

Relativism and the Social Construction of Science: Kuhn, Lakatos, Feyerabend

Theories as structures: Kuhn and Lakatos

Science and Ideology: Feyerabend

Science and Pseudoscience:
Thagaard

Theories as Structures: Lakatos and Kuhn



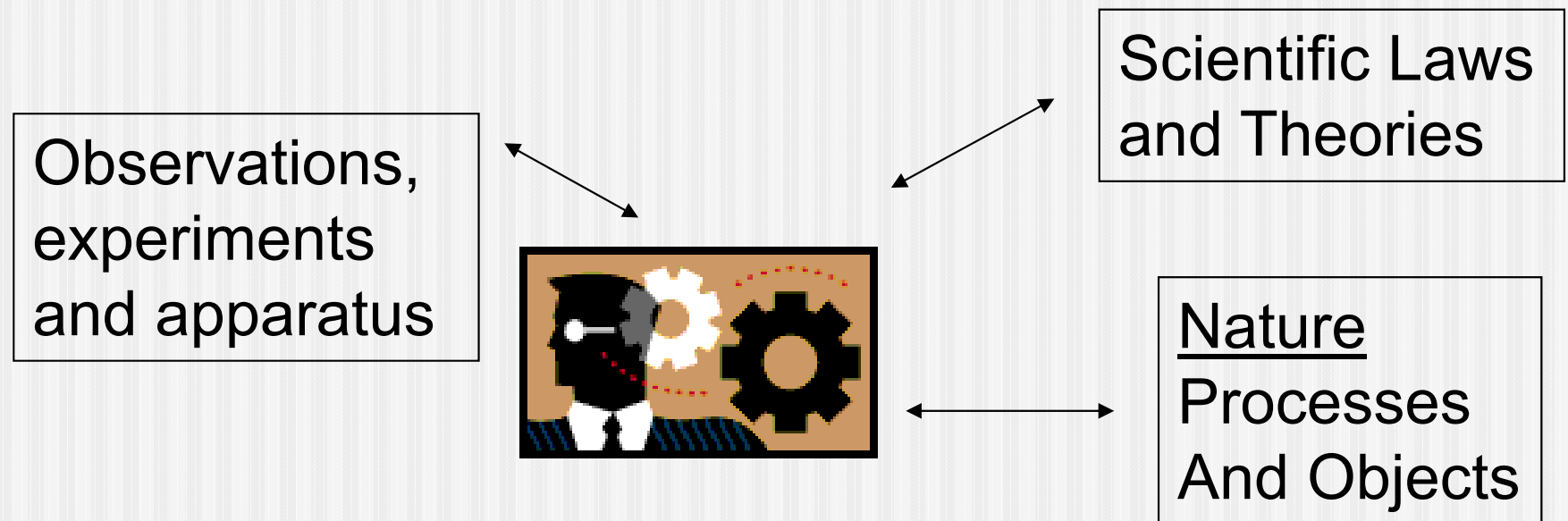
Lakatos and Kuhn

- Inductivist and falsificationist accounts of science fail to take account of the complexity of scientific theories and their development
- Both L. and K. demand that philosophical accounts should stand up to criticism based on the history of science
- Kuhn assigns an important role to the sociological and psychological aspects of scientific communities
- L. and K. differ with respect to “rationalist” / “relativist” attitudes

Theories as Structures

- Theories should be seen as organised structures because:
 1. history shows that theories do possess that structure
 2. a coherent structure is needed to allow concepts to have a precise meaning
 3. science needs to grow (open ended structures stimulates progress)

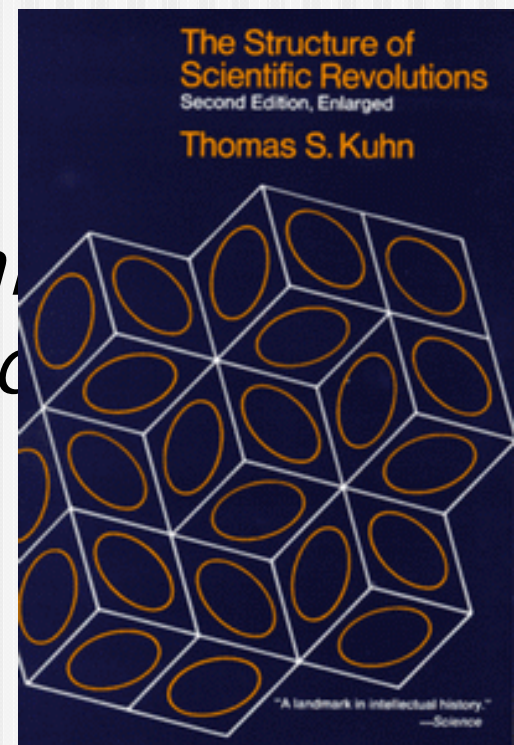
Theories as Structures



Kuhn: Paradigms and Scientific Revolutions

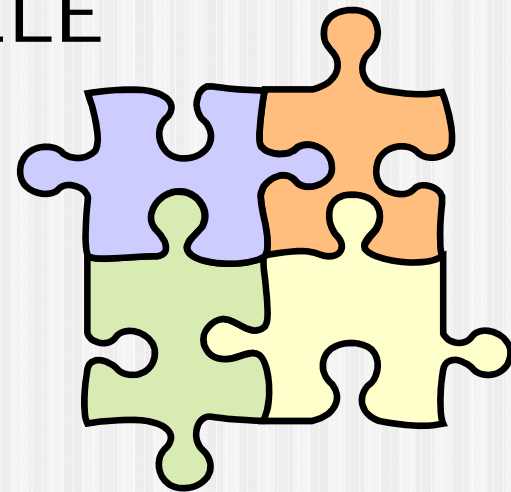
- Progression of Science
 - Pre-Science
 - Normal Science
 - Crisis—Revolution
 - New Normal Science
 - New Crisis
- Paradigm: *a framework of general theoretical assumptions, laws, and results and techniques for their application*

Thomas Kuhn: «*The Structure of Scientific Revolutions*»
(University of Chicago Press: 1962, 1970)



Paradigms

- Framework conformed to by the scientific community
- Open-ended structure enables normal science
- Co-ordinates and directs the PUZZLE SOLVING activity of scientists
- Existence of such a paradigm distinguishes science from non-science
- Have a concrete historical situation

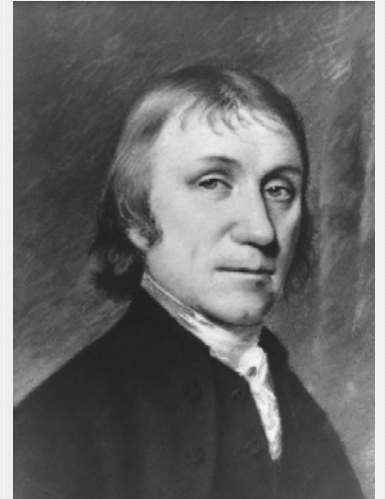


Scientific Revolution

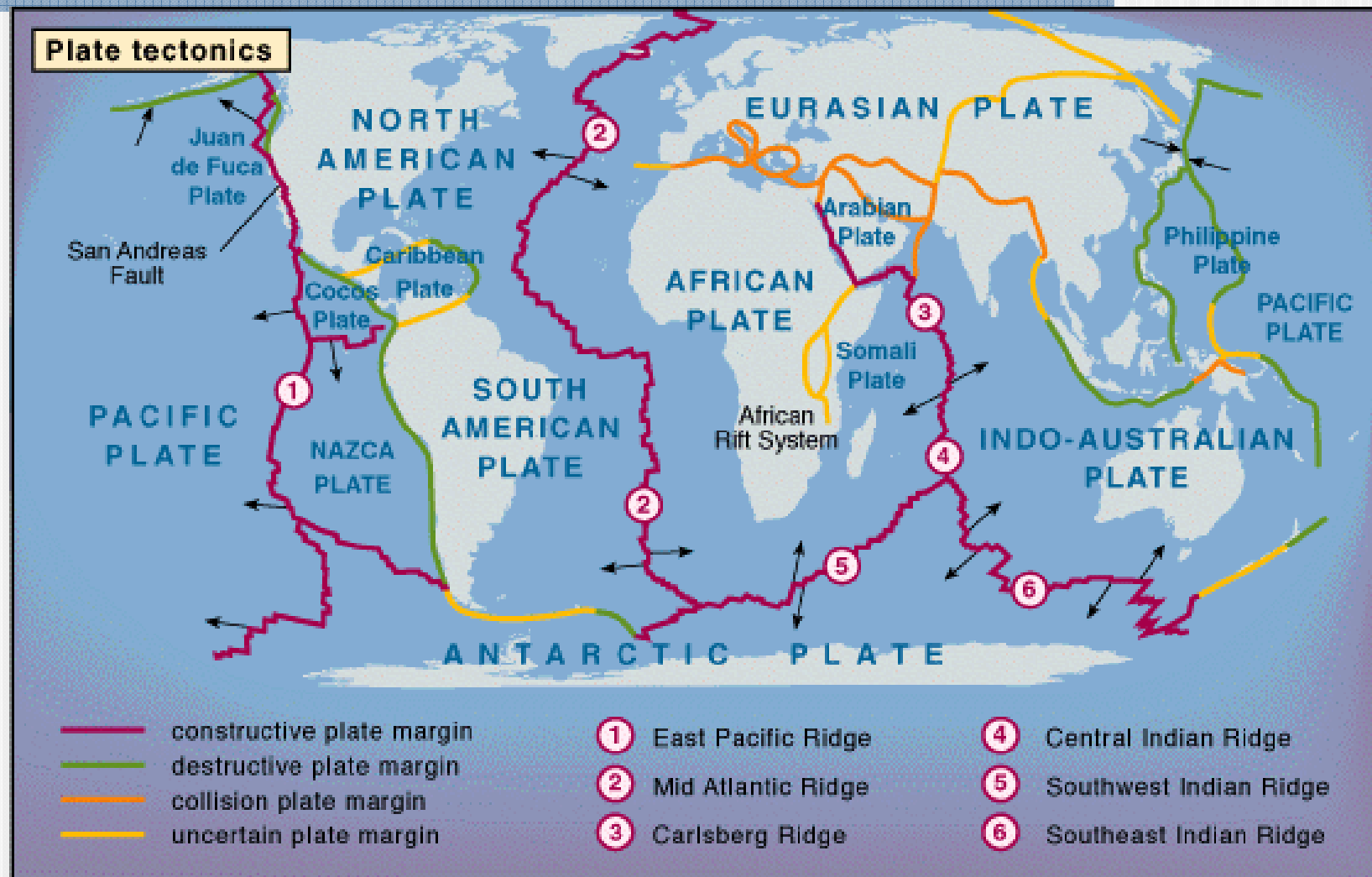
- Arises in response to the accumulation of anomalies and stresses that cannot be resolved within the framework of the paradigm
- *Psychological* - Gestalt switch
- *Sociological* - education, publication, shift amongst the community
- *Epistemological, methodological* - scientists regard different questions as important; do different things
- *Ontological* - scientists see the world differently; regard the world as made of different things

Phlogiston and Oxygen

Priestly and Lavoisier –
both “discovered”
oxygen; only Lavoisier
saw it as oxygen; for
Priestly it was
“dephlogistated air”



Case Study: Plate Tectonics



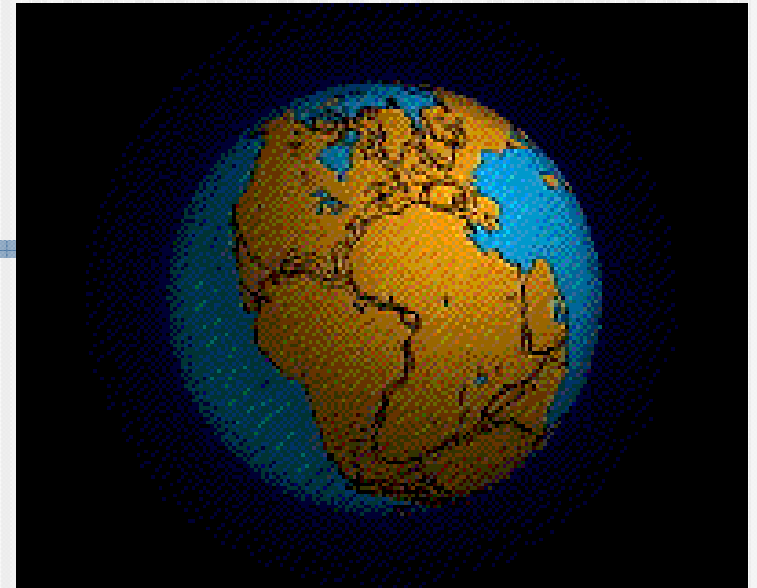
History

- 1915 - Alfred Wegener argued that the continents have «drifted» to their present positions from some other super continent Pangaea
- 1937 - Alexander du Toit published own version of Wegener's thesis (Laurasia and Gondwana)



History

- 1962 - Harry H. Hess
tectonic plate theory of
continents moving
around the globe
- 1963 - Fred Vine and
Drummond Matthews
magnetism of rocks
- Mid 1960s - adopted by
the geological
community



Is the Revolution Kuhnian? (Michael Ruse)

Sociological and Psychological Factors

- Greeted with hostility; textbooks rewritten; young age of revolutionists (apart from Hess); many geologists seemed to have a “conversion experience”

Epistemological and Ontological Factors

- Did the geological revolution cause a change in rules and methods of geology? - No
- Did the data in some way change (or it's interpretation)? - No

Evolution or Revolution ??

Research Programmes

- *Hard Core*: Basic assumptions underlying a research programme
- *Protective Belt*: auxiliary hypothesis, initial conditions, etc. Protects the *Hard Core* from falsification
- *Negative Heuristic*: the hard core must not be modified or rejected
- *Positive Heuristic*: rough guidelines as to how the research programme might be developed

Imre Lakatos: «Falsification and the Methodology of Scientific Research», in: *Criticism and Growth of Knowledge* (Lakatos and Musgrave) CUP:1974



Scientific Progress

- Initially a development on ideas
- Observational testing comes rather late
- Confirmation not falsification measures the success of a research programme
- By then the hard core and protective belt have been developed

Merit of Different Theories

- Coherence and outline of a definite research programme
- Discovery of novel phenomena (progressive)

Problems

- How to choose between different research programmes?
- How to know when a research programme has degenerated?
- Assumes that science is superior rather than proves it

Lakatos' methodology -- "*a verbal ornament*, as a memorial to happier times when it was still thought possible to run a complex and often catastrophic business like science by following a few simple and 'rational' rules" (Feyerabend)

Rationalism and Relativism

Rationalist/Realist - believes there is some universal criterion by which a good scientific theory can be judged (e.g. inductivism, falsificationist, coherence and progression of a research programme)

Relativist - denies this; any criterion will be relative to both the individual and the community

The slippery slope...

"Lakatos aimed to give a rationalist account of science; Kuhn denied that he aimed to give a relativist account of science but gave one nevertheless" Chalmers

Consequences of Relativism

"If 'science' (the relativist might well be inclined to use quotation marks) is highly regarded in our society, then this is to be understood by analysing our society, and not simply by analysing the nature of science" (Chalmers)

"Man is the measure of all things" Protagoras


"There is no standard higher than the assent of the scientific community" Kuhn

Science, Pseudoscience and Ideology

Cases: Creationism, Astrology,
Alternative medicine, Climate change
debate

■ Literature: Thagard; Feyerabend, Lakatos; Kitcher,

A set of ideas and beliefs: generally referring to political or social theory



Science and Ideology

Feyerabend's
anarchistic view of
science

Creationism debate

Literature:

Feyerabend; *"How to defend society against science"*

Kitchner, *"Believing where we cannot prove"*

Chalmers

Paul Feyerabend



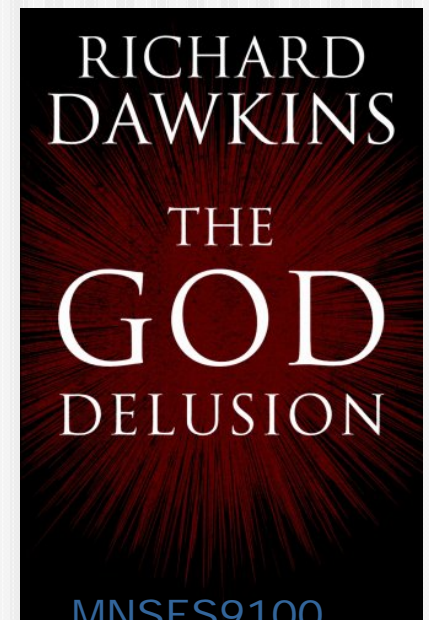
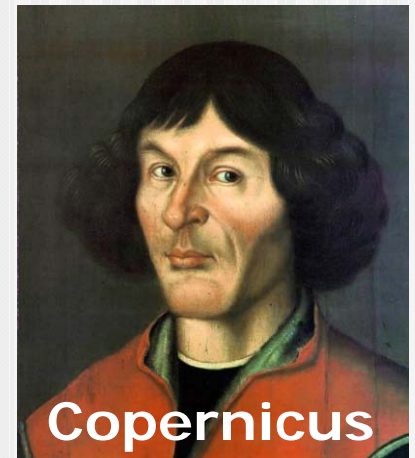
*"Against Method:
Outline of an
Anarchistic Theory of
Knowledge"* London
New Left Books,
1975

Against Method (1975)

- Wants to defend society against ideologies
- Suggests that 17th and 18th century science was an instrument of liberation (breaks hold the comprehensive system of thought) and enlightenment (made man question inherited beliefs)
- Claims that modern science has deteriorated into a «stupid religion»
«Science, with all its reductionism and materialism, has deprived man of his special status—only an idea of culture that excludes science can restore man's dignity» (Nietsche)

Feyerabend on Science and Religion

- Scientific «facts» are taught at a very early age and in the same way religious «facts» were taught a century ago.
- Science doesn't receive the criticism that society gets even at elementary level.
- The judgement of the scientists is received in much the same way as the bishop and cardinal was accepted.
- Science has become as oppressive as the ideologies it once had to fight. Heretics in science are sanctioned



Feyerabend's Argument

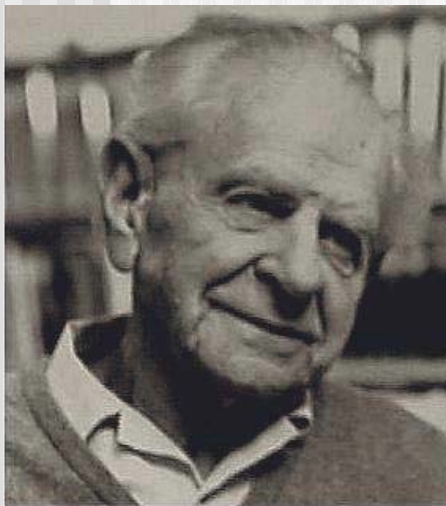
Two common arguments to defend the exceptionalist position that science has in society today:

- 1) That science has found the correct *method* for achieving results
- 2) That there are many *results* to prove the excellence of the method

Feyerabend's Argument

Feyerabend:

1) There is no such method



Sir Karl Popper (1902-1994)

Popper: rigid standards..
"would eliminate science"



Lakatos: "offers *words* that *sound* like a methodology: he does not offer a methodology"

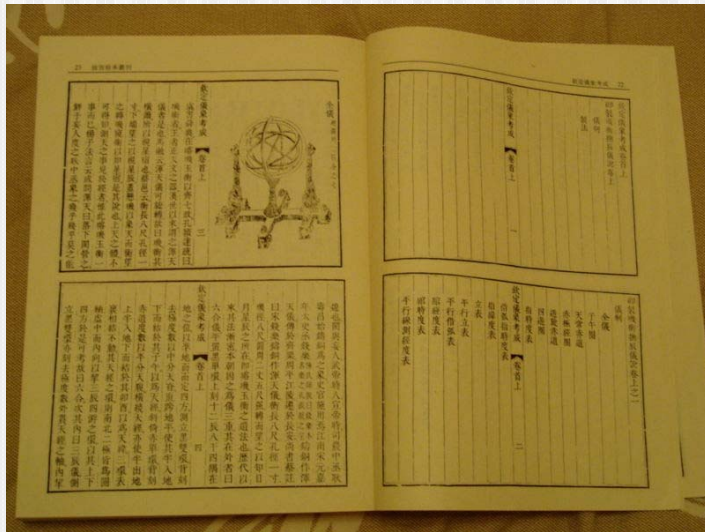


Kuhn: "too vague to give rise to anything but hot air"

Feyerabend's Argument

Feyerabend:

- 1) There is no such method
- 2) Only holds if it can be taken for granted that nothing else has produced results



"Science is just one of many ideologies that propel society and it should be treated as such"

Chinese astronomy

Against Method

" Anything goes "

" ... *or everything stays* "
(*Chalmers*)

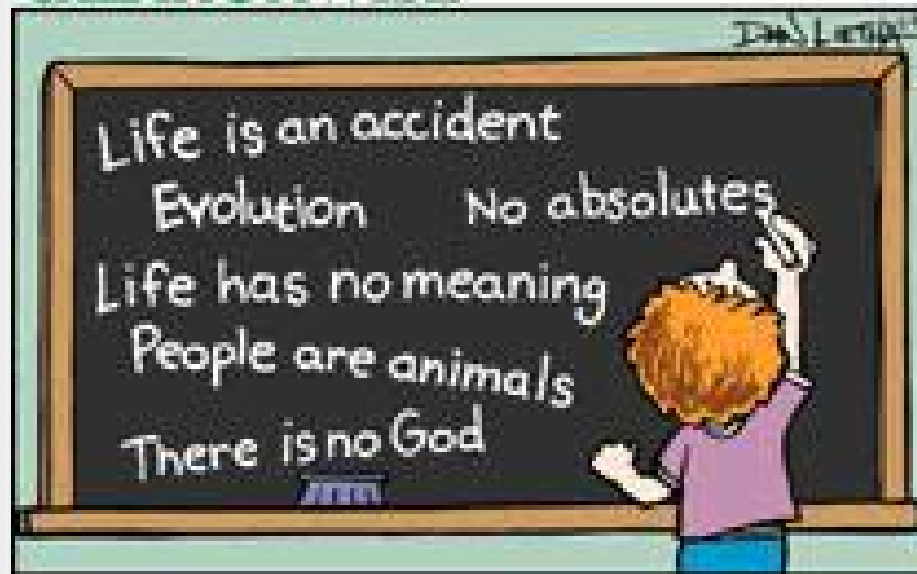
"Anything Goes"

- " A truth that reigns without checks and balances is a tyrant who must be overthrown, and any falsehood that can help us in the overthrow of this tyrant is to be welcomed"*
- "Three cheers to the fundamentalists of California who succeeded in having a dogmatic formulation of evolution removed from the textbooks and an account of Genesis included"*

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!

Challenges (Lakatos)

- Historically many accepted scientific theories have been accused of pseudoscience



Trial of Galileo



Lysenko and Mendelian genetics