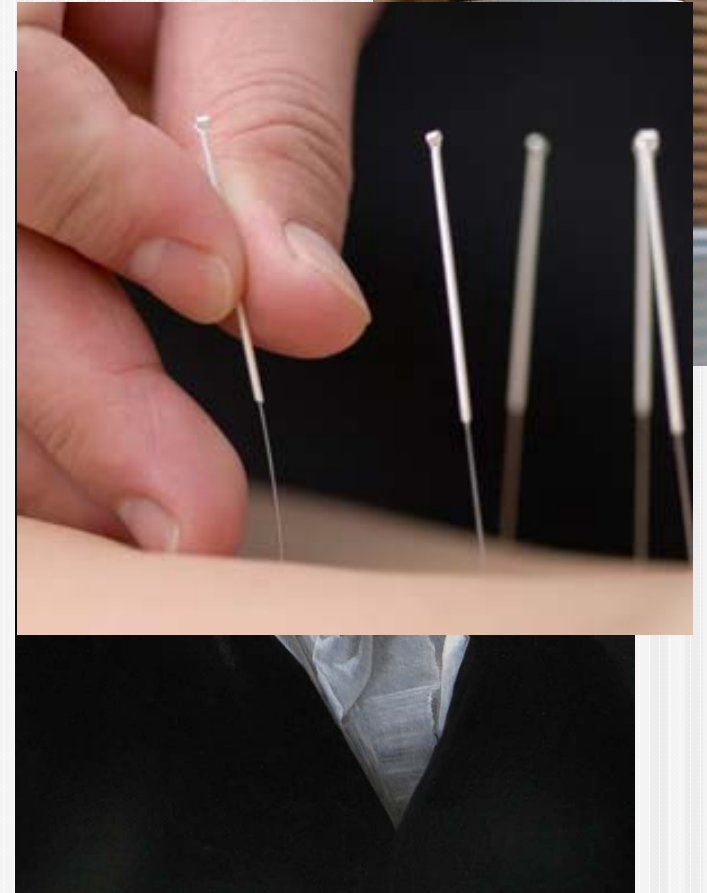
- Resists falsification
- Non-progressive
- Non-critical
- Not "public knowledge"
- Not objective
- Can be replaced by a better theory (psychology, genetics, sociology)





# Other Accusations of Pseudo-Science

- Homeopathy?
- Nutrition?
- Telepathy?
- Acupuncture?
- Extraterrestrials?
- Climate Change?
- Intelligent design?



Sammuel Hahnemann