

# Science and Naturalism

Does science have an official philosophical viewpoint?

“Rejecting the traditions of British natural theology and the privileges of the established church and its educational institutions, **the X Club represented the naturalistic movement in science.** The natural order, its members believed, is a deterministic order of cause and effect to be investigated by science; there may be mysteries beyond the scope of science, but, if so, they are beyond knowledge and are thus “unknowable.”

Britannica.com entry on “X Club”

- Thomas Henry Huxley (initiator), George Busk, Edward Frankland, Thomas Archer Hirst, Joseph Dalton Hooker,, John Lubbock, Herbert Spencer, William Spottiswoode, and John Tyndall

# What is 'naturalism'?

- Naturalism is often defined as the view that only *natural* objects exist – there is nothing supernatural (no gods, angels, demons, spirits, immortal souls, ghosts, etc.)



# What is 'naturalism'?

- It is hard to define 'natural' objects very precisely, but the rough idea is that they:
  - are made of matter,
  - can be described and understood (completely) using standard physics and chemistry.
- Naturalism is thus closely related to *physicalism*, the view that everything is physical.

# The Origins of Naturalism

- The ancient **atomists** (e.g. Leucippus and Democritus, 5<sup>th</sup> century BC) were naturalists, believing that the whole world (including human minds) was made of tiny, unbreakable lumps of matter (like Lego blocks). Hence no gods! 😊



# The Origins of Naturalism

- In the late Middle Ages, scientists such as Buridan and Oresme were dismissive of appeals to supernatural causes to explain everyday events.

“there is no reason to take recourse to the heavens, the last refuge of the weak, or demons, or to our glorious God as if He would produce these effects directly, more so than those effects whose causes we believe are well known to us.”

(Nicole Oresme, 1320-82)

# Primary and Secondary Causation

- Medieval scholars believed that God was the *ultimate* cause of everything, but they distinguished between 'primary' and 'secondary' divine causation:
  - **Primary:** God caused the event *directly*.  
(Supernatural causation, or miracle)
  - **Secondary:** God caused the event *indirectly*, via creating natural objects with their own causal powers, which then caused the event. (Natural causation)

# ‘Methodological Naturalism’

- Buridan and Oresme were Catholic priests, who therefore believed in God, as well as angels, demons and human souls. They were not naturalists as such.
- They supported however (what is now called) *methodological naturalism*. This is the view that science should appeal only to secondary (natural) causes in explaining phenomena.
- Supernatural explanations in science are “the last refuge of the weak”.



# ‘Methodological Naturalism’

- Most (though not all) theists working in science today are methodological naturalists. It allows their religious and scientific lives to be kept separate.
- Consider Francisco Ayala (biologist),
- “If they [science and religion] are properly understood, they cannot be in contradiction because science and religion concern different matters, and each are essential to human understanding.”

- Galileo (a Catholic)

“[nature] never violates the terms of the laws imposed upon her.”

# Yet theists are not *forced* to be methodological naturalists

“Whereas **materialists must be non-interventionists**, theists have more explanatory resources at their disposal. Thus, it seems that the evidence should decide the matter for theists.

Perhaps it is logically possible that God limited himself to secondary causes in natural history, but we cannot deduce that beforehand. If the fossil record remains discontinuous despite the occasional media hype over a new “missing link,” and if field studies of natural selection continue to show that natural selection merely keeps populations healthy, then so be it. Maybe God acted as a primary cause at different periods in life’s history.”

Logan Paul Gage (Thomist philosopher) *Touchstone*, Nov/Dec, 2010

# History of Physicalism

- Modern physicalism began with the ‘**mechanical philosophy**’, or ‘corpuscular philosophy’.
- Similar to ancient atomism, “the mechanical approach favored a contact or impact model of the interaction of small, unobservable “corpuscles” of matter (which possess only a limited number of mainly geometric properties, such as size, motion, shape, etc.)”

*[Stanford Encyclopedia of Philosophy]*

# History of Physicalism

- But what about humans? **Are humans made of material particles as well?**
- What about consciousness, rational thought, free will, and immortality? Can you build these out of “Lego”?
  - (A lot of people think this is unlikely.)
- Descartes:
  - Human bodies are machines, made of particles
  - Human minds (souls) are non-physical.

- Later scientists, especially the physician La Mettrie, author of *L'Homme Machine* (1748) simply got rid of the world of spirit. Such scientists were known as *materialists*.

(La Mettrie was also a hedonist *bon vivant*, and died from eating too much pheasant pâté with truffles.)



# Decline of the Mechanical Philosophy

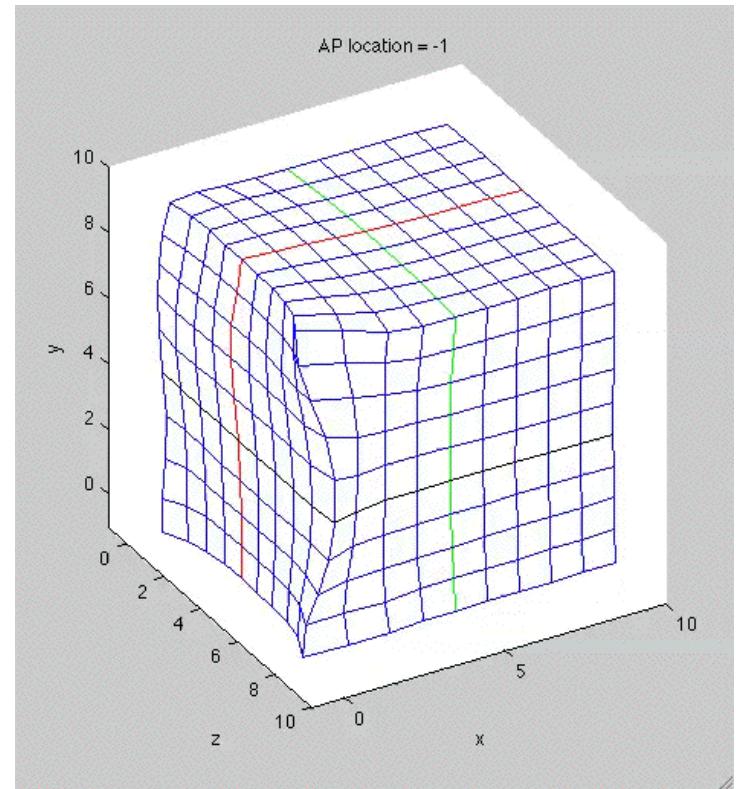
$$\nabla \cdot \vec{D} = \rho_{\text{free}}$$

$$\nabla \cdot \vec{B} = 0$$

$$\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$$

$$\nabla \times \vec{H} = \vec{J}_{\text{free}} + \frac{\partial \vec{D}}{\partial t}$$

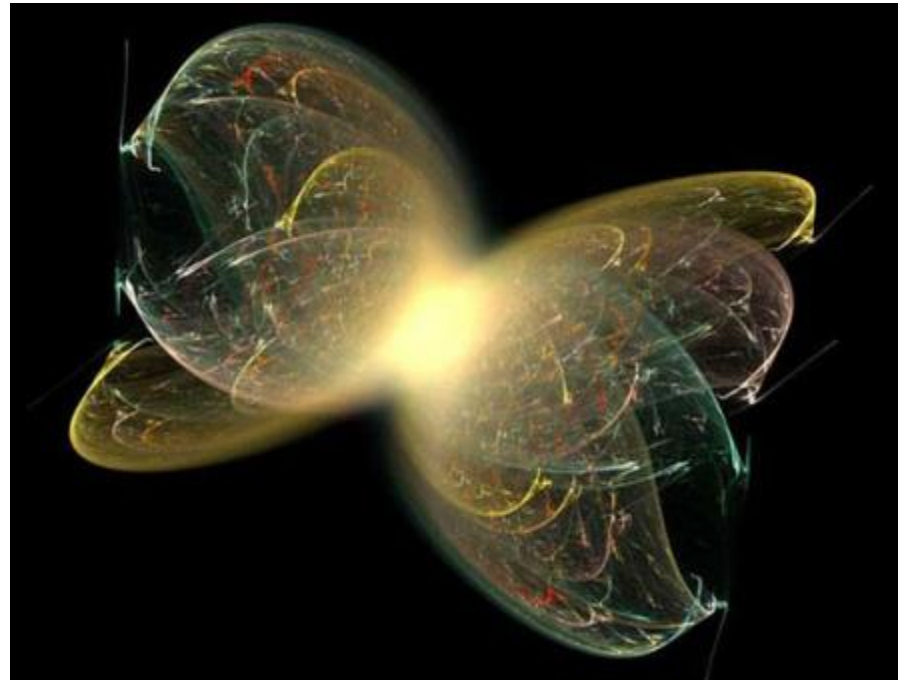
- Maxwell wrote down equations describing the electric and magnetic fields.
- He tried to interpret these fields as mechanical *displacement* fields (see animation) but this was impossible.



# Decline of the Mechanical Philosophy

- Quantum mechanics (1925) in particular showed that reality is much weirder than a mere mechanism.
- But it's still describable in mathematical terms, with equations and so on.

(Is the mathematical description *complete* though?)





# Is *methodological* naturalism (MN) a 'ground rule' of science?

“... since the scientific revolution of the 16<sup>th</sup> and 17<sup>th</sup> centuries, science has been limited to the search for natural causes to explain natural phenomena. ... While supernatural explanations may be important and have merit, they are not part of science. This self-imposed convention of science, which **limits inquiry to testable, natural explanations about the natural world**, is referred to by philosophers as “methodological naturalism” and is sometimes known as the scientific method. Methodological naturalism is a “ground rule” of science today ...”

Judge John E. Jones (2005)

# Argument for MN?

- One argument:
  - The supernatural is uncontrolled, ineffable, impossible to describe, predict, etc. so that such hypotheses are not *testable*.
- But we *already* require that scientific theories be testable (be precise, clear, make predictions, etc.) Why is an *additional* rule against supernatural causes needed?
- Also, Lyell's version of creationism was apparently testable (and falsified).

# Biologist Jerry Coyne

“I don’t see science as committed to methodological naturalism ... Science is committed to a) finding out what phenomena are real, and b) coming up with the best explanations for those real, natural phenomena. Methodological naturalism is not an *a priori* commitment, but a strategy that has repeatedly worked in science, and so has been adopted by all working scientists.”

*Why Evolution is True* (blog)

# Is MN empirical or *a priori*?

“Our willingness to accept scientific claims that are against common sense is the key to an understanding of the real struggle between science and the supernatural. We take the side of science *in spite* of the patent absurdity of some of its constructs, *in spite* of its failure to fulfill many of its extravagant promises of health and life, *in spite* of the tolerance of the scientific community for unsubstantiated just-so stories, because we have a prior commitment, a commitment to materialism. ...”

(Richard Lewontin, *NY Times Book Reviews*, Jan 9, 1997)

# Is MN empirical or *a priori*?

“... It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door.”

# What if?

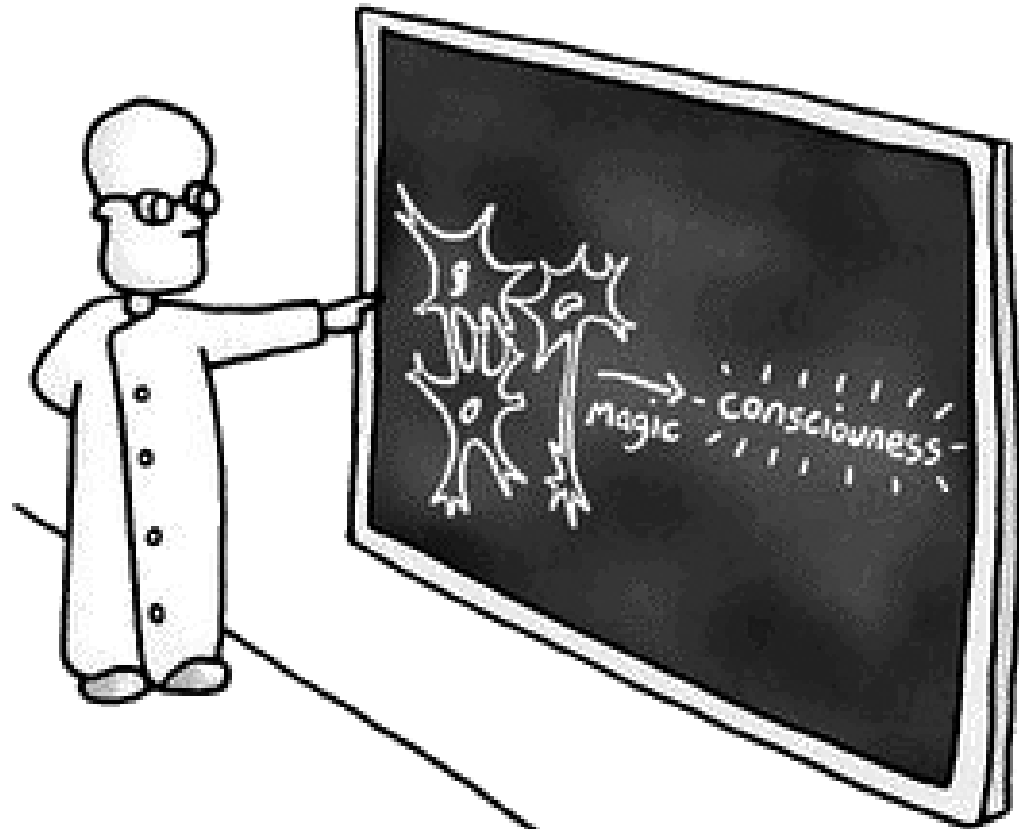
“... consider what would happen if microscopic examination revealed that every cell was inscribed with the phrase “Made by Yahweh.” Of course cells don’t have “Made by Yahweh” inscribed on them, but that’s not the point. ...if they were so inscribed, one would have to entertain the thought, as a scientist, that they actually were made by Yahweh. ... A priori prohibitions against design are philosophically unsophisticated and easily countered.”

William Dembski, “Science and Design”, *First Things*, March 2009.

[N.B. Craig Venter’s synthetic bacterium contains the names of 46 contributors in its genome!]

# A more realistic case

- Some biologists have suggested “front-loading” theories of evolution, according to which evolution was a mostly deterministic process, like embryonic development.
  - (E.g. Lev Berg’s ‘nomogenesis’, published in 1922.)
- On such views, the first living organisms were “front loaded” with all the genetic information needed to evolve into all the subsequent organisms.
  - Essentially, the first organisms were “designed to evolve”.
- Would such front-loading be empirically detectable?
  - Isn’t it a supernatural theory?



## Part 2

Explanatory gaps



# How do we deal with 'gaps'?

- An *explanatory gap* is an observable phenomenon that we presently cannot explain in natural terms. E.g.
  - Consciousness
  - Intentionality (rational understanding)
  - Free will
  - Personal identity
  - The origin of life
  - Some major steps in evolution

# Gap, $\therefore$ supernatural

- Some (mostly theists and dualists) use these gaps to argue that naturalism and physicalism are false.
- E.g.

“In a recent paper titled “Dissecting Darwinism,” Baylor University Medical Center surgeon Joseph Kuhn described serious problems with Darwinian evolution. He first described how life could not possibly have come from chemicals alone, since the information residing in DNA **required an input from outside of nature.**”

Brian Thomas (a creationist)

# ‘God of the gaps’

- Other theists argue *for* MN by claiming that any supernatural explanation for observed data is a ‘god of the gaps’ fallacy, of the following form:

Science cannot presently explain E

-----

∴ God caused E

(N.B. Here we don’t have any reason to think that E cannot have a natural cause.)

# God of the gaps

- The argument is similar to an *argument from ignorance*. (“We have no proof that  $P$ , hence  $P$  is false”).
- A ‘god of the gaps’ argument is also ultimately damaging to religion, it is claimed.
- When the gap is later filled by a natural explanation, this is taken to be evidence that God doesn’t exist.

Are there gaps in your understanding  
of the universe or science?  
**FILL THEM WITH GOD!**



**THE GOD OF THE GAPS.**  
I don't understand, therefore god.

# Bonhoeffer on God of the Gaps

“How wrong it is to use God as a stop-gap for the incompleteness of our knowledge. If in fact the frontiers of knowledge are being pushed further and further back (and that is bound to be the case), then God is being pushed back with them, and is therefore continually in retreat. We are to find God in what we know, not in what we don’t know.”

(Theologian) Dietrich Bonhoeffer, *Letters and Papers from Prison* (1997, p. 311)

# E.g. Newton's god of the gaps

- Newtonian mechanics was very successful when applied to the planetary motions, but there were things Newton couldn't explain.
  - E.g. Newton's laws didn't seem to entail that the solar system would be stable, over tens of thousands of years. It seemed perfectly possible, even likely, that small perturbations might grow and lead to chaos.
- Newton suggested that the creator might have to nudge a planet, now and again, to avoid instability.
  - (Apparently the perturbations cancel out, and these nudges aren't needed.)

- Also, concerning the planets all orbiting the sun in one plane, and in the same direction, Newton wrote:

“Such a wonderful Uniformity in the Planetary System must be allowed the Effect of Choice [i.e. design]. And so must the Uniformity in the Bodies of Animals...” *Opticks* (1704, Qu. 31, p. 402)

- However, such cases where God is arbitrarily invoked to fill explanatory gaps are apparently rare, as **it's hard to find other examples.**

“Part of the appeal of the AGOG [anti-God-of-the-gaps] position is the sense of progress marching on, removing one Christian evidential apologetic argument after another. ... However, this past history does not exist.”

David Snoke, “In Favor of God-of-the-Gaps Reasoning”, *Perspectives on Science and Christian Faith*, September 2001.



# John Lennox replies



- (Lennox is an Oxford U. mathematician who has recently become an apologist for Christianity.)
- He agrees that the standard god of the gaps argument is a fallacy.
  - But *what if science itself were to give evidence that no natural cause could produce E?*
- Would this not constitute scientific evidence for non-natural causes?

# David Snoke again

Snoke points out that it's standard practice in science to argue against a theory by pointing out data that the theory can't explain.

- E.g. (Snoke's example):

**Me:** I think the electrons move coherently. The wave length of this spectral line agrees with my calculation.

**Colleague:** But if that is true, shouldn't the energy of that second line also agree with your calculation?

**Me:** You are pointing out a gap of explanation in my theory. That is a "gaps" argument; therefore, it is invalid.

- Lennox says science has shown us that:
  - perpetual motion machines are impossible
  - Angle trisection is impossible with just a compass and straightedge
  - A complete axiomatic formal theory of arithmetic is impossible
- Some claim that science is revealing a “conservation of information” law, that prevents the natural evolution of specific complex objects like living organisms.
  - What if they’re right?

The [computing] machine does not create any new information, but it performs a very valuable transformation of known information.

Leon Brillouin, *Science and Information Theory*, 1956

William Dembski's alleged "Law of Conservation of Information" says:

"natural causes can only **transmit** complex, specified information but never **originate** it"

"Intelligent Design as a Theory of Information", 1998

[Home](#) > [Synthese](#) > [Article](#)

[Published: 07 September 2010](#)

# Self-organisation in dynamical systems: a limiting result

[Richard Johns](#) 

[Synthese](#) **181**, 255–275 (2011) | [Cite this article](#)

**183** Accesses | **2** Citations | **27** Altmetric | [Metrics](#)

## Abstract

There is presently considerable interest in the phenomenon of “self-organisation” in dynamical systems. The rough idea of self-organisation is that a structure appears “by itself” in a dynamical system, with reasonably high probability, in a reasonably short time, with no help from a special initial state, or interaction with an external system. What is often missed, however, is that the standard evolutionary account of the origin of multi-cellular life fits this definition, so that higher living organisms are also products of self-organisation. Very few

# Larry Moran

“Let’s assume, for the sake of argument, that Johns has made a reasonable case for his argument. Let’s assume that there may be ways of showing that life is impossible under the known laws of chemistry and physics. Is that science? Does it fit into the restriction of methodological naturalism?”

I think the answer to the first question is ‘yes.’ It may be bad science, it may even be really bad science, but it’s still science to investigate whether completely naturalistic explanations can account for life as we know it.”

LAURENCE A. MORAN



Larry Moran is a Professor Emeritus in the Department of Biochemistry at the University of Toronto. You can

(Sandwalk blog, Oct 14, 2010.)

# Good gaps?

- Lennox claims that, if science were to provide evidence that a certain phenomenon has no natural cause, then this would be a 'good gap', and inferring a supernatural cause would be reasonable (though of course fallible).  
E.g. maybe:
  1. The origin of the universe: space, time, matter, energy, etc.
  2. The origin of natural laws
  3. the origin of life
  4. The evolution of life, especially the appearance of eukaryotic cells, diverse animal body plans (Cambrian explosion), novel complex mechanisms, consciousness, rationality.

# Or: An inductive argument for naturalism?

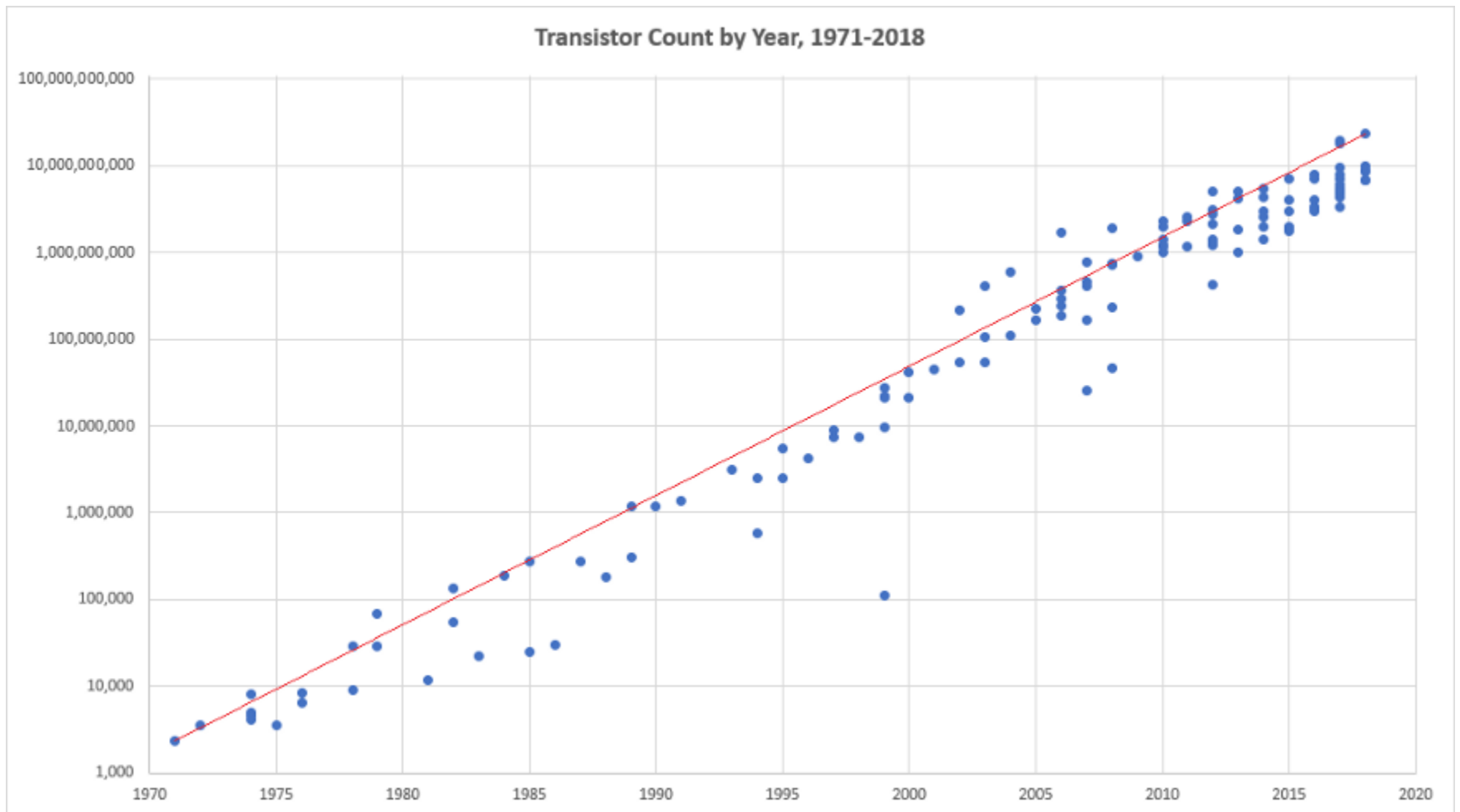
1. So far, we have been able to explain a heck of lot in terms of natural processes, physical laws, etc.
2. Many problems that stubbornly resisted solution in such terms were eventually solved. (E.g. understanding biological processes such as respiration and reproduction.)

-----

∴ We ought to expect that all remaining mysteries will eventually be understood in naturalistic terms.



# e.g. Moore's Law



- Can we be sure that Moore's Law will continue to apply indefinitely?
- Is it possible that the transistor count will simply plateau at some point, as some fundamental limitations are reached?
- (Gordon Moore himself said:  
"It can't continue forever. The nature of exponentials is that you push them out and eventually disaster happens.")

# Reductionism

- Explaining the properties of a (complex) whole in terms of the properties of its (simpler) parts is called a *reductive* explanation.
- Classic cases include the theory of heat as the motion of molecules, water as H<sub>2</sub>O, and lightning as an electrical discharge.
- But many philosophers doubt that there will ever be such a reductive explanation of consciousness, rational understanding, free will or personal identity.

# Leibniz's 'gap'

- We cannot imagine *inferring* the thoughts or conscious experiences of an organism from a physical description of it, no matter how detailed it is. Physical descriptions are structural, mathematical, but thoughts and conscious experiences cannot be described in such terms.
- If certain phenomena cannot be logically reduced to physics and chemistry, does that mean either physicalism or naturalism is false?

# Leibniz's 'gap'

“It must be confessed, moreover, that perception, and that which depends on it, are inexplicable by mechanical causes, that is, by figures and motions, And, supposing that there were a mechanism so constructed as to think, feel and have perception, we might enter it as into a mill. And this granted, we should only find on visiting it, pieces which push one against another, but never anything by which to explain a perception. This must be sought, therefore, in the simple substance, and not in the composite or in the machine.”

Gottfried Leibniz, *Monadology*, 1714.

# Physicalism and Free Will

“... this sort of free will is ruled out, simply and decisively, by the laws of physics. Your brain and body, the vehicles that make “choices,” are composed of molecules, and the arrangement of those molecules is entirely determined by your genes and your environment. ... (It’s possible, though improbable, that the indeterminacy of quantum physics may tweak behavior a bit, but such random effects can’t be part of free will.)”

Jerry Coyne, “You Don’t Have Free Will”, March 18, 2012.

# Physicalism and the existence of persons

- It also appears that physicalism is incompatible with the existence of persons, considered as entities that persist through time.
- The physical description of a 'person' includes nothing stable that persists from birth to death. Personal identity is an illusion, or just a legal fiction.
- “The line of reasoning that has so successfully explained the identity of plants and animals, of ships and houses, and of all changing complex things—natural and artificial—must be applied to personal identity too. The identity that we ascribe to the mind of man is fictitious” (David Hume)

# Alvin Plantinga on knowledge

- Contemporary Christian philosopher Alvin Plantinga has argued that evolutionary naturalism is *self-defeating*.
- He claims that, on the assumption that our cognitive mechanisms evolved by natural selection, we have little reason to believe that those mechanisms are reliable, i.e. produce true mostly beliefs.
- Hence evolutionary naturalism is self-defeating, since acceptance of the view undermines the general reliability of all our beliefs, including our belief in naturalism.



# Naturalism is self-defeating?

- I'm not presenting all the details of Plantinga's argument here, and I'm not convinced that it works.
  - In particular, I'm not sure he has a strong rebuttal of claims that true beliefs, and rational inferences, are more adaptive than their alternatives.
- A more solid argument (it seems to me) of the same general kind is the one I gave in the lecture on the problem of induction.
  - Naturalism cannot account for the *a priori* knowledge that science needs.

# Alvin Plantinga on knowledge

- More generally, Plantinga argues that naturalism is unable to account for objective *normative* facts, i.e. facts about what is *right, good, true, valid, healthy, rational, knowledge*, etc.
- What, for example, makes an argument *valid*, or reasoning *cogent*? This cannot be answered by the sciences. On a naturalistic view, thinking is merely a biological process within Homo Sapiens. Psychology, for example, studies how humans *do* think, but not how they *ought* to think.

# Similar to Alfred R. Wallace's argument

“Neither natural selection nor the more general theory of evolution can give an account whatever of the origin of sensational or conscious life. They may teach us how, by chemical, electrical, or higher natural laws, the organized body can be built up, can grow, can reproduce its like; but those laws and that growth cannot even be conceived as endowing the newly-arranged atoms with consciousness....

*Quarterly Review* v. 126, n. 252 (April 1869): 359-394