

Wednesday

- Science and Pseudoscience
- Science and Ideology
- Cases: Creationism, Alternative medicine, climate change debate

■ Literature: Thagard; Feyerabend, Lakatos; Kitcher,

Science and Pseudo-Science

-Demarcation of science from
pseudo science (case study
astrology)

■ Literature: Thagard; Lakatos; Kitcher,

Definitions (OED)

- *Science* – systematic study through observation, experimentation, interpretation to the derivation of universal laws and theories
- *Natural Sciences* – the study of the nature of the material and physical universe (physics, chemistry, biology, geology, astronomy, etc.)
- *Social Sciences* – the study of society and the relationship of individual members within society (economics, history, political science, psychology, anthropology, sociology, etc.)
- *Technology* – the application of practical or mechanical sciences, usually to industry of commerce; the methods, theory and practice governing such applications

(*Vitenskap* – science or branch of knowledge)

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"](#)



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



Case study: Science and Astrology

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



Astrology

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



Kepler



1975 statement by 192 scientists and 19 Nobel prize winners

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)



"Technobabble": Brain Gym"

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

[Newsnight](#)



Hugh Charles Sparker

Other Accusations of Pseudo-Science

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



Samuel Hahnemann



Jorlaf Gjerstad.
Photo Frode Hansen



Astarte
EDUCATION



''Use angels and your own power to create miracles in your life''

Challenges

- Historically many accepted scientific theories have been accused of pseudoscience



Trial of Galileo



Lyschenko and Mendelian genetics

Challenges

- Separation of pseudoscience and political ideology
- Impact of both pseudoscience and ideology on scientific objectivity
 - Cases: Creationism and Climate change debate

Kansas State Science Standards

- August 1999, the Kansas State Board of Education voted 6-4 in favour of state science standards from which several topics, including virtually all references to evolution had been deleted. Students will no longer be tested on these topics
- Also deleted were the Big Bang theory, environmental science concept and any mention of geologic time



Figure 1 The bizarre climax of the sensational Scopes trial occurred on the afternoon of 20 July 1925 when Clarence Darrow (right) questioned William Jennings Bryan (left) about the literal truth of the Bible. The Scopes trial remains the most famous event in the evolution-creationism controversy. Photograph courtesy of Bryan College.

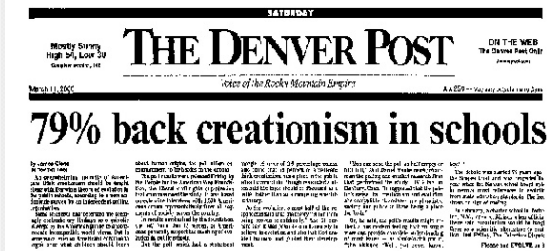


Figure 2 This front-page headline on the 11 March 2000 issue of *The Denver Post* announced Americans' continuing and overwhelming desire to have creationism taught in public schools.

Decades after monkey trial, debate hasn't evolved much

Theory's detractors say 'popular revolt' under way

By TODD ACKERMAN
Houston Chronicle

Even before he became a Christian, Jeff Farmer was an opponent of evolution.

His interest in such matters was fueled, like a wildfire, when he studied animal anatomy and as a budding dentist at Ball State University in Muncie, Ind.

It wasn't until he read Darwin's research in the 1920s, however, that he was convinced evolution was "true."

But when he wrote an opinion column for the *Chronicle* earlier this month, he called evolution a "grand illusion."

That sentiment, he wrote, is not unique to creationists. Many people who are not creationists see it in the same way.

Three decades after the Scopes monkey trial, Americans' resistance to evolution continues to grow. Since the Kansas Board of Education in August 1999, the state has passed several laws to restrict the teaching of evolution in public schools.

It's not as if the most people, as a matter of fact, are turning away from evolution. In fact, a 1997 University of Houston

survey found that 79 percent of Americans support the teaching of creationism in public schools.

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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

naturenews

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

Additional Literature

- "Bad Science" Ben Goldacre, 2006

