The Creation-Evolution Controversy
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Lecture 1:
Evolution & Its Arguments

I. Evolution Defined[1]

A. Biological Change

Changes have taken place in living things over the history of life on earth.

B. Descent with Modification from a Common Ancestor

If life arose on earth only once, and if all life comes from pre-existing life, then all life has descended from one original life form, no matter how different it is now.

C. Darwinian Mechanism

The means by which living things change is the production of diversity (now called mutation and recombination) and the selection of the better varieties through differences in reproduction and survival in the various circumstances and environments on earth.

D, Other Uses of the Term "Evolution"

1. Extension to cosmology, etc.

The origin and development of the whole univese, our solar system, and the planet Earth is often referred to as evolution, though the elements of meanings A-C, above, are not involved.

2. Extension to any kind of development

The origin and development of any object or institution is often referred to by this term, even if this involves intelligent design, e.g., "the evolution of the computer."

II. Arguments in Favor of Evolution

A. Arguments from Life on Earth Today

1. Animal and plant breeding

Humans, be selecting and breeding individuals with particular traits, are able to produce large changes in a give population, e.g., varieties of dogs, roses, pigeons. This is called *artificial selection*. Nature itself does something similar by means of *natural selection*.

[1] Keith Stuart Thomson, "The Meanings of Evolution," *American Scientist* 70 (Sept-Oct 1982): 529-31.

2. Biological classification

All living things can be categorized by their resemblances and differences into a large "tree" which records something of the history of life on earth as it has developed by growth and branching, just as a tree grows up from a single seed.

3. Development of fetuses

As living things develop in the egg or womb, they provide a sort of fast playback of their evolution, beginning first with a single cell and developing into the mature baby. Less similar animals will diverge from each other earlier in their fetal development; more similar animals diverge later.

4. Similarity of structure

When we compare the bone structure, muscle system, blood system, etc., of various animals, we see corresponding parts in each, though these have often developed in very different ways; e.g., the forelimbs of humans, dogs, bats, whales.

5. Similarity of biochemistry

When we compare the proteins (say) found in various plants and animals, those which perform a particular function are more similar in more closely related plants or animals and less similar in less closely related ones, and this in a way that parallels the physical similarities in item 4, above.

B. Arguments from the Fossil Record

1. Geologic ages

Geologic evidence has continued to accumulate that the earth is several billions of years old rather than just a few thousand, preserving a history of life on earth in the remains of plants and animals which have been fossilized over the ages.

2. Sequences of living things

Within the various layers of rock deposited over these geologic ages, we find that the oldest rocks contain no life. Later rocks contain a few examples of the simplest one-celled life; later rocks show fossils of more complex one-celled life. Still later rocks contain the major non-backboned animals, then the primitive fishes, then amphibians, then reptiles, then mammals and birds, and finally humans.

3. Similarities & differences

Within the fossil record we find fossils of types of plants and animals that are no longer aroud today, that have become extinct in the course of time. These fossils share the sorts of similarities and differences mentioned under A-4, above, suggesting that they are "cousins" descended from a common ancestor also.

4. Geographic distribution

The various continents which are more isolated (Australia, South America, Antarctica) have peculiar plants and animals today, plus plants and animals with similar peculiarities in the fossil record. These look like they migrated into these isolated areas, then evolved in their own peculiar direction, rather than that they were all created at one time. If the geologic strata were laid down by the flood, then the animals must have been transported from each continent to the ark (since their fossils are presenved in the rock), and returned to the same continuent afterward (since they are there today). Examples include: Darwin's finches, penguins, kangaroos, tree sloths, etc.

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Lecture 2:
Scientific Problems of Evolution

I. Problems with the Fossil Record

A. Problem of Sudden Appearances

1. Darwin's Expectations: 1859 ff
   Evolution is gradual, universal.
   The fossil record should be filled with intermediates.
   If not, then the fossil record is incomplete.

2. Neo-Darwinian Repair: 1930s ff
   Evolution is often rather rapid.
   It primarily occurs in small, isolated populations.
   So we won't see many (or any?) transitions.

3. Punctuated Equilibrium: 1970s ff
   Like Neo-Darwinian, but even more rapid.
   Adds tendence of species not to change (stasis, equilibrium).
   Seeks to explain lack of change & long continuation of species.

4. Creation Alternative
   Creation by sudden intervention.
   Small changes (microevolution) allow adjustment to changing environments.

B. Problem of Speculative Connections

1. Evolutionary "tree"
   Tree is virtually all tips, no branches.
   Kerkut, *Implications of Evol*: no agreement on how to relate lowest forms of life.
   Simpson, *Tempo & Mode in Evolution*: gaps in fossil record as systematic (regular, universal).

2. Fossil record is not particularly fragmentary
   80% of modern species have been found in the record.
   About ¼ billion fossils are cateloged in world's museums; why no (or so few) transitions? (see comments of Gould, Stanley, Raup).

II. Problems with the Evolutionary Mechanism

A. Tension between mutation and natural selection

1. Observed life today is very complex.
   Complex organs: eye, wing, poison fang
   Elaborate systems: metabolism, photosynthesis, cell, nervous system
   Optimization: parts work together at or very near best possible

2. The problem stated:
   If natural selection strong enough to optimize, **then** neutral mutations weeded out.
   If neutral mutations weeded out, **then** all change must follow paths of constant improvement.
   But many organs and systems consist of several parts, which organ or system is useless unless all parts present (e.g., poison fang, bombadiet beetle, sphex wasp).

B. Turning off natural selection to jump the gaps (non-selected innovation via pseudogenes)

1. Maybe change takes place in genes not in use (called pseudogenes), then these are turned on, ready to go.

2. Calculation to show impossibility of such innovation here:

   Suppose r specific amino acids are required at specific positions on a polypeptide chain.

   We have 61 base triplets coding for 20 amino acids, or 3.05 codons per amino acid.

   To reach a specified amino acid at a given position, up to 3 mutations will be required: of the 63 possible changes, 9 require 1 mutation, 27 require 2 mutations, 27 require 3. So geometric mean = 2.16 mutations per amino acid reached.

   Using mutation rate of 10^{-8} mutations/nucleotide replicated:

   $$\text{Prob } s = 3.05\ (3 \times 10^{-8})^{2.16}$$

   $$s = 1.87 \times 10^{-16} \text{ /nucleotide replicated}$$

How many replications do we have available?

Biological activity on earth today turns over 10^{16} moles of carbon per year.

A bacterium has 10^{-14} moles of carbon.

Bacterial genome has 5×10^{6} nucleotide pairs.

Assuming all carbon turnover is in bacteria, number of replications per 300 million years is R.

$R = 10^{16} \times 10^{14} \times 5 \times 10^{6} \times 3\ 10^{8}$

$R = 1.5 \times 10^{45}$ replications

Number of cases S in which r specified amino acids at given positions of protein would be obtained in 300 million years is:

$S = Rs^{r}$ (i.e., R times s raised to the r power)

r	S
2	5×10^{13}
3	10^{-2}
4	2×10^{-18}
5	3×10^{-34}

Result: Even 3 specified amino acids at particular locations on amino acid chain are unlikely!

3. Some creation alternatives to this:
   a. Guidance of a small-step process?
   b. Intervention => large steps of the right sort?
   c. Creation from scratch?

C. The problem of forming organized systems by random processes:

1. Mutations are random: selection only chooses which will survive.

2. Life is not simple:

Carl Sagan estimates the information content of a simple cell as about 10^{12} bits = 100 million pages of the *Encyclopaedia Britannica* = 4,000 sets of *EB* (Sagan, article "Life" in *EB*)

3. Problem of generating order by random processes:

Monkeys typing just title "ENCYCLOPAEDIA BRITANNICA" is a job requiring some 30 billion billion billion monkey-years!

Wistar Symposium: *Mathematical Challenges to the Neo-Darwinian Interpretation of Evolution*: Computer simulation shows the evolutionary mechanism to be inadequate; order is destroyed, not increased.

4. Contrast creation and evolution models re/ order:
   Evolution: randomness (w/ natural selection) produces order (but no model that can be shown to work).
   Creation: mind produces order (our own human minds function as a working model).

III. Conclusions

Creation solves problems insuperable to evolution.

We don't know all the answers, but we should not be ashamed to hold to the Biblical teaching here.

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Lecture 3:
The Origin of Life

I. The Standard Scenario for the Naturalistic Origin of Life

This is usually called "chemical evolution" or "biogenesis."

A. The complexity of a simple cell and the consequent need to form life in several steps:

1. Step One: Simple chemicals to organic chemicals

2. Step Two: Organics to biopolymers

3. Step Three: Biopolymers to pre-living "cells"

4. Step Four: Pre-living to living cells

B. Constituents of life and their roles

1. Amino acids – function as structural elements of proteins, which form the structure of cells and the catalysts for biochemical reactions.

2. Nucleic acids – combination of sugars and nucleotides to make DNA and RNA, the bacis information molecules of life.

C. Step One: Proposed formation of organics on earth

1. Earth's early atmosphere – to get amino acids, need to have an atmosphere which is reducing rather than neutral or oxidizing.

2. The role of sunshine, lightning, thunder, heat – to break up consituents of hypothesized atmosphere, need a strong energy source to split up molecules of hydrogen, water, ammonia, methane into pieces.

3. Some evidence in favor of this:

a. Miller-Urey experiment – in 1950s, showed that some amino acids would be produced in spark chamber containing atmosphere of molecules listed in #2, above.

b. Organics, including some amino acids have been detected (remotely) in interstellar clouds.

c. Amino acids have also been found in meteorites, stones that have fallen from space to earth.

D. Step Two: Proposed formation of biopolymers

1. The need to concentrate the organics – to get amino acids and other organic molecules to combine into long chain molecules such as proteins, they need to be concentrated to a much higher level than they would be by forming in the atmosphere and falling into the oceans.

2. The concentrating mechanism:

a. A suitable reservoir – typically, a pond that lies on a seashore just above the normal high tide level, so that it will not be replenished too frequently.

b. A heat source – to evaporate the water so that the organics become more concentrated. This would normally the sun in a tropical area.

c. Repeated addition of new material – so as to increase the total volume of organics available for reaction.

d. Protection from:
(1) dilution – which would cancel the benefits of concentration.
(2) untraviolet radiation – which would destroy the biopolymers which one wishs to make.

E. Step Three: Proposed formation of pre-living "cells"

Two suggested pathways to prduce cell-like structures in which the organics and biopolymers would be isolated from outside influences:

1. Microspheres – small spheres of a protein-like substance, formed when certain mixtures of amino acids were heated under dry conditions and then disssolved in warm water and cooled. These have about the size and look of simple cells.

2. Coacervates – tiny droplets of lipids or other high molecular weight organic compounds that form when these materials are placed in water, rather like oil droplets.

F. Step Four: Proposed formation of simple cells

1. Differences between prokarylotes and eukaryotes – the former are simple cells, the latter much more complex; prokaryotes have no cell nucleus or organelles such as mitochondria.

2. Microfossils and their formation – there is evidence in the geologic record of fossils of microscopic organisms, though these only form rarely in special environments.

3. Correlation between geologic age and complexity – the earliest geologic strata appear to be lifeless, but evidence of life shows up very soon after the earth has cooled enough so as not to cook meat. The earliest evidence is for prokaryotic one-celled life, then later for eukaryotic one-celled life.

4. Comparison between ancient microfossils and simple cells living today. We cannot directly test the complexity of ancient microfossils, but they resemble in general appearance the simpler lifeforms which exist today.

II. Problems with the Naturalistic Origin of Life

A. The General Problem of Producing Organized Complexity

1. The simplest life today is very complex (Sagan, "Life," *EB*)

2. Work on self-reproducing machines indicates that the simplest possible life would be complex also, even if not nearly as complex as modern living things. The formation of such does not look at all likely in the length of time and space available.

B. Specific Problems with Step One

1. The Miller-Urey experiment was only the first (and very small) step toward life, like the jump in complexity from one word to a few, or at most a sentence. Life, by contrast is like 4,000 sets of the *Ecyclopaedia Britannica.*

2. Was the early atmosphere free of oxygen? If not, these Miller-Urey type reactions won't work. It looks like, due to the dissociation of water into hydrogen and oxygen due to ultraviolet rays, that the earth's atmosphere was not sufficiently free of oxygen early on.

3. No version of the Miller-Urey has yet formed all the amino acids occurring in life. Two (arginine and histidine) have not been formed in any such. Other amino acids that don't occur in life are regularly formed. So one would at least need many Miller-Urey type reactions under very different conditions.

4. Protection from ultraviolet radiation is also a problem. Without our ozone layer, UV can penetrate 100 feet of water. With our ozone layer, we have oxygen in the atmosphere.

5. Laboratory synthesis of nucleic acids (the predecessors to DNA and RNA) has been unsuccessful with Miller-Urey type experiments.

C. Specific Problems with Step Two

1. Building up large molecules is opposed by entropy, the natural tendency toward disorder.

2. Other competing chemical reactions are far more likely than the reactions needed, and there is no natural way to get rid of competitors.

3. Natural reactions produce equal numbers of left- and righ-handed molecules, but life does not. The amino acids in living things (except for the first, which has no handedness) are all left-handed. The sugars in DNA/RNA are right-handed only.

4. There does not appear to be sufficient time and space available in our universe to form the simplest proteins used in life.

   The universe is about 20 billion years old, maximum.

   The known (accessible) universe is thus about 20 billion light years in radius.

   To form a specific simplest protein (a chain of about 100 amino acids linked together), one needs about 10^{38} years for the entire universe = only about 1 chance in 10^{27} for this happening since the big bang.

   The calculations of Hoyle and Wickramasinghe give similar results (see their *Evolution from Space*). Both were originally agnostic; now they feel some sort of god is necessary to explain the origin of life.

D. Problems with Steps Three and Four

1. Microspheres and coacervates have only a superficial resemblance to cells.

2. The problem of the initial partnership between proteins and information molecules (DNA, RNA) is both critical and unsolved.

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Lecture 4:
A Biblical Alternative to Evolution

A. Evangelical Options on Origins

Evangelical Christians have not been able to reach agreement on how to respond to evolution, though all are satisfied that without God, evolution will not work. The three standard positions on relating the Bible and science in the matter of origins are as follows:

1. Young-Earth Creation
    a. The earth is only a few thousand years old.
    b. The creation described in Genesis took place in seven literal, consecutive days.
    c. Typically, the geologi column was laid down during Noah's flood.
    d. Young-earth creationists vary on how much change has taken place in living things and when this occurred.

2. Old-Earth Creation
    a. The earth is a few billion years old.
    b. The creation days are actually ages, or else they have gaps between (or before) them.
    c. Geology and astronomy give us a reliable history of the earth.
    d. God intervenes to effect large-scale changes in life.

3. Theistic Evolution
    a. The earth is a few billion years old.
    b. The Genesis account may or may not be scientifically useful.
    c. God produces the diversity in life providentially.
    d. Theistic evolutionists vary on how to handle Adam:
        (1) Adam-type evolution: Adam was a remodelled ape.
        (2) No-Adam evolution: A whole population of apes gradually evolve into mankind.

B. Relative Merits of These Options

1. Young-Earth Creation

a. It is based on the simplest reading of the Bible, though the Bible appears to have hints of an old earth.
(1) 2000 years ago it was already the "last hour" (1 John 2:18)
(2) "no earthquake like it since man was on earth" (Rev 16:18)

b. It has serious problems with geology and astronomy.

(1) Astronomy: e.g., light travel-time
We see objects more than 10,000 light-years away.
(a) A small universe?
Camping's physically small universe would make the dim stars too small to hold together.
Moon & Spencer's optically small universe would look like mirrors in clothing stores or amusement parks.
(b) Changing speed of light?
Setterfield sees light speed infinite at creation, decreasing till now, but this would make drastic changes in light from distant sources.
(c) Light created *en route*?
This is commonest young-earth view, but it requires God to crete fictitious history, not merely creation with appearance of age.

(2) Geology, e.g.:
(a) Living and buried coral reefs
Several modern ones are too thick to have formed in 10,000 years, e.g., Eniwetok Atoll, 4600 ft thick (at max growth rate of 8 mm/yr, would take about 150,000 years.
Many buried reefs are underlaid & covered with hundreds of feet of sediments, yet are apparently in their growth position, e.g., Rainbow formation in Alberta, Canada
See Wonderly, *Neglect of Geologic Data*, 78-86.
(b) Paluxy dinosaur & human footprints
Numerous alleged human footprints are extension of obvious dinosaur tracks.
The tracks are underlaid by thousands of feet of sediments and are over a hundred miles from any high ground.

Who was out running around in the middle of the flood, anyway?

See Glenn Kuban, *Origins Research*, Spr/Sum 86.

(c) Cooling of large igneous rock masses

These masses (being igneous) were once melted.

Cooling rates depend on thickness & conductivity of the rockmass itself, plus same for surrounding rock which must carry off the heat, e.g.

Palisades Sill, NY: over 300 years to cool Stillwater Formation, MT: > 50,000 years Granitic Batholith, CA: > 1,000,000 years

See Young, *Creation and the Flood*.

2. Theistic Evolution

a. It is based on the simplest reading of nature, though gaps in the fossil record and in biochemistry hint that abrupt appearance is more likely.

b. It has serious problems with the Genesis account.

(1) The No-Adam version must treat the account of Genesis 2 as parabolic, since (on this view) there never was a single original pair. This raises fierce problems for the account of the fall, which is itself the basis for the atoning work of Christ.

(2) Even the Adam version has Adam made from an ape, which is a rather strained interpretation of:

Gen 2:7: "Then the LORD God formed man of dust from the ground, and breathed into his nostrils the breath of life; and man became a living being."

3. Old-Earth Creation

a. It is a serious attempt to harmonize the data of Bible and nature.

(1) It takes both the scientific and biblical materials seriously, but tries to construct a (more complex) model which will fit both.

(2) There are several varieties:

(a) Day-Age view – the days of Genesis 1 are long periods of time rather than 24-hour days.

(b) Intermittent-Day view – the days are 24-hour but separated by long periods of time.

(c) Gap-Restitution view – the days are literal & recent, but they record a restitution of a previously-ruined earth.

b. Opponents see this view as forcing a harmony which is not actually there.

(1) Varieties (a) and (b) have the sun created before the earth, which is claimed to contradict Genesis.

(2) There is no evidence in the text for long days or gaps.

(3) Did the author of Genesis really have one of these views in mind when he wrote?

C. A Proposal for Harmonizing the Bible and Nature

1. The universe
   a. An absolute beginning at the big bang.
   b. God designs and guides the development, and may have intervened on many occasions.

2. The earth
   a. God guided natural processes, perhaps also intervening.
   b. There is a real correlation between Genesis and science. See Newman & Eckelmann, *Genesis One and the Origin of the Earth*.

3. Life
   a. Life could not have begun without God's intervention.
   b. The fossil record and problems with Darwinian mechanisms favor intervention are the gaps.
   c. There is a common design, reusing some stock plans. E.g., God uses a common body plan, suitably modified, for vertebrates.

4. Mankind
   a. Man was a separate creation.
   b. Man was designed to resemble ape-kinds (Eccl 3:18).
   c. The creation of man (*Homo sapiens*) was probably relatively recent, perhaps 10 to 100 thousand years ago.

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