

Chapter 20

Intelligent Design

20.1 Readings and Homework

- Readings:
 - SCOTT (534-41, 586-92),
 - THE INSTITUTE FOR CREATION RESEARCH (555-7),
 - RUSE (493-500, 605-12),
 - THE NATIONAL ACADEMY OF SCIENCES (289-300, 617-23),
 - JOHNSON (581-6), BEHE (592-601), AND DORIT (601-4)
 - DANIEL C. DENNETT, “Show Me the Science”, *The New York Times*, August 28, 2005

- Homework:
 1. How can we understand the fact that the theory of evolution, while non controversial among scientists, is not accepted by the general public in the United States?
 2. What are the main trends of the anti-evolutionist movement in the past 50 years?
 3. What are Johnson’s main contentions against the theory of evolution?
 4. What are the confusions he makes concerning the theory of evolution and scientific methodology?

5. Explain Behe's argument from complexity.
6. What are the six fallacies that Dorit finds in Behe's argument?
7. What is methodological naturalism and how does it rely to science?
8. How do creationism and the theory of evolution compare in terms of empirical support?
9. (Dennett) What are the criteria for a theory to qualify as a competing theory? Does creationism fulfill such criteria?

20.2 A little bit of history

Reading: Eugenie Scott

20.2.1 Introduction

- Two facts which make the theory of evolution special:
 - while it is non-controversial within the scientific community, it is not accepted by the majority of the general public (only 44% agreed with the descent of man from earlier species)
 - such public reluctance happens only with the theory evolution: other new theories, like the theory of continental drift, are largely accepted by the public
- According to Scott, the explanation is that the theory of evolution is incompatible with **literal interpretation of holy texts**.

Indeed, ultraconservative Christians, Jews and Muslims can consider that learning evolution would ruin the life and after life of their children.

NOTICE THAT THIS IS TRUE ONLY IN THE US: in Europe, all religions are in peace with the theory of evolution

20.2.2 Evolution

Definition:= Descent with modification

The state of play:

- Darwinism: natural selection

- neo-Darwinism: synthesis of natural selection and genetic theory (see Bowler 319-25)
- Eldredge and Gould: punctuated equilibrium (see Gould, 344-49): modification of the theory concerning the mechanism of evolution
- Neutralism: non selective mechanisms

20.2.3 Creationism

Definition:= A supernatural entity created the universe and humankind

- Young Earth Creationists: the Earth is a thousand year old: Flat Earther, Geocentrists
- Henry Morris and the Institution for Creation Research – pretends to give a scientific rationale to creationism.
- 80's: bills for equal time in teaching
- 1982: McLean vs. Arkansas – equal time law declared unconstitutional
- 1983: creation of the National Center for Science Education (NCSE)
- Wayne Moyer, Stanley Weinberg etc. – Scientists take the task to fight against the attempts to pass equal time bills.
- Importance of scientists' expertise in these decisions: creationism is proved to be non-scientific.
- 1987: *Edwards vs. Aguillard* – equal time laws are declared to violate the First Amendment of the Constitution
- Neo-creationism after *Edwards* creationism

20.2.4 Intelligent Design

Definition:= Argument for the existence of God on the basis of the order and intricacy of the world

- Core argument: complex order cannot originate in mere chance**
- Dean Kenyon (San Fran), Percival Davis
- in the tradition of William Paley – the watch and the eye examples
- allows for micro-evolution but not between “kinds”: demands that a role be left for the intelligent designer for the creation of these kinds.
- Philip Johnson 1991 *Darwin on Trial* – shifts from YEC but still lacks solid grounding

- Michael Behe 1996 *Darwin's Black Box*: accepts most of evolution but takes it that there are “irreducibly complex” processes and structures of which it is impossible to give a natural account.

Note on Naturalism and Reductionism: ontological vs. methodological – see Dawkins (300)

20.3 Darwin on Trial

Let us see what the opponents of evolution have to say.

20.3.1 Johnson *Darwin on Trial*

Main contentions:

1. Rejects the argument which says that, in absence of any alternative theory, the best to do is to go on with the best we have right now.
2. Claims that Darwinists give ad hoc explanations for facts that could be seen as incompatible with the theory: “living fossils”, group selection and kin selection, pleiotropy (a single gene has multiple effects)
3. Claims that the theory of evolution lacks empirical evidence.
4. Theory vs. facts
5. Claims that “scientific naturalism” is an “essential starting point for Darwinism”. He defines naturalism and scientific naturalism in the following way:

Naturalism: “the entire realm of nature [is] a closed system of material causes and effects, which cannot be influenced by anything outside”

Scientific Naturalism: “makes the same point by starting with the assumption that science, which studies only the natural, is our only reliable path to knowledge.”

Notice that his definition of scientific naturalism fails to recognize the difference between the ontological and the methodological versions of it.

6. The main idea here is to argue that:
 - the theory of evolution is not founded in empirical research but rather is fundamentally based on an ideology: naturalism
 - as such, it can be denied by the believer, who does not accept the ideology.
7. So: Johnson's strategy is the following:
 1. Cut Evolution from its evidential support = claim that there is no empirical basis
 2. Claim that the support for the theory is a particular and challengeable ideology.

Of course, he is mistaken on both point.

20.3.2 How Johnson's arguments fail

1. **Johnson does not know the scientific theory** he is criticizing:
 - He does not know Darwinism
 - He does not know the modern theory of evolution
 - Actually, he does not know the differences between the two
 - Nor does he know the difference between evolution and the various mechanisms of evolutionary processes (590)

Mainly, the explanation is that his knowledge comes from biased second hand literature (ICR).
2. Thus, all his arguments about "ad hoc explanations" and the lack of empirical evidence only show his ignorance of what scientists have been doing in the past century.

Typically (588): Not mentioning the large amount of fossils that has been found and which fill in the gap of the fossil record, his argument about the lack of transitional forms in the fossil record is an objection against Darwinism, which takes evolution to be a slow, continuous and gradual process. But this is denied by modern theory of evolution with the punctuated equilibrium theory.

Same thing for the lack of explanation for speciation. Johnson simply does not know well the theory he is criticizing.

3. Scientific method

The most important flaw in Johnson's argument comes from the ignorance of scientific methodology

- **Consilience:** against the notion of consilience or unificatory power, he reject a theory as scientific, even if it is well supported by large and various empirical evidence, and only on the basis that it does not give all the details of a particular process
- **The proper domain of a given scientific theory:** the theory of evolution does not explain either the origin of life or the origin of the universe. But it does not have to. No more than mathematics have to explain how numbers appeared.
- **Theory and fact:** theories are not fact, but this does not mean there are iffy hypotheses.
- **Empirical evidence:** can we see evolution occur? Yes, just as much as we can see gravity occur. That is, we observe the empirical facts that we can logically infer to be the case from the theory.
- **Science and ideology:** scientific theories are not ideologies. That they may be used as part of ideologies does not make them ideologies. Nor does it make them not worth teaching. Quite the contrary: to teach the theory of evolution makes you understand how, for example, social Darwinism hinges on a fundamental misinterpretation of it !
- **Ontological vs. methodological naturalism:**

Ontological naturalism is a philosophical stance about what the world is fundamentally made of.

Methodological naturalism is a philosophical stance about how to study the world scientifically. One possible assumption of science is methodological naturalism. It is also the method adopted for the theory of evolution, just because it is the starting point of *any* scientific theory. A scientist starts of with the idea to explain the world in term of natural processes. Appeals to supernatural forces indeed do not pertain to science. This does not imply that all explanations of the world must be that way, only that scientific explanations must.

Methodological naturalism has proved more fruitful both for technological applications and for the advancement of knowledge.

- **Science and Religion** – because it only involves methodological materialism, science is not anti-religious. At best, you may call a-religious: it just has nothing to say about religion, and nothing to learn from it either.

Thus, two main criticisms against Johnson: his ignorance of the state of play of the scientific theory he is criticizing and his profound misunderstanding of scientific methodology:

- Confusion between Darwinism and the presently accepted theory of evolution
- Confusion about what is a scientific theory and how it is supported by empirical evidence
- Confusion between scientific methodology and the ideologies/philosophies/religion taking scientific theories as their base

20.3.3 Behe, *Darwin's Black Box*

- starts with a quotation from Darwin: a consequence of Darwinism is that complex systems gradually and slowly evolved from simpler system
- Behe is going to argue that there are complex systems which could not have evolved from simpler systems. Exhibiting such systems amounts to exhibits counterexamples for the theory.
- Definition of an “irreducibly complex system”: “a single system composed of several, well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning”

The idea behind is that if all the parts are not there *at once*, then the system fails to work. The challenge is to find biological systems that cannot be a complexification of other working systems.

- Still in the hypothesis of the existence of such systems, he rejects possible answers, in terms of multiple chancy mutations at the same time. Note the criticism over “luck” as a satisfactory explanation. Behe contrasts “chance explanation” with “causal explanation”. Of course, this amounts to a general criticism against the kind of explanation that the theory of evolution provide. Evolution is fundamentally chancy.

The problem is that chances are well accepted in science! If you reject chance as a scientific explanation, you might end up rejecting a lot of well accepted theories, including quantum theory, thermodynamics etc.!

Behe's trick here is to conflate "chance" with "luck". By the latter, he means the simultaneous occurrence of several events that "work together". This is what he rejects here. Evolution is probabilistic but this does not mean that it explains everything by luck!

- argues that a mutation can only affect one step of a building process of an organism, not many of them at once.
- argues that "we can't tell" whether the defensive apparatus of the bombardier beetle and the intricacy of the vertebrate eye could have evolved gradually from simpler system. His argument hinges on the assumption that in order to tell so, we must know all the components of the system first.

This strikes me as a dubious assumption: do we have to know all the details of the molecular composition of living organism to explain how such organism arose from evolution?? We do not know any system in so many details! This does not prevent us to explain them in terms of evolutionary processes. For example, we do not need to know the details of the molecular composition of the fins of a whale to understand its evolution from the hands of mammals on the ground!

20.4 The scientific character of evolution

Reading: Evolution and the Nature of science (289-300)

20.4.1 What it takes to be a scientific theory: empirical evidence

- While no scientific theory can, of course, be taken as absolutely true of the world, many scientific theories are very well established. The theory of evolution is such a well established scientific theory.

- No explanation which is not based on empirical evidence qualifies as scientific. The theory of evolution is an explanation which is based on observation. As such, it qualifies as scientific
- By contrast, creationism is not based on empirical evidence and cannot be supported by further testing. As such, creationism does not qualify as scientific:
 - we have no empirical evidence that a supernatural designer exists
 - we have strong evidence that organisms in general are not perfectly designed
- Conclusion about teaching...
- Important Note: There is a confusion in terms when it is claimed that “evolution should not be taught as fact, only as a theory”
 - No scientific theory is a fact. This is a category mistake. Scientific theories are based on physical facts, but are not themselves “facts”.
 - Scientific theories are “well-substantiated explanations of some aspect of the natural world that incorporates facts, laws, inferences and tested hypotheses” (290). As such, they are the highest achievements of scientific activity.

The problem arises (Scott 539) because the understanding of the notion of fact and theory differ in the scientific community and in the general public. No scientific theory is a fact. A bunch of facts does not make a scientific theory either. But this does not mean that they are mere conjectures that one should not take seriously, quite the contrary. Theories consists in systems of laws that together provide an unified explanation for a set of empirical facts. Thus, theories *are* not facts, but they are based on facts, and corroborated by facts.

20.4.2 Evidence in favor of the theory of evolution

- Remember the principal tenets of Darwinism:
 - variations
 - struggle
 - inheritance

- selection
- divergence
- **Evolution of Evolution.** Filling in the gaps
 - While Darwin was still very unsure about the “laws of inheritance”, we have now a well theory of inheritance: **genetics**.
 - The main feature of Darwinism remains: “Genetic mutations arise by chance” (not by “adaptation” for example). **Chance stays at the core of the evolutionary process.**
 - **Speciation** is now understood as a consequence of geographical separation of two populations of the same species. One the separation has occurred, the two populations evolves in different ways, until mating is not possible anymore.
 - Example of Darwin’s finches
- **Fossil Record:**

The fossil record has been completed and provides a huge amount of empirical support for descent with modification
- **Structural homologies:**
 - similarities in bone structure between completely different species.
 - dissimilarities which can be linked to evolution: reptilian jaw and mammalian ear bones
- **Distribution of species:** evolution vs. migration

From the theory of evolution one can infer that species in area A, which do not have an ancestor in area A have come there from migration. This is empirically well confirmed.
- **Embryology** – similarities of larval stages supports the thesis of a common ancestry (free swimming larva of the barnacles, early development gene sequences in worms, mice and humans).
- **Molecular Biology**
 - similarities between organisms at the molecular level: proteins’ component and molecular structure

- differences can be embedded in family trees

Both support descent with modification

Molecular biology can complete the paleontological evidence: whales are terrestrial mammals that went back to the sea (the hippopotamus may be the link)

20.4.3 Objections and Answer

- **Incompleteness of the fossil record:**

- The fossil record has been greatly completed

- It shows a never challenged consistency

- **“no one has seen evolution occur”**

- No one sees relativity occur either: One sees only empirical consequences of scientific theories!

- We have strong evidence of actual evolutionary processes: evolving viruses and bacteria (anti-biotic resistant)

- **Complexity**

- It has been shown that complex systems can be built up from simpler systems through evolutionary process

- it is not true that complex systems only works when everything is in place: we have instances of “simpler” hemoglobins etc.

- example of the eye

20.4.4 Humans

- Form Paleontology and molecular biology:

- Australopithecus: 4 millions years ago

- Homo: 2.4 millions years ago

- Neanderthals separated from our ancestors 500.000 years ago

- Homo sapiens: 100.000 to 150.000 years ago

20.4.5 Conclusion

The conclusion restates that the theory of evolution is a scientific theory while creationism is not. Besides empirical supports, it adds an important point: falsifiability.

It is a crucial aspect of scientific theories that they could be rejected by further evidence. Creationism again does not meet this criterion for scientificity.

Creationism and empirical support:

- EITHER they commit to some predictions (no extinction, perfect adaptation of the correspondence between the species and their niche, perfect organs) and then *it is falsified*
- OR they do not commit to any predictions (the ways of God are unknowable) and then it does not qualify as a scientific theory *because it is not falsifiable*.

In both cases, it is unacceptable as a scientific theory.

20.5 Intelligent design does not qualify as a competing theory

Daniel Dennett, “Show me science”

- The true reason why the theory of evolution is targeted is that its tenets stand in contradiction with a literal reading of the Bible, which takes God as being the creator of species. The theory of evolution is no more a “conjecture” than any other actually well established scientific theories, like Relativity or Quantum Theory.

- How intelligent design plays on confusion about design:

The test: Design argument for the dummies.

The theory of evolution answers your qualms about how the world became what it is, that is, seemingly well designed.

The evolution of the eye:

20.5. INTELLIGENT DESIGN DOES NOT QUALIFY AS A COMPETING THEORY²⁴⁹

- we have a theory, well supported by empirical evidence (observation of intermediates and computer simulations), that explains how something as complicated as an eye has been the result of the blind and chancy process of evolution.

- the eye actually presents “design flaws”, such as the blind spot, which cannot be given an account in terms of intelligent design.

Dennett makes a distinction between the RESULT and the PROCESS of evolution.

- the result is a “brilliant” design

- but the process is mindless

In Dennett’s words:

Yes, eyes are for seeing, but these and all the other purposes in the natural world can be generated by processes that are themselves without purposes and without intelligence. This is hard to understand, but so is the idea that colored objects in the world are composed of atoms that are not themselves colored, and that heat is not made of tiny hot things.

- Scientific ways to propose an alternative scientific theory

There is no doubt that a new scientific theory can be proposed and eventually win over the presently accepted theory. This is just what history of science is about. That said, not any theory can pretend to overcome an accepted theory. Dennett distinguishes between three main ways in which an alternative theory can be accepted:

1. It has empirical predictions which are incompatible with the presently accepted theory, and such a prediction is empirically confirmed.

Example: Einstein’s theory and the curved path of light (Eddington 1919)

2. It gives an account of a well known empirical fact which the presently accepted theory cannot explain.

Example: The orbital precession of Mercury (Vulcan)

3. It unifies several theories, and hence several domains, that were considered different before and are understood as ruled by the same laws within the new theory.

Example: Maxwell's unification of Electricity and Magnetism

Creationism does not accomplish any of these. It does not qualify as an alternative theory worth considering from the scientific point of view: "no intelligent design hypothesis has even been ventured as a rival explanation of any biological phenomenon".

The point is that it is not enough to say that some scientific theory is not a complete, comprehensive, and absolutely true explanation of the phenomena to cast doubt on such theory. For one, no scientific theory is a complete, comprehensive, and absolutely true explanation of the phenomena. And second, you have to propose something else!!

There are true scientific controversies, and this is not hidden. It is the main way in which scientific knowledge makes progress. That said, competitive theories in a domain are not discussed in textbooks, but in peer-reviewed journals. In these articles, theorem proofs and experiments are discussed. No intelligent designer has shown the ability to come up with a good paper.

Establishment hostility is not enough to explain such a gap of publication. Many scientific theories have faced establishment hostility, but could get through. Young people get excited, and run in their labs in search for empirical evidence which confirms or refutes the theory. This is the most promising option for a carrier! But this can be only the case when the theory has a content...and intelligent design just lacks content. No content, no controversy.

The upshot is: intelligent design does not qualify as a competing theory to evolution from the scientific point of view.