

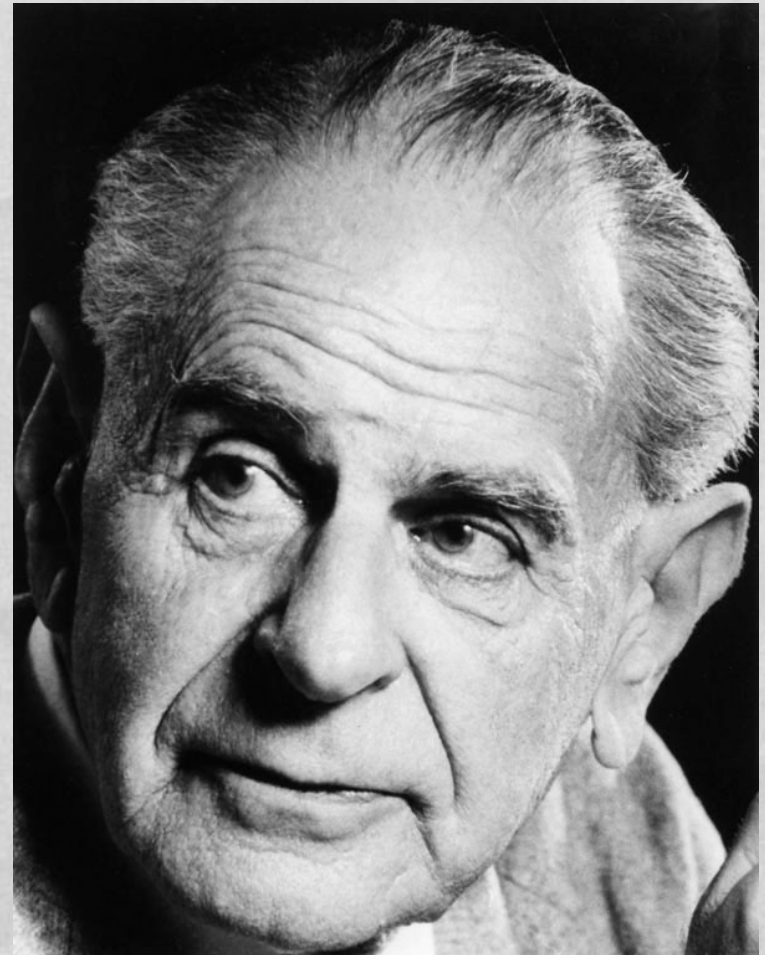
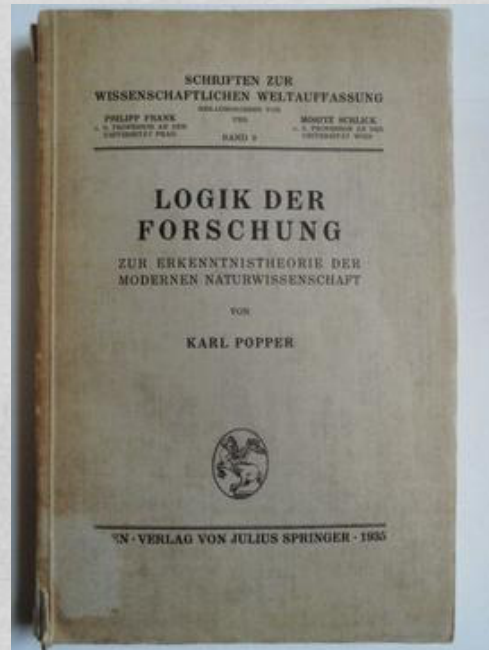
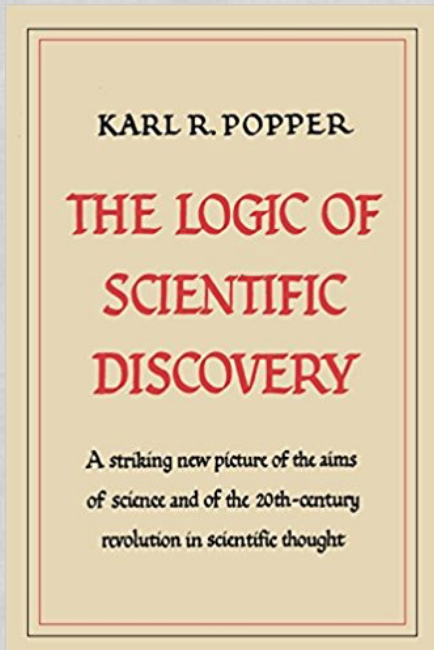
SCIENCE AND TESTABILITY

Joel Velasco
Feb 8, 2018

SIR KARL POPPER (1902-1994)

*The Logic of Scientific
Discovery*

1934 in German
1959 in English



FALSIFIABILITY

- The question is NOT “When is a theory true? ... I wished to distinguish between science and pseudo-science; knowing very well that science often errs, and that pseudo-science may happen to stumble on the truth.”
 - The criterion of the scientific status of a theory is its falsifiability, or refutability, or testability

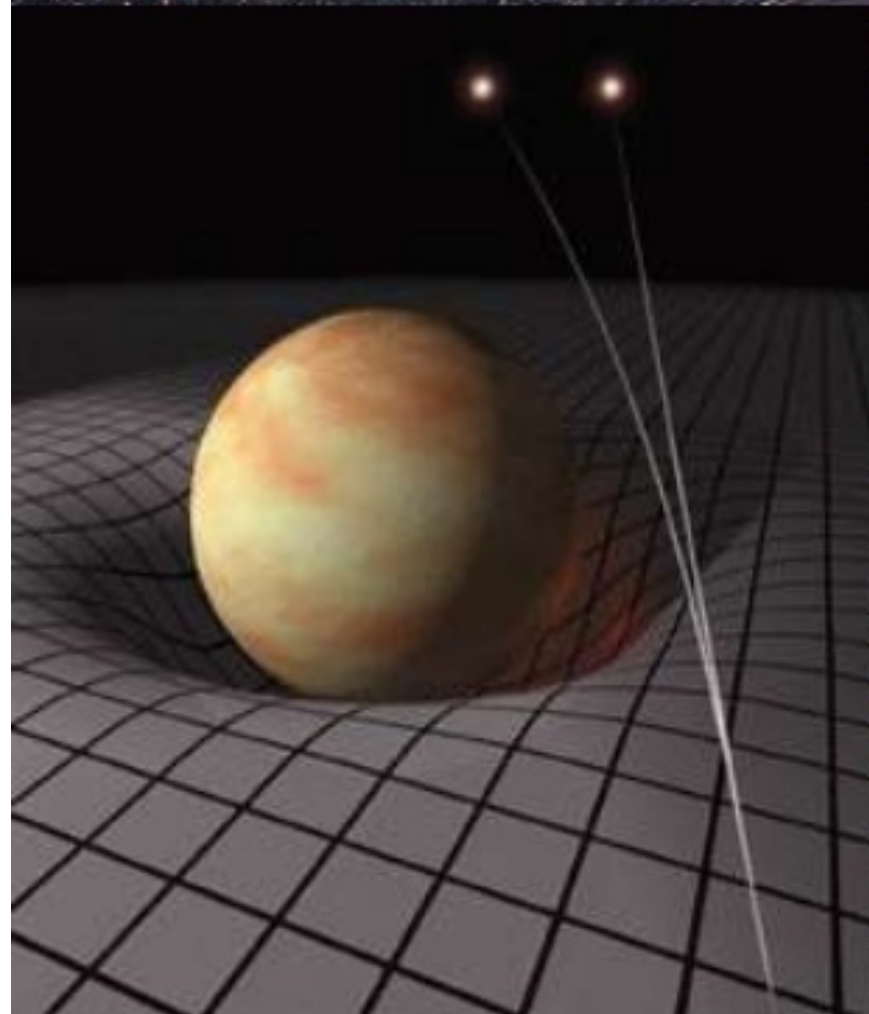
CONJECTURES AND REFUTATIONS (POPPER 1963)

- “What is wrong with Marxism, psycho-analysis, and individual psychology? Why are they so different from physical theories, from Newton’s theory, and especially from the theory of relativity?”

Answer: Einstein predicted that light bends around the sun, these other theories don’t predict anything in particular - they are consistent with *any* result.

Testing the Theory:

Eddington's 1919 Expedition to Principe



- Experiment always has the final say.
- GTR could be confirmed by measuring the deflection of light passing close to a massive body.
- For the deflection to be sizeable, the massive body would have to be the sun.
- However, observing deflection is difficult as the brightness of the sun blots out the stars 'close by'.
- Solution? Observe shifts in apparent positions of stars during solar eclipse.

Testing the Theory: Eddington's 1919 Expedition to Principe



- In May 1919, British astronomer Arthur Eddington sailed to Principe, of the coast of Africa, where a total solar eclipse would be observed.
- He took a series of photographs of the sun, as the eclipse progressed.
- The plates clearly showed a shift in the apparent position of the background stars by an amount as predicted by Einstein.
- GTR had been proved.

CONFIRMATION VS. FALSIFICATION

If H then O

O

—————

H

If H then O

not O

—————

not H

Logic of confirmation:

Affirming the consequent

Deductively invalid

Logic of falsification:

Modus Tollens

Deductively valid

POPPER IS EVERYWHERE

- “Any acceptable scientific theory must make testable predictions; otherwise, as Karl Popper consistently maintained, a theory is just idle speculation.” (pg 164)

ROBERT M. HAZEN

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the origin or coming
into being of some

gen•e•sis

s/n,pl -e•ses
n or coming
ing of something

THE SCIENTIFIC QUEST FOR LIFE'S ORIGIN

POPPER'S PROBLEMS WITH EVOLUTION

- “I have come to the conclusion that Darwinism is not a testable scientific theory, but a *metaphysical research programme*” (pg 134)

**Popper, K. "Darwinism as a Metaphysical Research Programme."
In P. A. Schilpp (ed.), The Philosophy of Karl Popper. Vol. I.
LaSalle, Ill: Open Court, 1974, pp. 133-143.**

History of Antievolution Legal Cases



- Scopes Trial, 1925
- Evolution banned in many states
- “Monkey Trial”
- ACLU actually *lost*, the laws remained on the books

BUTLER ACT (TENNESSEE 1925)

The law, "An act prohibiting the teaching of the Evolution Theory in all the Universities, and all other public schools of Tennessee, which are supported in whole or in part by the public school funds of the State, and to provide penalties for the violations thereof" (Tenn. HB 185, 1925) specifically provided:

That it shall be unlawful for any teacher in any of the Universities, Normals and all other public schools of the State which are supported in whole or in part by the public school funds of the State, to teach any theory that denies the Story of the Divine Creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals.

COMMENTS ON THE LAW

- Butler (Tennessee farmer/legislator)
—— “I didn't know anything about evolution... I'd read in the papers that boys and girls were coming home from school and telling their fathers and mothers that the Bible was all nonsense.”
- William Jennings Bryan (to governor Austin Peay)
—— “The Christian parents of the state owe you a debt of gratitude for saving their children from the poisonous influence of an unproven hypothesis.”

Tennessee v. Scopes (1925)

(aka the Scopes Monkey Trial)



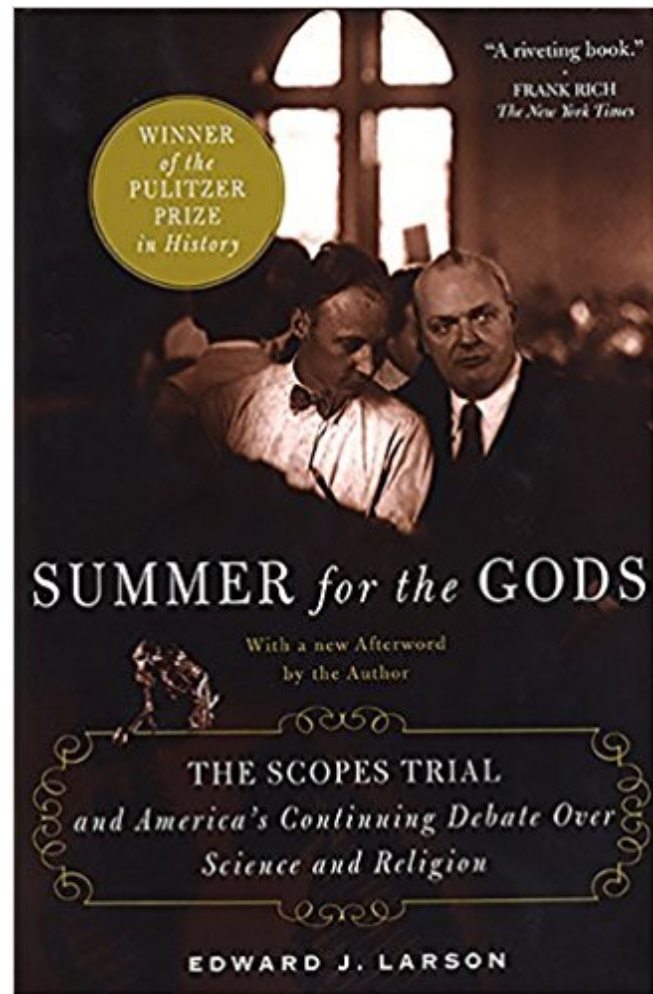
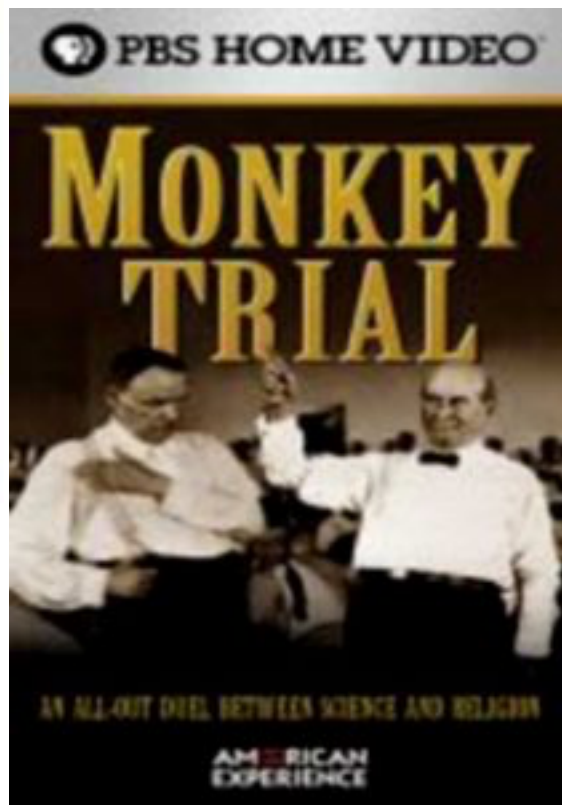
WILLIAM JENNINGS BRYAN

Scene at Dayton Courtroom during Scopes trial as the Commoner delivered his speech defending the Bible

ACLU actually
lost

Evolution
banned in many
states

William Jennings Bryan




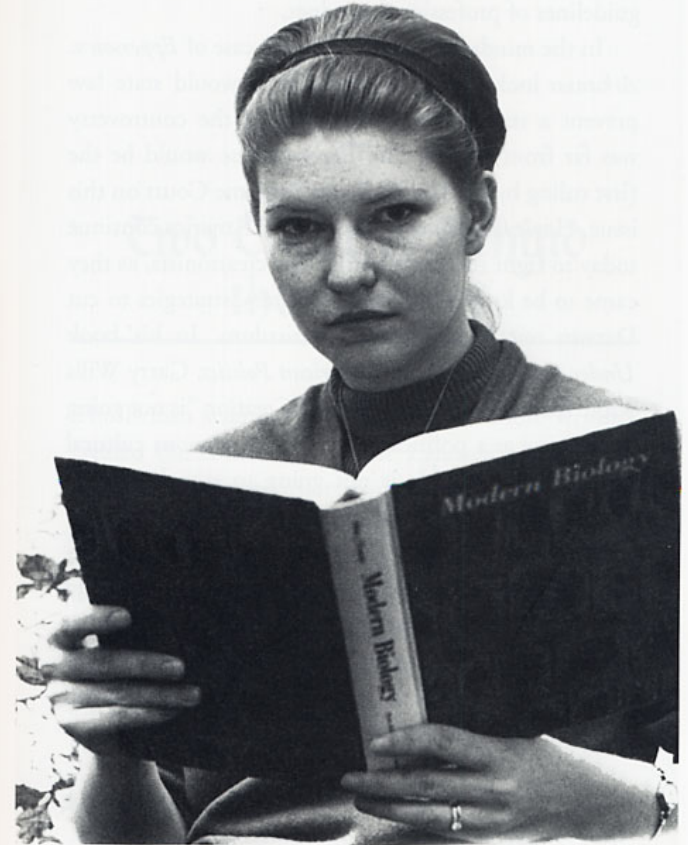
Epperson v. Arkansas

Epperson v. Arkansas: Constitution does not permit a state to require that teaching and learning must be tailored to the principles or prohibitions of any particular religious sect or doctrine.



The 1967–68 Supreme Court that decided *Epperson v. Arkansas* is shown. Seated from left to right: John M. Harlan, Hugo L. Black, Earl Warren, William O. Douglas, and William J. Brennan, Jr. Standing from left to right: Abe Fortas, Potter Stewart, Byron R. White, and Thurgood Marshall.

Susan Epperson's Dilemma 



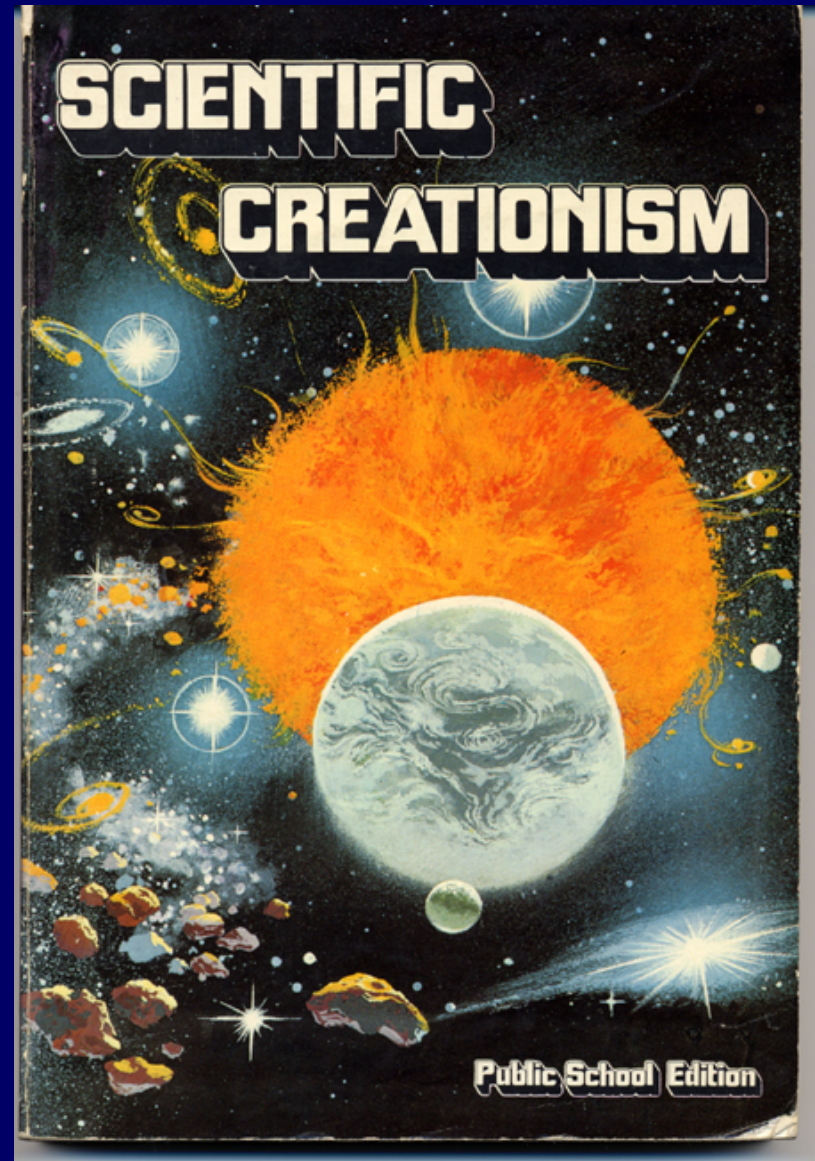
Susan Epperson holds the textbook that violated the antievolution law.

History: “Creation-science”

- Henry Morris
- Duane Gish
- Institute for Creation Research

“Equal Time” Laws:

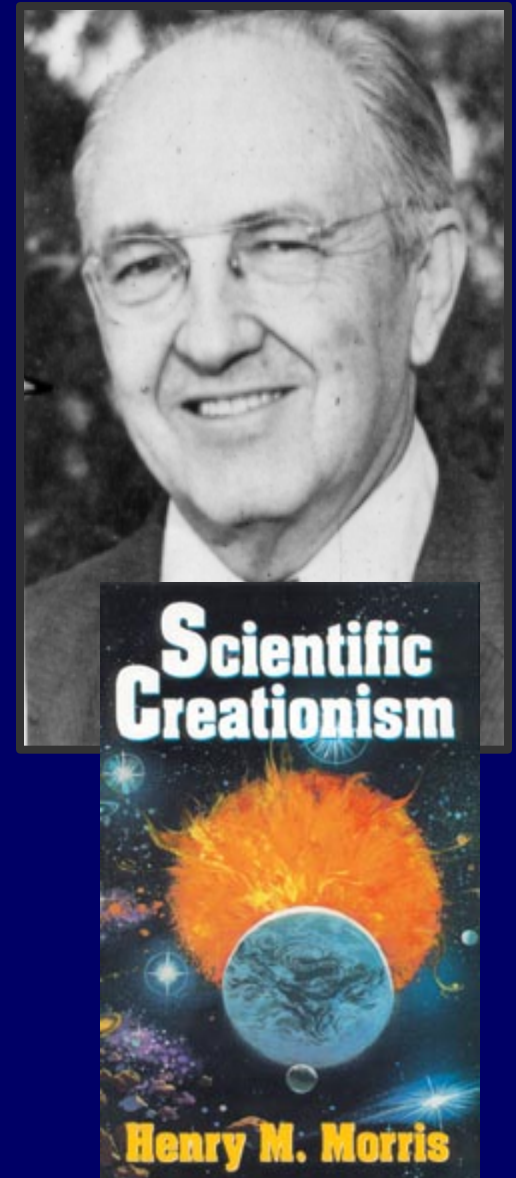
Either teach both evolution and creation science, or neither



Background: Why the fuss over evolution?

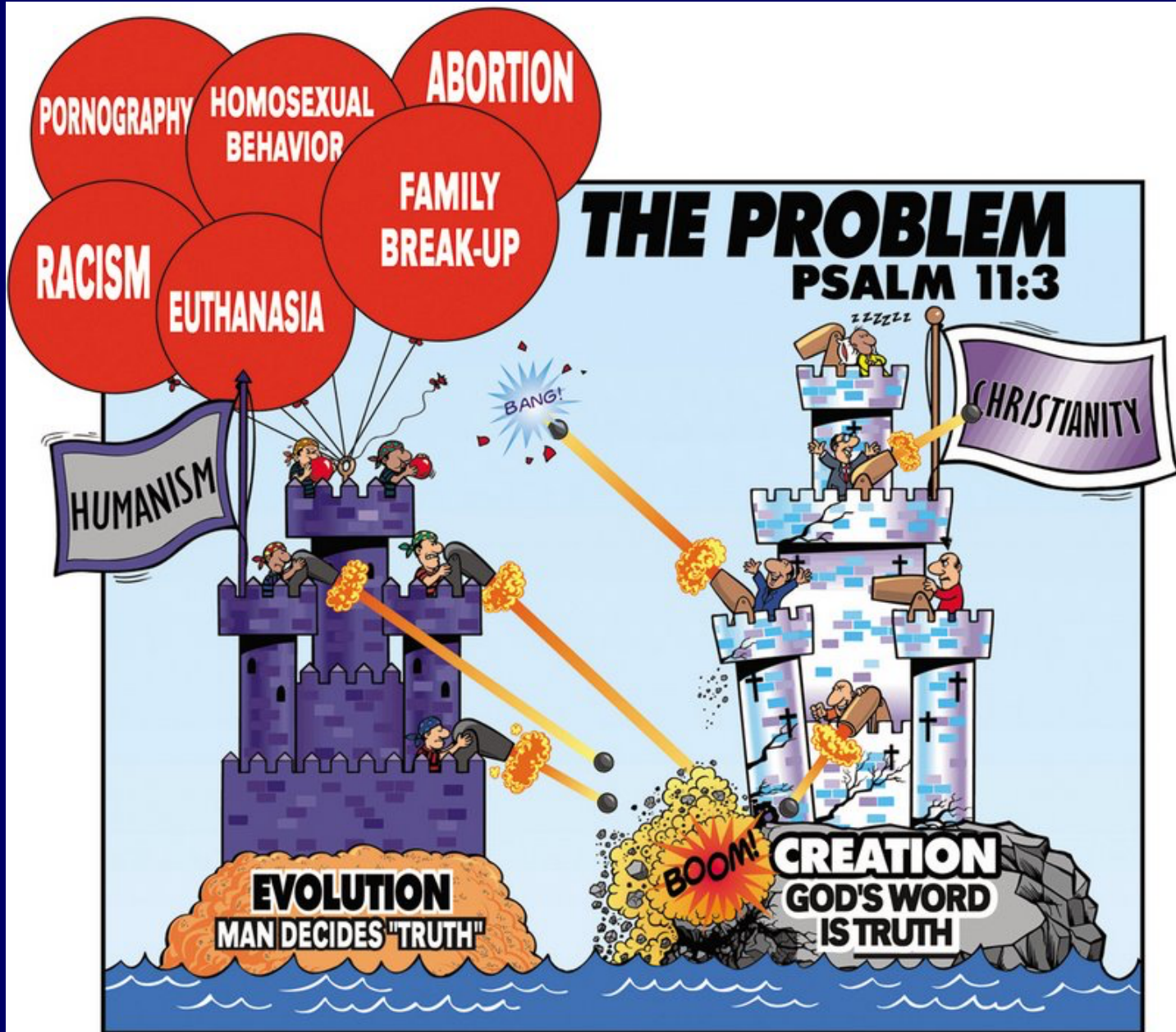
"Evolution is at the foundation of communism, fascism, Freudianism, social Darwinism, behaviorism, Kinseyism, materialism, atheism, and in the religious world, modernism and neo-orthodoxy. Jesus said, 'A good tree cannot bring forth corrupt fruit.' In view of the bitter fruit yielded by the evolutionary system over the past hundred years, a closer look at the nature of the tree itself is well warranted today."

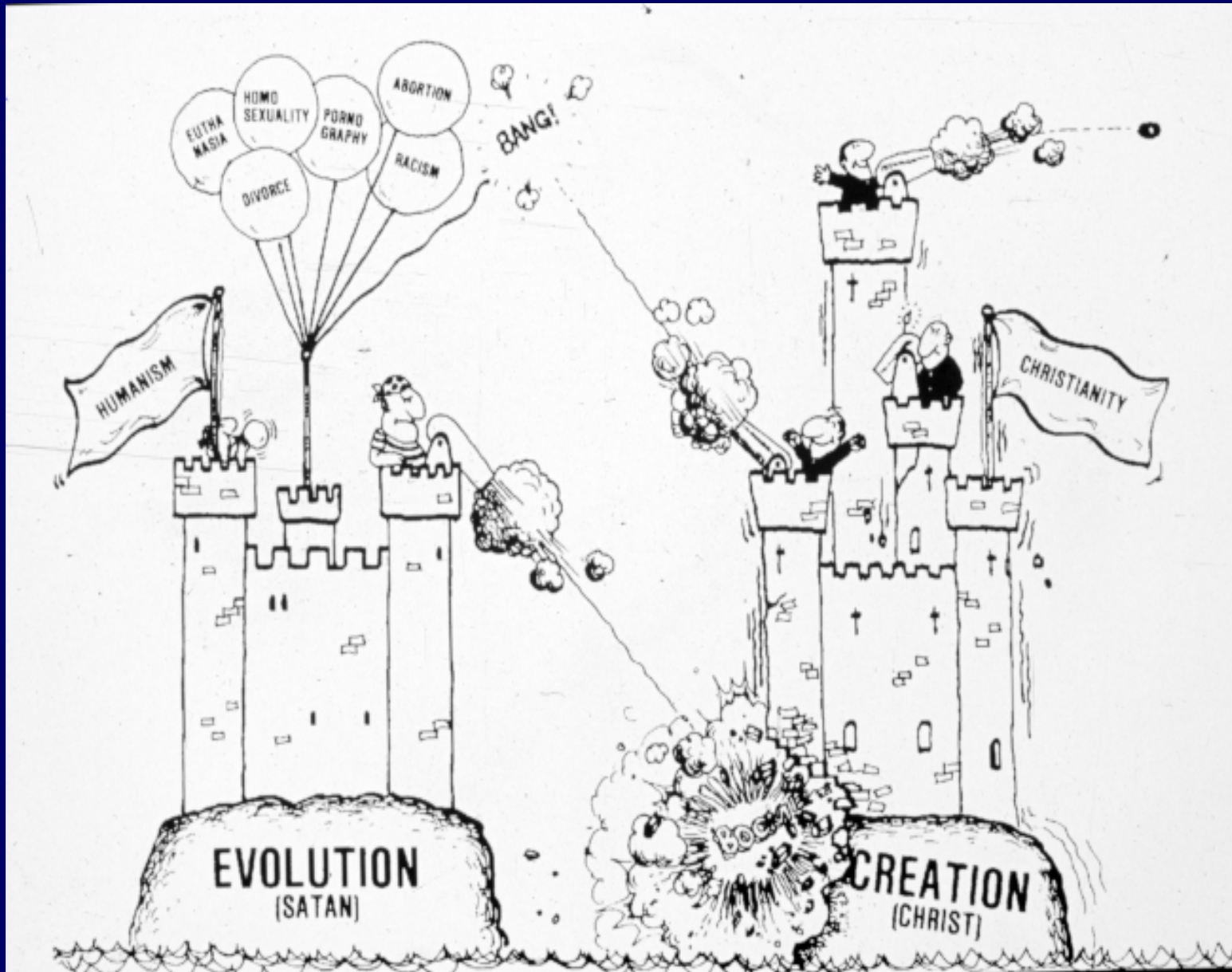
-- Henry Morris, *The Twilight of Evolution*, p. 24, 1963





From Answers in Genesis (Ken Ham):





KEN HAM

ANSWERS IN GENESIS (1982)

While Christians *could* see the increasing rejection of Christian morality, as well as the growing acceptance of abortion and homosexual behavior, family breakdown (a “culture war”), etc., they couldn’t see the real foundational reason. Many Christians (zealous for the faith) were fighting only the issues (such as abortion), when in reality, these were just the *symptoms* of the *real* problem—the loss of Biblical authority, beginning with Genesis. We wanted to represent this artistically, and a castle illustration began to “evolve.”

McLean v. Arkansas Board of Ed.

• 1982 Decision, struck down "Equal Time" Laws

No Way to Explain Creationism Without Creator, Judge Told

Scientists Hit Contentions Of Creationists

By GEORGE WELLS
Gazette Staff



DR. STEPHEN J. GOULD

Jay Gould of the Harvard University geology department and Dr. Harold Morowitz of the Yale University department of biophysics and biochemistry sharply disputed key contentions of creation-science advocates about alleged scientific evidence supporting their views.

The American Civil Liberties Union, which filed the suit in May on behalf of 23 groups and individuals who believe the law violates the First Amendment prohibition against the establishment of religion, completed its evidence on science Wednesday and began the final phase of its case, which deals with education. The ACLU has now presented evidence from theologians to support its contention that the law is really religion in disguise and scientists who said creation-science is not science.

The state will begin calling its witnesses immediately after the

olution to give balanced treatment to creation-science.

Earlier Wednesday, Dr. Stephen

(See CREATOR on Page 24A.)

Arkansas Gazette.



WEATHER
Mild becoming colder with a high near 60 and a low in the upper 20s.
(Weather Map on Page 2B.)

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LITTLE ROCK, WEDNESDAY, JANUARY 6, 1982

90 Pages 20 Cent

Creation Law Struck Down

Act Called Bid To Advance Biblical View

By GEORGE WELLS
Gazette Staff

Federal Judge William R. Overton declared Act 590 of 1981 unconstitutional Tuesday after finding that "the evidence is overwhelming that both the purpose and effect of Act 590 is the advancement of religion in the public schools."

In a 38-page opinion, he rattled nearly every defense raised by Attorney General Steve Clark during 41 days of testimony last month and agreed with the American Civil Liberties Union completely that the law could not be disentangled from its religious roots.

The judge also enjoined the state from implementing the law, which would have gone into effect in the fall. Act 590 would have required all public schools that teach evolution to give balanced treatment to the "scientific evidence" supporting creation-science.

"Not one Arkansas state school is taught along with evolution because most Americans wanted that," Judge Overton commented that the "application of First Amendment principles are not determined by public opinion polls or by a majority vote. Whether the proponents of Act 590 constitute a majority is quite irrelevant under a constitutional form of government. No group, no matter how large or small, may use the organs of government, of which the public schools are the most conspicuous and influential, to foster its religious beliefs on others."

Clark said Tuesday that the law was basically defensible and that he would probably appeal, but would have to read the decision closely and consult with the state education



Steve Clark listening on radio call-in show.

Clark Calls Decision Surprise; Undecided Whether to Appeal

Federal Judge William R. Overton's decision striking down the creation-science law surprised Attorney General Steve Clark because it was

saw contradictions in Judge Overton's findings. He pointed out that the judge was firm in saying creation-science is religion, not science, but

MCLEAN V. ARKANSAS RULING (JUDGE WILLIAM OVERTON)

Essential characteristics of science:

1. It is guided by natural law
2. It has to be explanatory by reference to natural law
3. It is stable against the empirical world
4. Its conclusions are tentative i.e. are not necessarily the final word
5. It is falsifiable

FROM POPPER TO RUSE TO OVERTON...

- These characteristics come (more or less) directly from the testimony of philosophy Michael Ruse - who of course discussed Popper's views...

“The concept of falsifiability is something which has been talked about a great deal by scientists and others recently. It's an idea which has been made very popular by the Austrian-English philosopher, Karl Popper. Basically, the idea of falsifiability...” (Ruse, transcript)

FROM POPPER TO RUSE TO OVERTON...

- Of course Ruse was also asked by the defense about Popper's views on evolutionary theory...
 - MR. NOVIK: Excuse me, your Honor. We learned from the Attorney General yesterday in his opening argument that the State is interested in demonstrating that evolution is not science, and that evolution is religion. This line of questioning seems to go to that issue. The plaintiffs contend that that entire line of questioning as to both of those points are irrelevant to these proceedings. Evolution is not an issue in this case.

Edwards v. Aguillard (1987)

- Louisiana law challenged
- Supreme Court Decision confirmed the judgment in *McLean*

NOTICE: This opinion is subject to formal revision before publication in the preliminary print of the United States Reports. Readers are requested to notify the Reporter of Decisions, Supreme Court of the United States, Washington, D. C. 20543, of any typographical or other formal errors, in order that corrections may be made before the preliminary print goes to press.

SUPREME COURT OF THE UNITED STATES

No. 85-1513

EDWIN W. EDWARDS, ETC., ET AL. APPELLANTS *v.*
DON AGUILLARD ET AL.

ON APPEAL FROM THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

[June 19, 1987]

JUSTICE BRENNAN delivered the opinion of the Court.

The question for decision is whether Louisiana's "Balanced Treatment for Creation-Science and Evolution-Science in Public School Instruction" Act (Creationism Act), La. Rev. Stat. Ann. §§ 17:286.1-17:286.7 (West 1982), is facially invalid as violative of the Establishment Clause of the First Amendment.

I

I

The Creationism Act forbids the teaching of the theory of evolution in public schools unless accompanied by instruction in "creation science." § 17:286.4A. No school is required to teach evolution or creation science. If either is taught, however, the other must also be taught. *Ibid.* The theories of evolution and creation science are statutorily defined as "the scientific evidences for [creation or evolution] and inferences from those scientific evidences." §§ 17:286.3(2) and (3).

Appellees, who include parents of children attending Louisiana public schools, Louisiana teachers, and religious leaders, challenged the constitutionality of the Act in District Court, seeking an injunction and declaratory relief.¹ Appel-

¹Appellants, the Louisiana Governor, the Attorney General, the State Superintendent, the State Department of Education and the St. Tammany Parish School Board, agreed not to implement the Creationism Act pending the final outcome of this litigation. The Louisiana Board of Elementary and Secondary Education, and the Orleans Parish School Board were

The end of creationism?

- Creationists saw hope in one line of *Edwards*:

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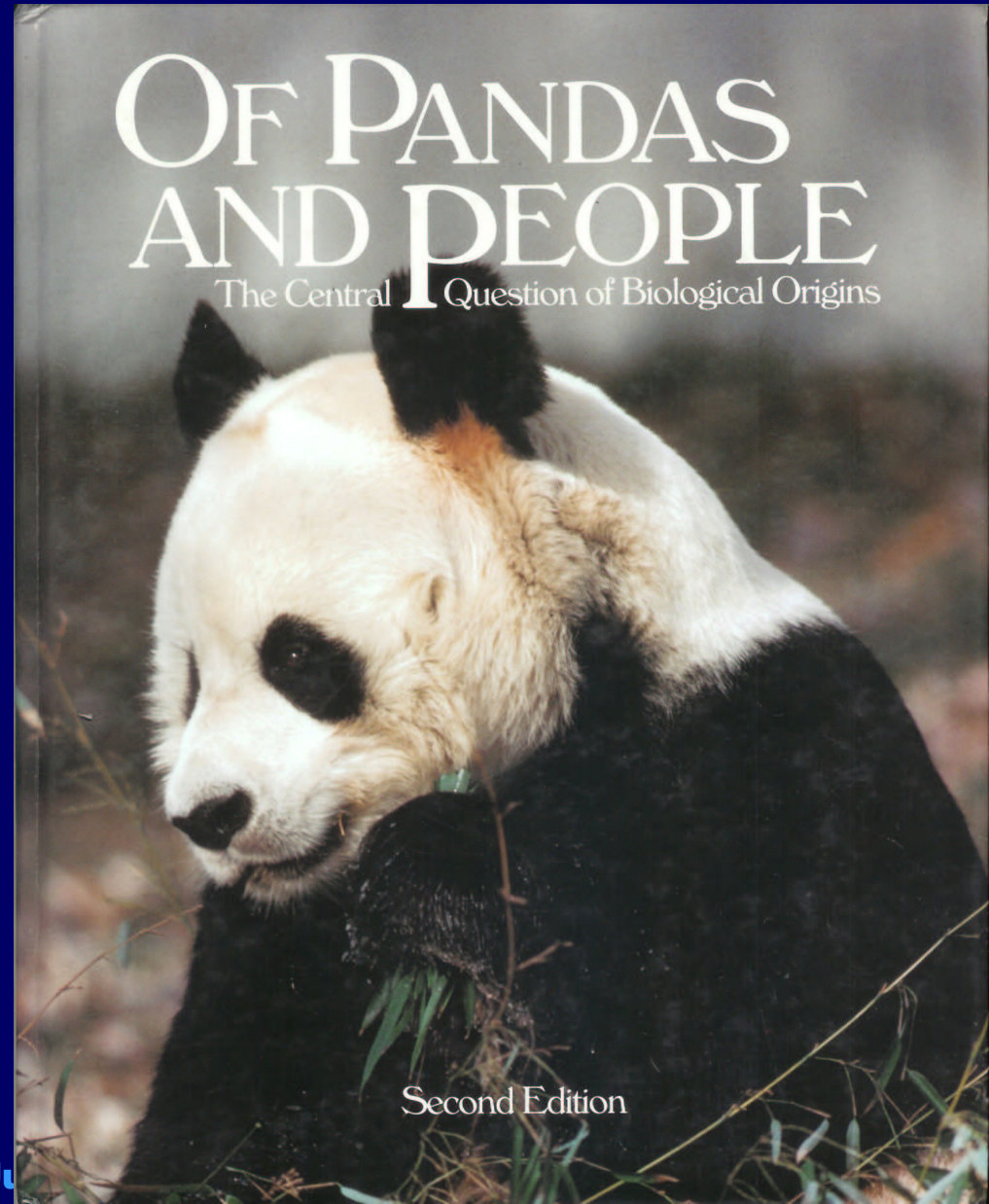
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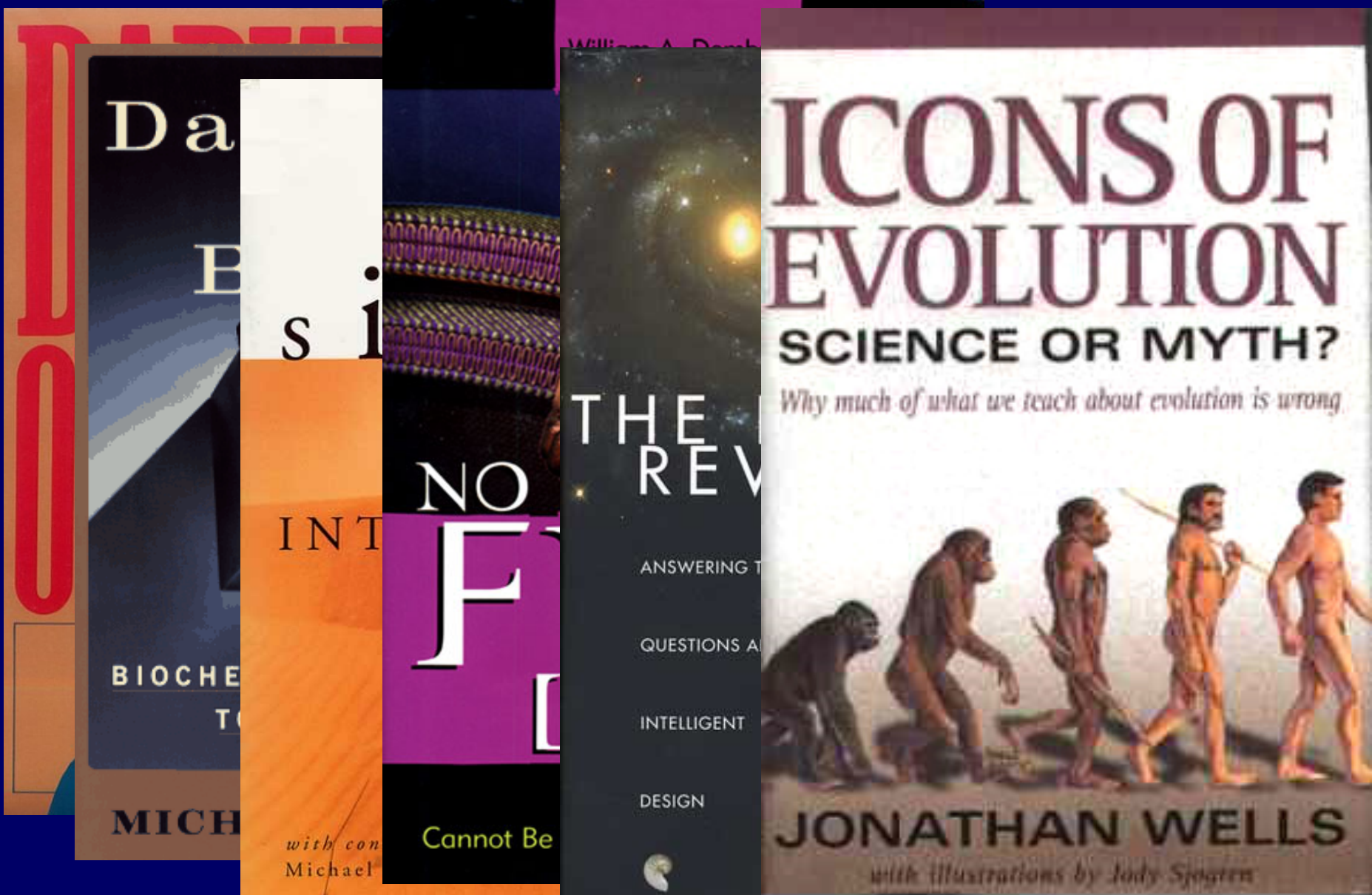
“Teaching a variety of scientific theories about the origins of human-kind to school children might be validly done with the clear secular intent of enhancing the effectiveness of science instruction.”

Creationism Evolves

- Creationists saw hope in one line of *Edwards*
- “Intelligent Design” (ID) is born as the new buzzword in the 1989 book *Of Pandas and People* by Davis and Kenyon
- Dean Kenyon: Pro-creationism affidavit in *Edwards*
- Dean Kenyon: “Creationist View of Biological Origins”, *NEXA Journal*, Spring 1984
- Percival Davis: *The Case for Creation* (1967, 1983)



Intelligent Design

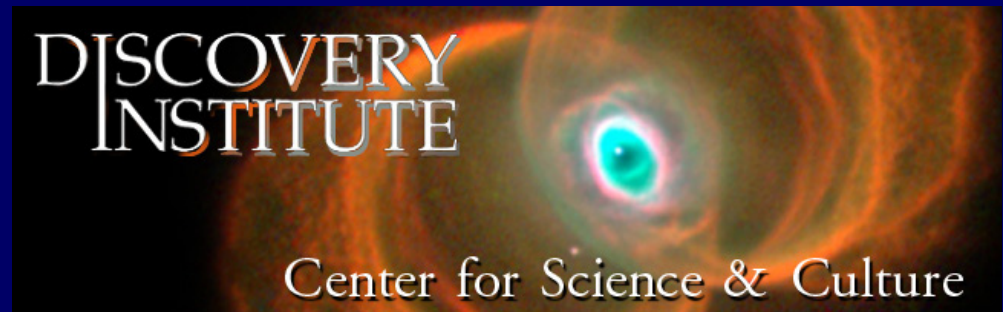


Background: Why the fuss over evolution?

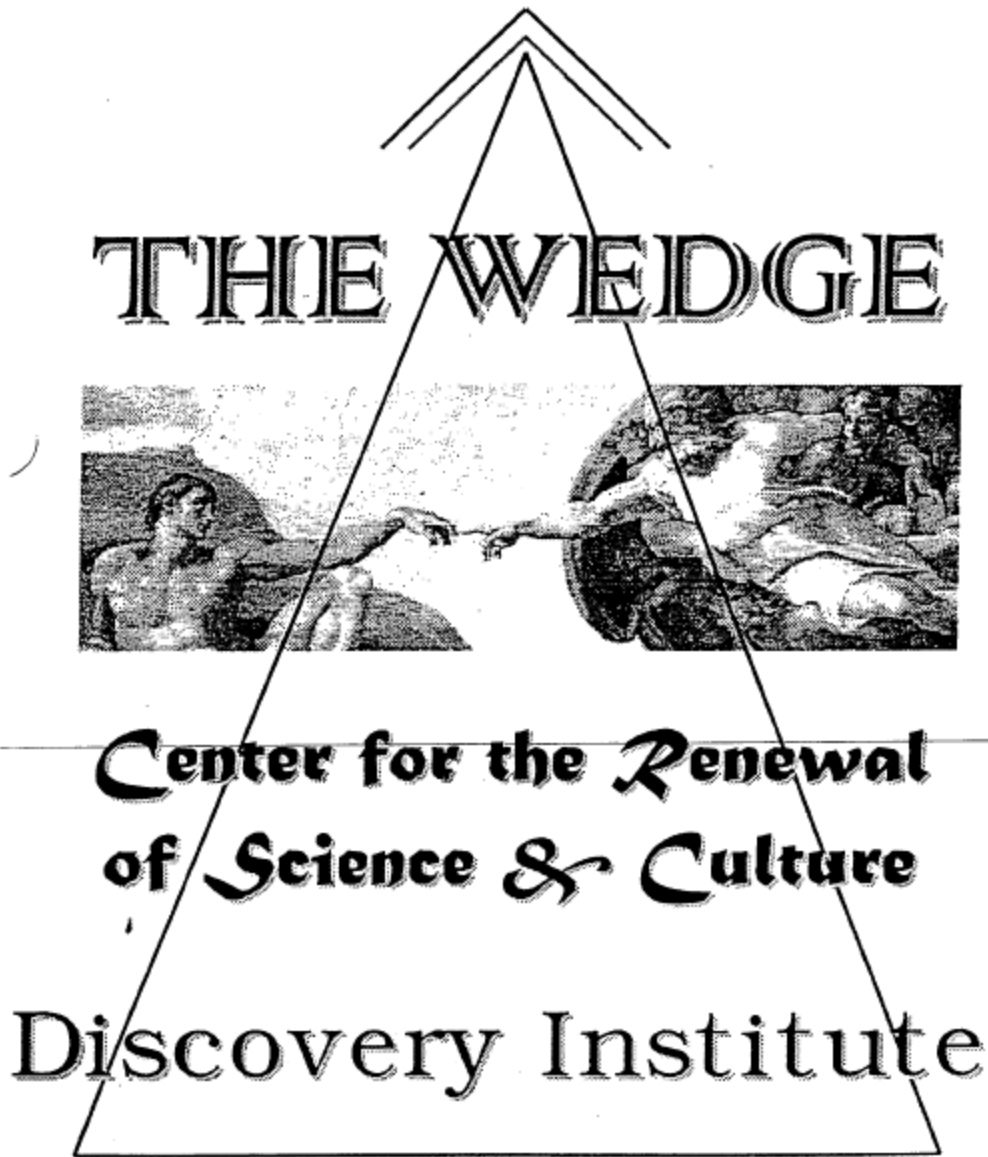
"Our view of origins shapes our understanding of ethics, law, education--and yes, even sexuality. If life on earth is a product of blind, purposeless natural causes, then our own lives are cosmic accidents. There's no source of transcendent moral guidelines, no unique dignity for human life. On the other hand, if life is the product of foresight and design, then you and I were meant to be here. In God's revelation we have a solid basis for morality, purpose, and dignity."



-- Nancy Pearcey, Discovery Institute Fellow. "Design & the Discriminating Public." *Touchstone*. July/August 1999. http://www.leaderu.com/orgs/arn/pearcey/np_touchstone0899.htm



Background: Why the fuss over evolution?



GOALS

Governing Goals

- ◆ To defeat scientific materialism and its destructive moral, cultural and political legacies.
- ◆ To replace materialistic explanations with the theistic understanding that nature and human beings are created by God.

Twenty Year Goals

- ◆ To see intelligent design theory as the *dominant* perspective in science.
- ◆ To see design theory application in specific fields, including molecular biology, biochemistry, paleontology, physics and cosmology in the natural sciences, psychology, ethics, politics, theology and philosophy in the humanities; to see its influence in the fine arts.
- ◆ To see design theory permeate our religious, cultural, moral and political life.

Background: Why the fuss over evolution?



CENTER FOR THE RENEWAL OF SCIENCE & CULTURE

THE proposition that human beings are created in the image of God is one of the bedrock principles on which Western civilization was built. Its influence can be detected in most, if not all, of the West's greatest achievements, including representative democracy, human rights, free enterprise, and progress in the arts and sciences.

Yet a little over a century ago, this cardinal idea came under wholesale attack by intellectuals drawing on the discoveries of modern science. Debunking the traditional conceptions of both God and man, thinkers such as Charles Darwin, Karl Marx, and Sigmund Freud portrayed humans not as

devastating. Materialists denied the existence of objective moral standards, claiming that environment dictates our behavior and beliefs. Such moral relativism was uncritically adopted by much of the social sciences, and it still undergirds much of modern eco-

The Center seeks nothing less than the overthrow of materialism and its cultural legacies...

nomics, political science, psychology and sociology.

Materialists also undermined personal responsibility by asserting that human thoughts and behaviors

materialist reformers advocated coercive government programs that falsely promised to create heaven on earth.

Discovery Institute's Center for the Renewal of Science and Culture seeks nothing less than the overthrow of materialism and its cultural legacies. Bringing together leading scholars from the natural sciences and those from the humanities and social sciences, the Center explores how new developments in biology, physics and cognitive science raise serious doubts about scientific materialism and have re-opened the case for a broadly theistic understanding of nature. The Center awards fellowships for original research, holds

Dover Area School District

York Daily Record



Dow up
22.94;
Google
tool has
flaw. 9A

**Ortiz, BoSox
do it again in
extra innings. 1B**



The cars that thieves target the most. 3A
Astros push Cardinals to the brink. 1B
Fall fun for kids (minus the frights). 1D

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'Intelligent design' voted in

■ **As now written, Dover Area science curriculum will require the theory to be taught, said a biology teacher.**

By JOSEPH MALDONADO
For the Daily Record/Sunday News

The Dover Area School Board voted to add "Intelligent Design Theory" to the district's biology curriculum Monday evening just two weeks after Supt. Richard Nilsen assured former board member

Lonnie Langione that wouldn't happen.

The change passed by a six-to-three margin after a heated discussion by the board and a dozen members of the community.

During the Oct. 4 board meeting, Langione asked Nilsen if teachers would be

required to teach "intelligent design," after he allowed 50 copies of the book "Of Pandas and People," published by the Foundation for Thought and Ethics, to be used in science classrooms as reference books.

"No," replied Nilsen at the time. "A teacher can, but is not required."

But during Monday's meeting, district biology teacher Jen Miller said the new curriculum wording implies that she will

be required to teach "intelligent design."

The new wording in the curriculum states: "Students will be made aware of gaps/problems in Darwin's Theory and of other theories of evolution including, but not limited to, intelligent design. Note: Origins of life will not be taught."

For more than an hour, outgoing board member Noel Wenrich tried to

See DOVER, page 7A

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Controversy!

New York Times, Jan. 16, 2005

16 NYT

SUNDAY, JANUARY 16, 2005

National Report

The New York Times

An Alternative to Evolution Splits a Pennsylvania Town

By NEELA BANERJEE

DOVER, Pa. — Ever since the school board here voted to make this town in Pennsylvania Dutch country the first in the nation to discuss an alternative to evolution in high school biology classes, students have been as sharply divided as the rest of this normally close-knit community.

"I think we should have a choice: They should teach you both," said Meagan Hass, 14, while eating pizza after school at KT's restaurant with her friend Abbi Hake. "Evolution to me is like we come from monkeys."

At a nearby table, Jessika Moury, 14, said her mother supported the school board but she did not. "There are so many aspects of religion, so you have to teach what each of them says," Jessika said. "There's Bible Club in school for this, and that's where it should be taught."

With the new instruction on the origin of life set to begin, Dover has become a critical testing ground in a widening national debate about teaching evolution.

In early January, Dover High School's science teachers refused to read to ninth-graders a short statement written by the school board that criticizes evolution and cites a controversial approach called Intelligent Design as an alternative.

The teachers contend that such a change to the curriculum amounts to

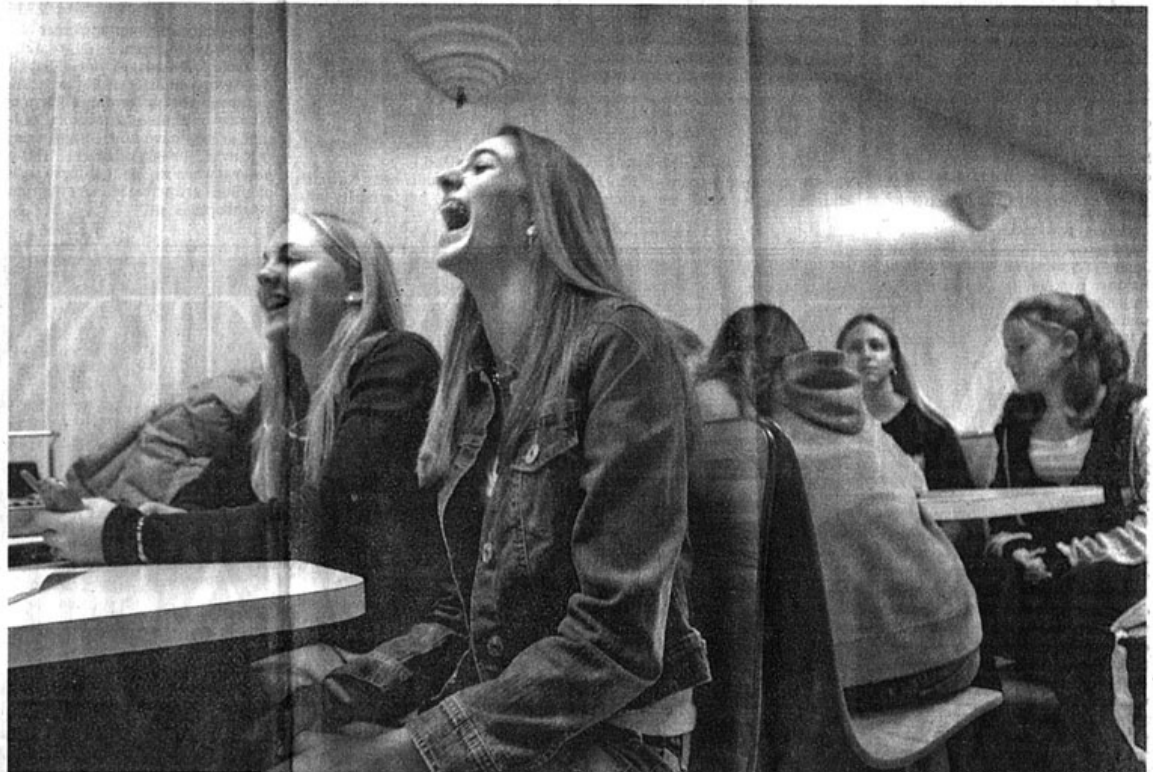
ment instead, as early as next week. Students may opt out of the reading with their parents' permission.

Several states have issued disclaimers to students questioning the validity of evolution, claiming it is riddled with gaps. But the Dover school board went further on Oct. 18 when it voted to specifically identify an alternative to evolution and encourage students to learn more about it.

Proponents of Intelligent Design, which asserts that life is so intricately complex that an architect must be behind it, say it is a valid scientific theory. Critics argue that Intelligent Design has no basis in science and is another iteration of creationism. And while people are still polite to one another in Dover, those same arguments have split school board members, clergy, residents and students alike.

"It's been very polarizing," said the Rev. David F. Sproull, pastor of the Dover Assembly of God Church and a supporter of the board's decision. "I see very few people sitting in the middle of it. It evokes very strong feelings."

Some have already moved to stop the school board. In mid-December, 11 local parents represented by the American Civil Liberties Union and Americans United for Separation of Church and State sued the school board, contending that discussing In-



Photographs by Ryan Donnell for The New York Times

Jessika Moury, left, and Megan Boyer, students at Dover High, at a restaurant after school. "There's Bible Club in school for this," Jessika said.

"There's Bible club in school for this," Jessika sa

STATEMENT READ TO 9TH GRADE BIOLOGY CLASSROOM

The Pennsylvania Academic Standards require students to learn about Darwin's theory of evolution and eventually to take a standardized test of which evolution is a part.

Because Darwin's Theory is a theory, it is still being tested as new evidence is discovered. The Theory is not a fact. Gaps in the Theory exist for which there is no evidence. A theory is defined as a well-tested explanation that unifies a broad range of observations.

Intelligent design is an explanation of the origin of life that differs from Darwin's view. The reference book *Of Pandas and People*, is available for students to see if they would like to explore this view in an effort to gain an understanding of what intelligent design actually involves.

As is true with any theory, students are encouraged to keep an open mind. The school leaves the discussion of the origins of life to individual students and their families. As a standards-driven district, class instruction focuses upon preparing students to achieve proficiency on standards-based assessments.

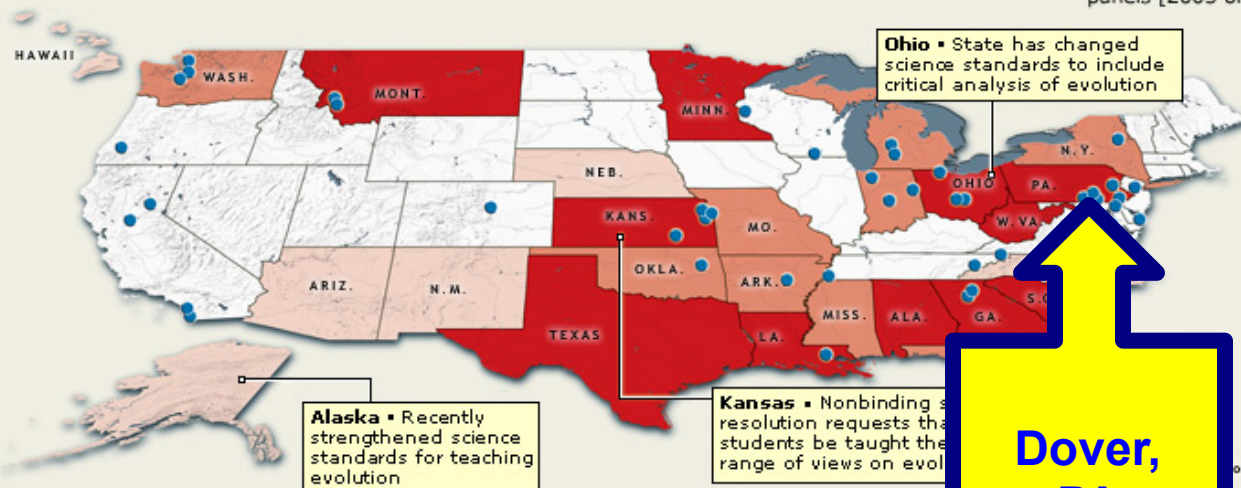
Time magazine (summer 2005)

COAST-TO-COAST CHALLENGES

Across the U.S., states and localities have considered changing the way biological evolution is taught. Some call for critical analysis of the theory; others seek equal time for intelligent design and creationism

Antievolution proposals considered since 2001 by:

■ State board of education
 ■ State legislature
 ■ Both
 ● Local schools or panels [2005 only]



A TALE OF TWO TEXTBOOKS: Excerpts from a leading traditional volume, left, and a new one, right, both by advocates of intelligent design



Biology

By Kenneth Miller and Joseph Levine
Prentice Hall
1,146 pages
More than 2 million copies sold

“Darwin made bold assumptions about heritable variation, the age of Earth and relationships among organisms. New data from genetics, physics and biochemistry could have proved him wrong on many counts. They didn’t. Scientific evidence supports the theory that living species descended with modification from common ancestors that lived in the ancient past.”

(p. 410)



Of Pandas and People

By Percival Davis and Dean Kenyon
Houghton Publishing
170 pages
More than 20,000 copies sold

“Intelligent design means that various forms of life began abruptly through an intelligent agency, with their distinctive features already intact—fish with fins and scales, birds with feathers, beaks and wings, etc. Some scientists have arrived at this view since fossil forms first appear in the rock record with their distinctive features intact, rather than gradually developing.”

(p. 99-100)

Kitzmiller v. Dover



“Students will be made aware of gaps/problems in Darwin’s Theory and of other theories of evolution including, but not limited to, intelligent design.”

PARTLY CLOUDY

32°

19°

BACK PAGE

PENNSYLVANIA NEWSPAPER OF THE YEAR

The Patriot-News

WEDNESDAY
December 21, 2005

50 cents

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HARRISBURG, PA. PENNLIVE.COM FINAL EDITION

JUDGE JONES ON THE DOVER SCHOOL BOARD: "The students, parents, and teachers of the Dover Area School District deserved better than to be dragged into this legal maelstrom, with its resulting utter waste of monetary and personal resources."

THE DECISION: U.S. District Judge John E. Jones III, right, struck down Dover's intelligent design policy, saying the school board's real purpose was to promote religion.



JUDGE JONES ON INTELLIGENT DESIGN: "We have addressed the seminal question of whether ID is science. We have concluded that it is not, and moreover that ID cannot uncouple itself from its creationist, and thus religious, antecedents."

JUDGE RULES INTELLIGENT DESIGN IS 'NOT SCIENCE'

Area schools walk a fine line over religion

BY DIANA FISHLOCK
Of The Patriot-News

Religion still has a place in public schools, a fact in evidence during the holidays, but districts face a delicate balance in studying faith without promoting it or alienating students.

This time of year, midstate schools take different approaches. While some of the more religiously diverse communities revel in Christmas, Hanukkah and Kwanzaa, others avoid religious holidays altogether.

Religion can't be avoided when studying American history and culture, some area school officials say.

Derry Twp. teachers talk about traditions, including Christmas, Hanukkah and Kwanzaa, said Troy Portser, a school district spokesman.

FROM THE RULING:

"The citizens of the Dover area were poorly served by the members of the Board who voted for the [intelligent design] Policy. It is ironic that several of these individuals, who so staunchly and proudly touted their religious convictions in public, would time and again lie to cover their tracks and disguise the real purpose behind the ID Policy."



Historic ruling orders Dover to rescind policy

BY BILL SULON
Of The Patriot-News

In a sweeping and potentially landmark ruling, a federal judge yesterday said that the Dover Area School District's policy on intelligent design is unconstitutional and that the concept of intelligent design is unscientific and religious.

And in an unusually scathing rebuke, he called several former school board members who supported the policy liars.

U.S. Middle District Judge John E. Jones III, who presided over a six-week trial in Harrisburg, ruled that the intelligent design policy promotes religion and violates the U.S. and Pennsylvania constitutions. The First Amendment's Establishment Clause bars government from

FROM KITZMILLER RULING (JUDGE JOHN E. JONES III)

ID is not Science

1. ID violates the centuries-old ground rules of science by invoking and permitting supernatural causation
2. the argument of irreducible complexity, central to ID, employs the same flawed and illogical contrived dualism that doomed creation science in the 1980's
3. ID's negative attacks on evolution have been refuted by the scientific community

(page 64)

FROM KITZMILLER RULING (JUDGE JOHN E. JONES III)

ID is not Science

.... Since that time period, science has been a discipline in which testability, rather than any ecclesiastical authority or philosophical coherence, has been the measure of a scientific idea's worth...

... Methodological naturalism is a “ground rule” of science today which requires scientists to seek explanations in the world around us based upon what we can observe, test, replicate, and verify.

(page 65)

The lineage of *Pandas*

OF PANDAS AND PEOPLE
the central questions of biological origins

Dean H. Kenyon
P. William Davis

Copyright 1987, Foundation for Thought and Ethics

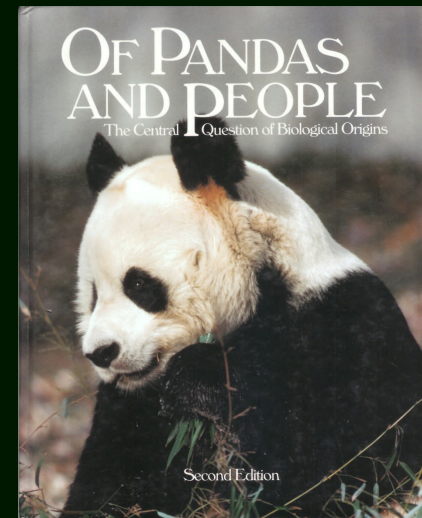
***Of Pandas and People* (1987)
(creationist version)**

OF PANDAS AND PEOPLE
the central questions of biological origins

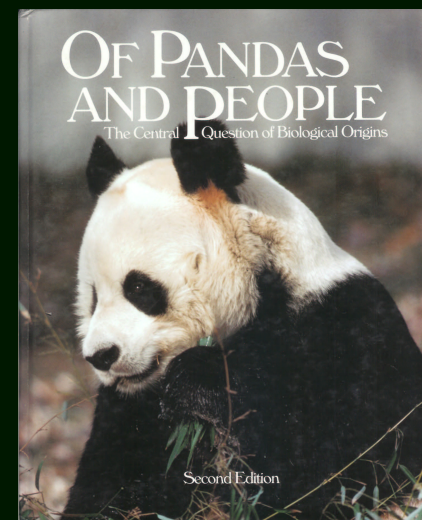
Dean H. Kenyon
P. William Davis

Copyright 1987, Foundation for Thought and Ethics

***Of Pandas and People* (1987)
("intelligent design" version)**



***Of Pandas and People* (1989,
1st ed.)**



***Of Pandas and People* (1993,
2nd ed.)**

ID = creationism relabeled

2-10

Biology and Creation 1986

Creation means that the various forms of life began abruptly through the agency of an **intelligent creator** with their distinctive features already intact--fish with fins and scales, birds with feathers, beaks, and wings, etc.

2-13

Biology and Origins 1987

Creation means that various forms of life began abruptly through the agency of an **intelligent Creator** with their distinctive features already intact--fish with fins and scales, birds with feathers, beaks, and wings, etc.

2-14

Of Pandas and People 1987, version 1

Creation means that various forms of life began abruptly through the agency of an **intelligent Creator** with their distinctive features already intact--fish with fins and scales, birds with feathers, beaks, and wings, etc.

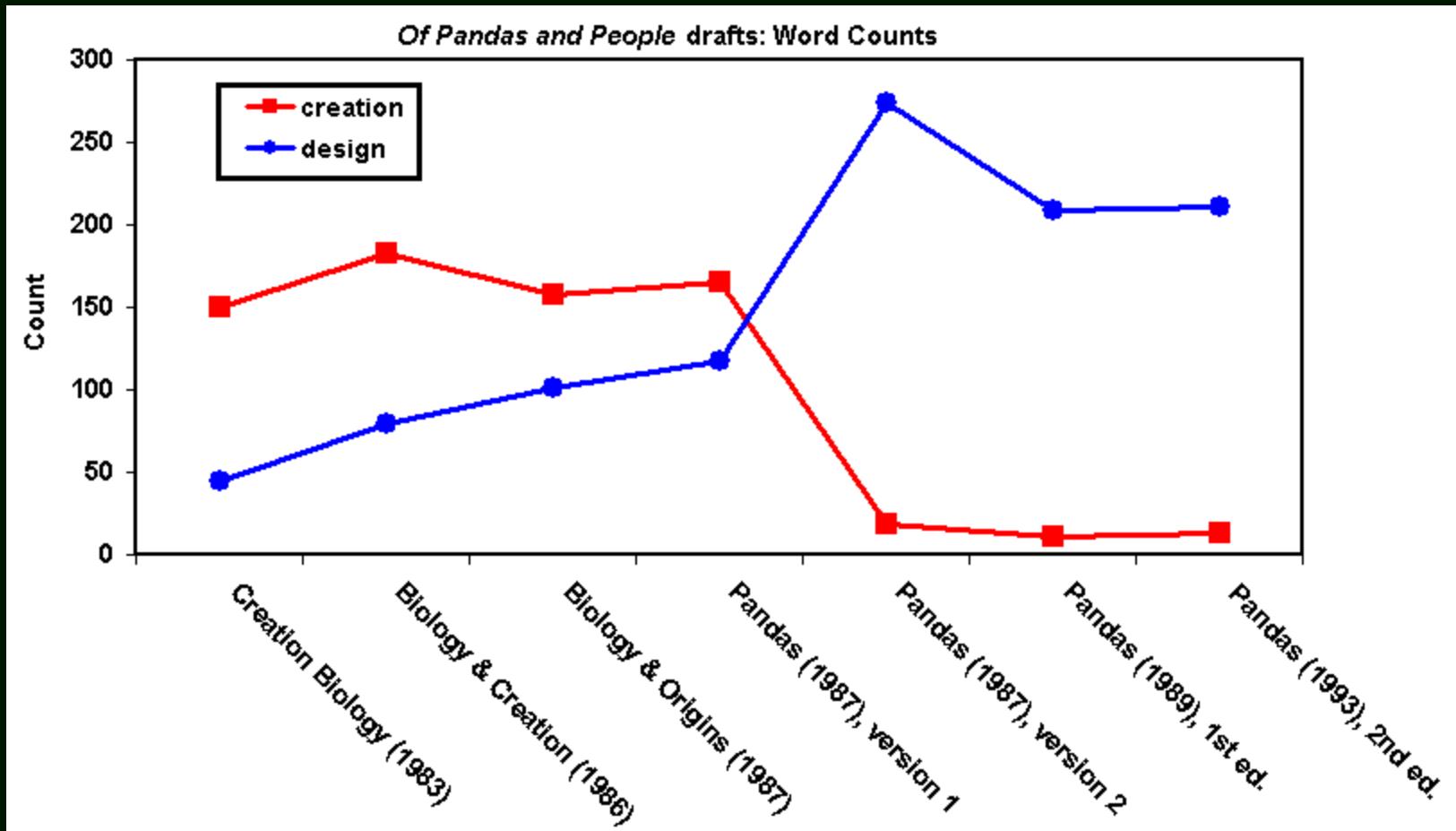
2-15

2-15

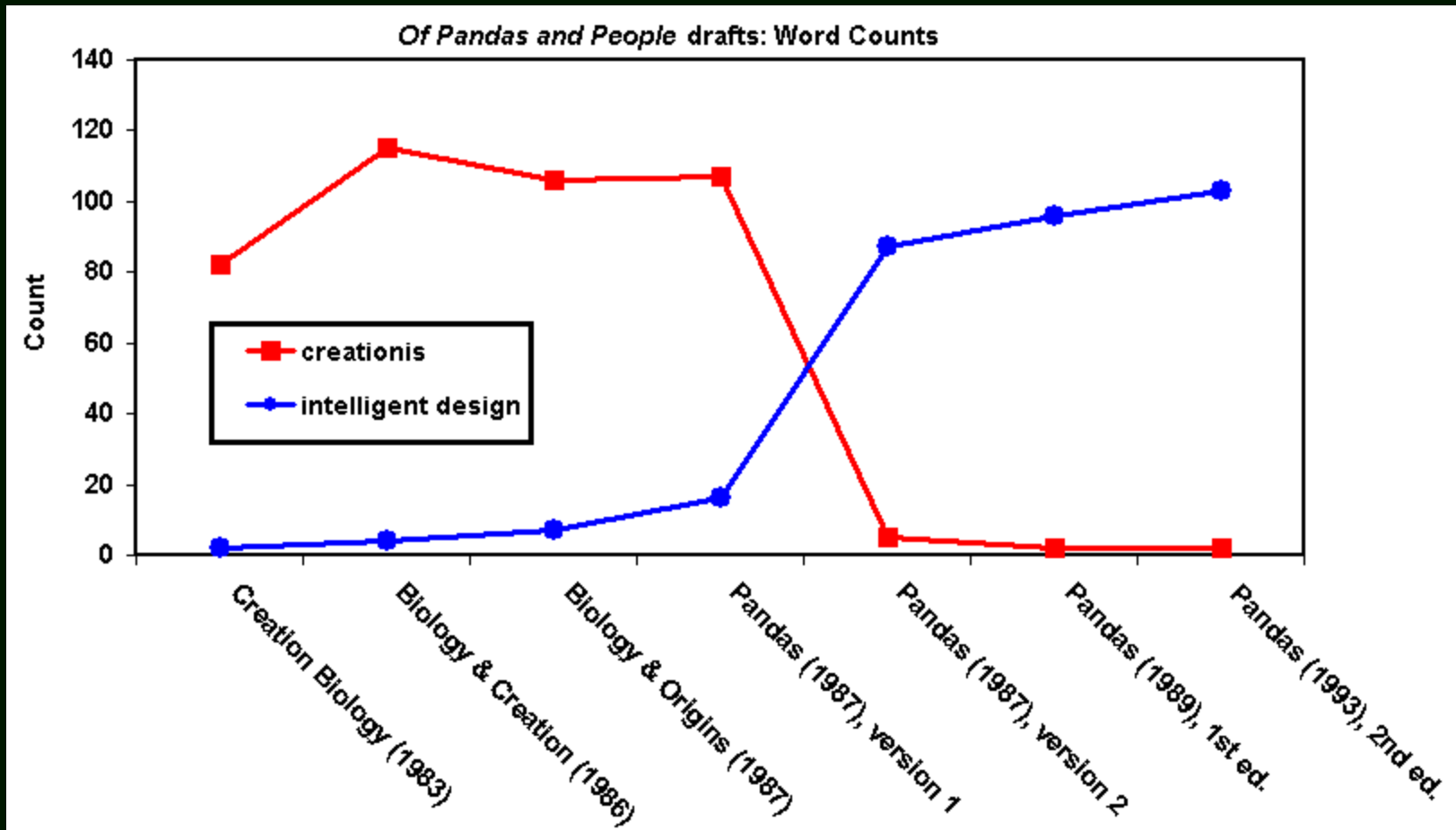
Of Pandas and People 1987, version 2

Intelligent design means that various forms of life began abruptly through an **intelligent agency** with their distinctive features already intact--fish with fins and scales, birds with feathers, beaks, and wings, etc.

Intelligent Design = Creation science



Intelligent Design = Creation science



The evolution of *Pandas*

198

creationists

198

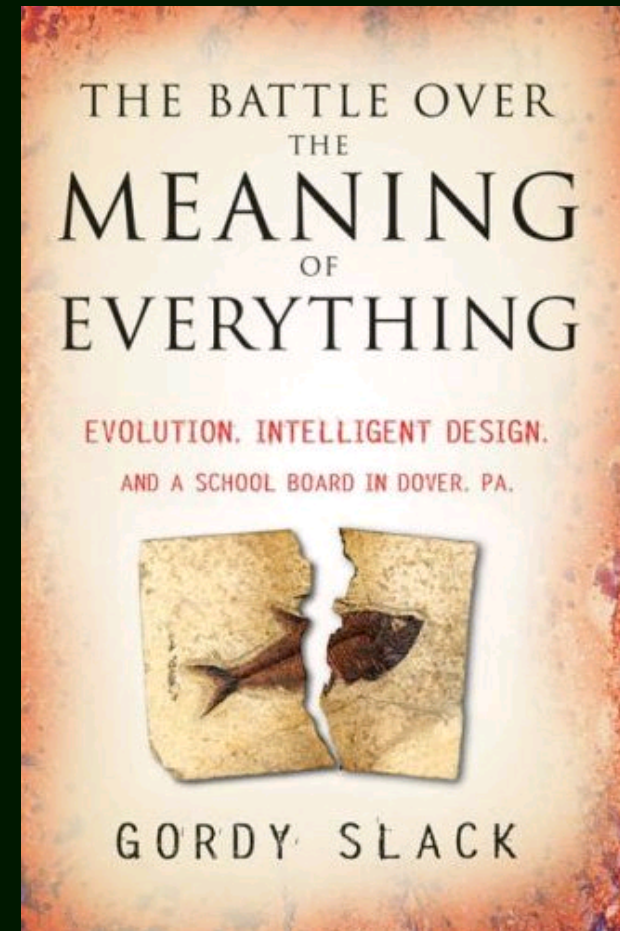
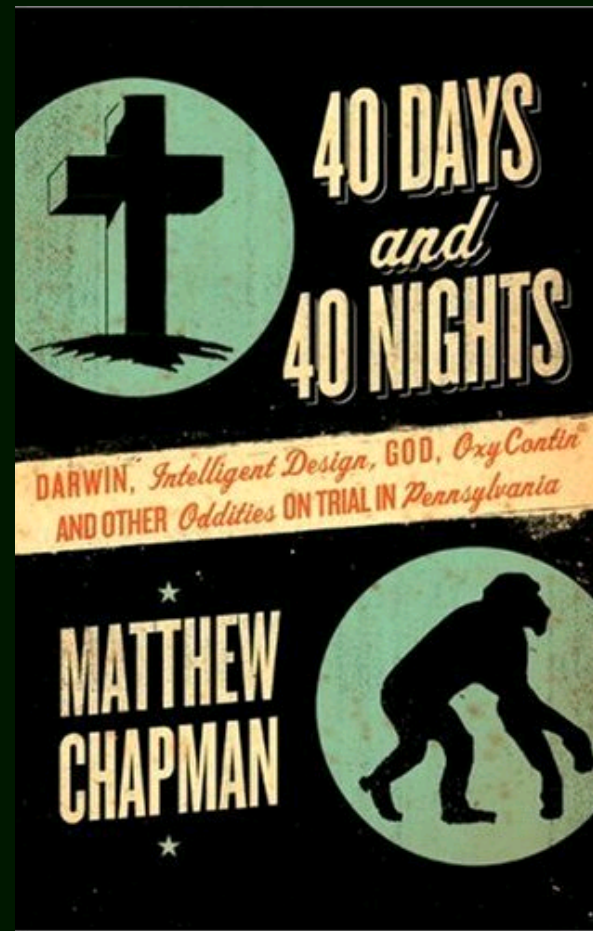
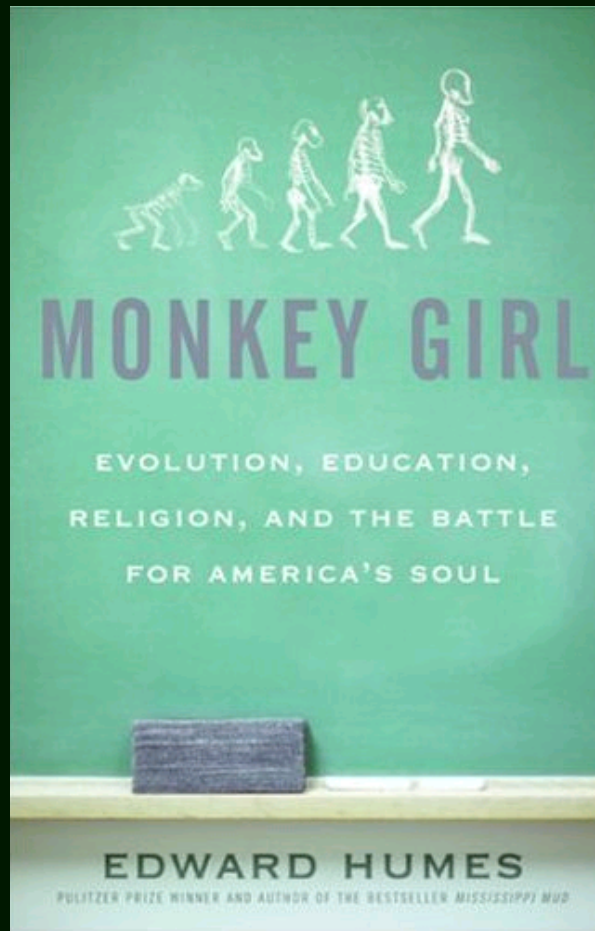
cdesign proponentsists

1987

The missing link!

1987

Books on the case:



Plus: Lauri Lebo (2008): *The Devil in Dover: A Journalist's Story of Dogma v. Darwin in Small-town America*

See also: PBS NOVA “Judgment Day”

NOVA

Major corporate funding provided by



Airing soon:
Master of the Killer Ants



JUDGMENT DAY

INTELLIGENT DESIGN ON TRIAL

SCIENCE IS “EXHIBIT A”
IN A LANDMARK TRIAL ON THE
TEACHING OF EVOLUTION.

AIRS ON NOVEMBER 13 AT 8 PM

BUT WAIT...

- So the question of whether some theory counts as scientific is not just inherently interesting (which it is!) but it also really matters
- But there is a big worry here - Popper's basic theory seems to have some really basic problems!

FALSIFICATION

If H then O

not O

—————

not H

A good Popperian test

FALSIFICATION

Problem 1: What exactly are you observing?

If H then O
not O

not H

A good Popperian test

Testing the Theory: Eddington's 1919 Expedition to Principe



- In May 1919, British astronomer Arthur Eddington sailed to Principe, of the coast of Africa, where a total solar eclipse would be observed.
- He took a series of photographs of the sun, as the eclipse progressed.
- The plates clearly showed a shift in the apparent position of the background stars by an amount as predicted by Einstein.
- GTR had been proved.

EDDINGTON WAS NOT ALONE!

- In 1918, there was a solar eclipse across the U.S. The Lack Observatory (California) took pictures of it but their primary equipment was in Russia from a previous (failed) attempt.
- Their measured deviations were much lower than Einstein predicted but Campbell (the director) didn't trust them and they were never published.
- Photographs were taken in Brazil in 1919 but Eddington dismissed them as untrustworthy

Relativity and Eclipses: The British Eclipse Expeditions of 1919 and Their Predecessors

Author(s): John Earman and Clark Glymour

Source: *Historical Studies in the Physical Sciences*, Vol. 11, No. 1 (1980), pp. 49-85

Published by: [University of California Press](#)

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Accessed: 08/09/2014 05:53

JOHN EARMAN & CLARK GLYMOUR

Relativity and eclipses:

The British eclipse expeditions of 1919 and their predecessors

EVERYONE WHO KNOWS a little of the history of physics recalls that Einstein predicted in 1916, on the basis of his newly presented general theory of relativity, that starlight is bent by the gravitational field of the sun, and that in 1919 British expeditions obtained confirmation of this prediction from photographs taken during a total eclipse. The report of the expedition made Einstein an international celebrity, and put talk of relativity on the front page of the *Times* of London. The eclipse expedition report drove scientific opinion in Einstein's favor and won general relativity the admiration and interest of many physicists. As far as science is concerned, no eclipse before or since has been so important. The British eclipse results and the British discussion and assessment of relativity that preceded and followed them have been offered as an example of a scientific revolution carried out rationally, without nationalist prejudice or obscurantism,¹ an example the more remarkable because it occurred during and immediately after a bitter war with Germany, Einstein's home. Perhaps the example is too remarkable. The apparently sud-

FALSIFICATION

Problem 2: hypotheses almost never entail any particular observations

If H then O

not O

not H

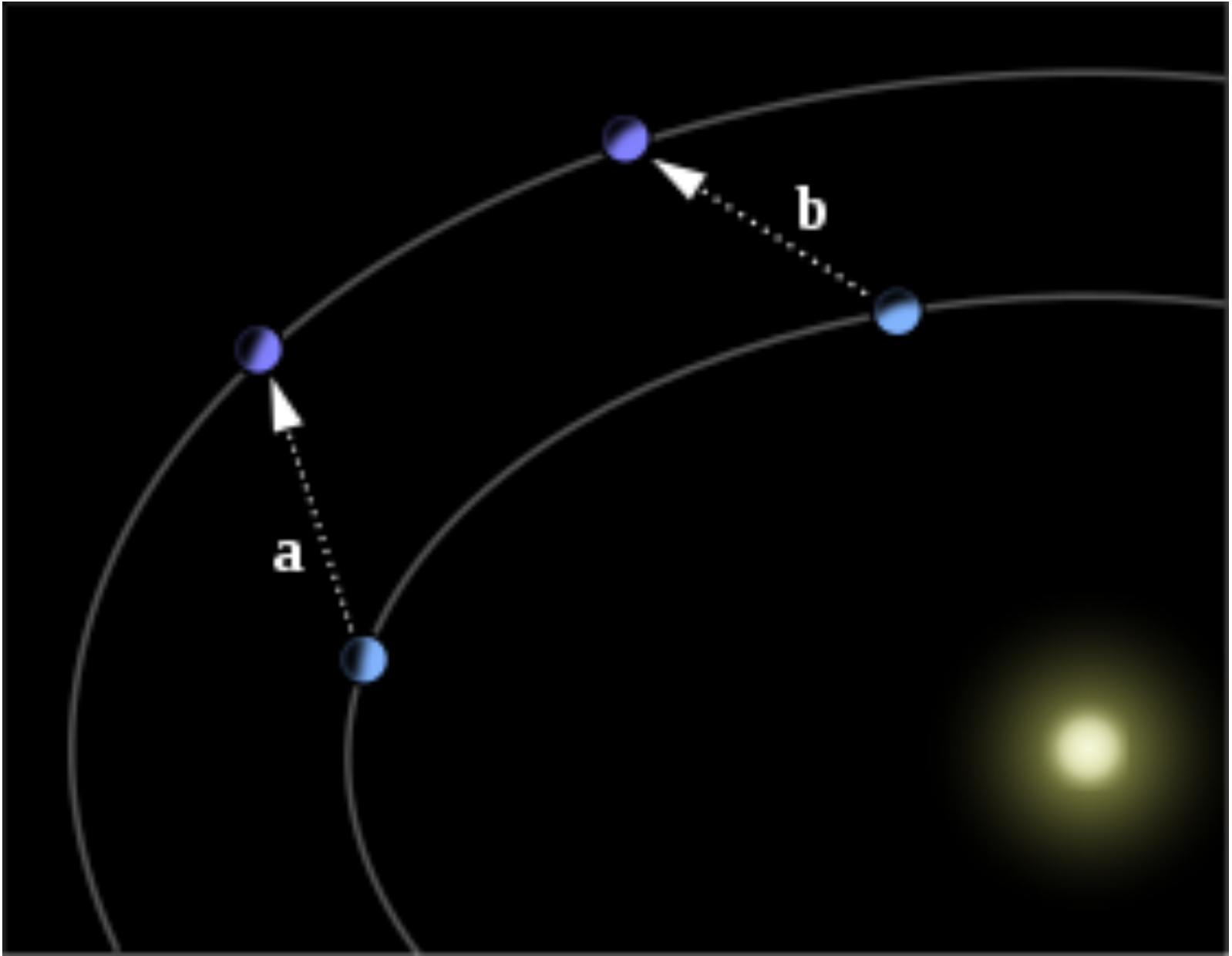
A good Popperian test

$$F_g = \frac{Gm_1m_2}{r^2}$$

what exactly does this entail?

THE DISCOVERY OF NEPTUNE

- Uranus was discovered by Sir William Herschel in 1781
- Astronomers across the globe plotted its orbit location over the next 60 years and it was very close to, but not exactly what was expected...
- In 1846, John Couch Adams in Britain and Urbain Le Verrier in France predicted mathematically the location of another planet (Neptune) causing the deviations which was then subsequently discovered



- A few years later, Le Verrier calculated that the precession of the perihelion of Mercury was off by 38 arc seconds per century (later calculated to 43'')
- Unlike the previous case, Einstein was convinced Newton physics was wrong here

