

درس گفتارهای مقولات ویژه در فلسفه دین

دکتر سید حسن حسینی

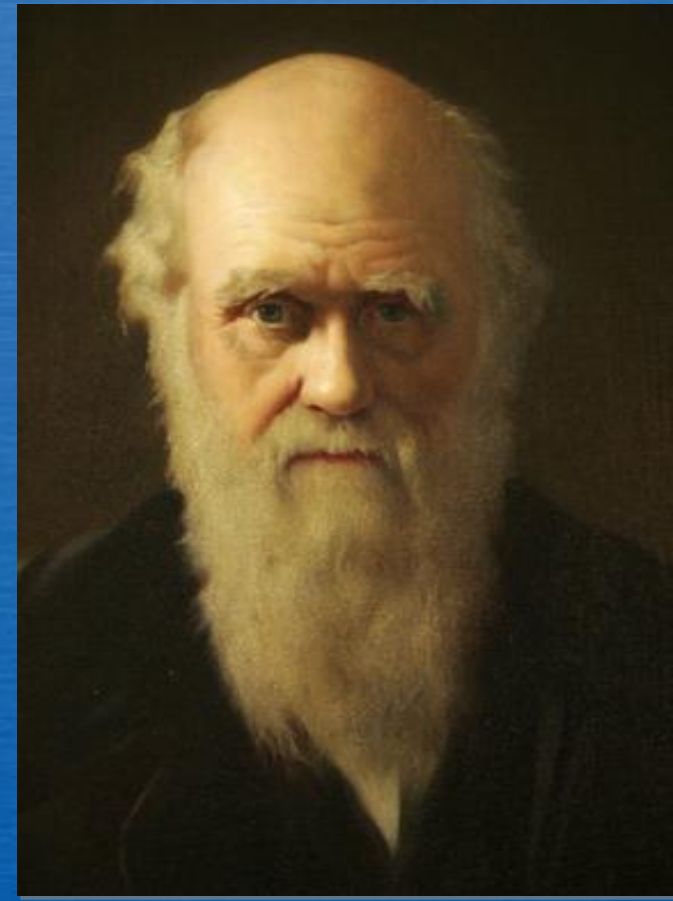
گروه فلسفه علم

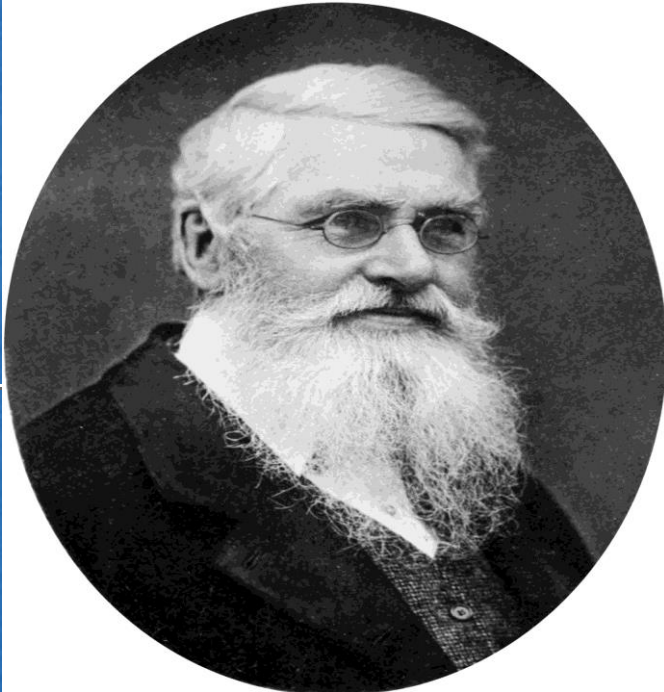
دانشگاه صنعتی شریف

پاییز و زمستان ۱۳۹۹

Darwin, (1809 –1882), The Origin of Species

1. Lamarck's (1744–1829) Transmutation
2. Thomas Malthus' (1766–1834)
Principle of Population
3. Herbert Spencer's (1820–1903)
The Survival of the Fittest
4. Charles Lyell's (1797 – 1875) Principles
of Geography
5. Darwin's Voyage From 1831-1836
6. Alfred Wallace's (1823 –1913) Letter in
18 June 1858

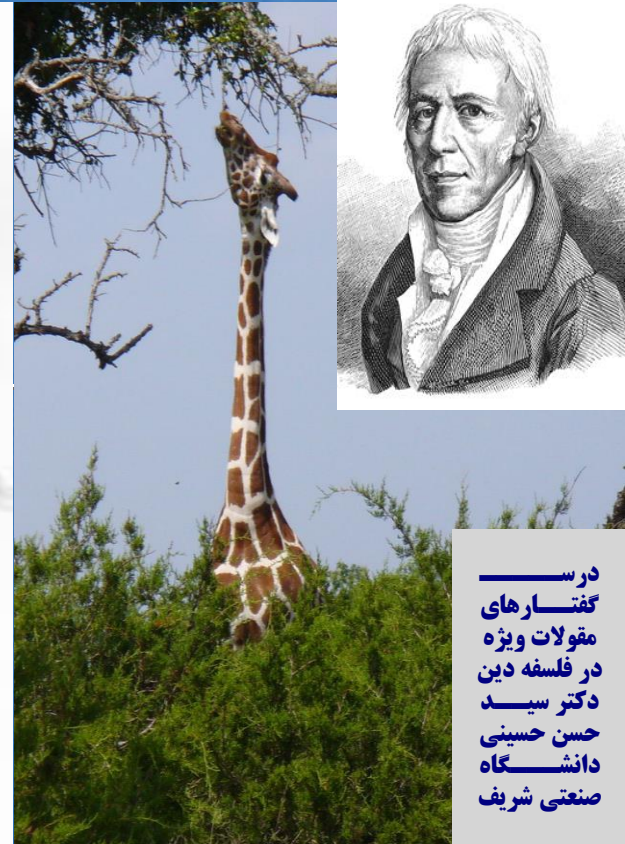




Alfred R. Wallace



Charles Lyell



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This survival of the fittest, which I have here sought to express in mechanical terms, is that which Mr. Darwin has called natural selection, or the preservation of favoured races in the struggle for life.

(Herbert Spencer)

lzquotes.com



"It is an acknowledged truth in philosophy that a just theory will always be confirmed by experiment."

Thomas Malthus



The Origin of Species

- Six British Editions: 1859, 1860, 1861, 1866, 1869, 1872.
- The Main Core:

I will here give a brief sketch of the progress of opinion on the Origin of Species. Until recently the great majority of naturalists believed that species were immutable productions, and had been separately created. This view has been ably maintained by many authors. **Some few naturalists, on the other hand, have believed that species undergo modification, and that the existing forms of life are the descendants by true generation of pre-existing forms.**

(The Origin of Species, 6th edition, xii.)

ON
THE ORIGIN OF SPECIES

BY MEANS OF NATURAL SELECTION,

OR THE
PRESERVATION OF FAVOURED RACES IN THE STRUGGLE
FOR LIFE.

By CHARLES DARWIN, M.A.,

FELLOW OF THE ROYAL, GEOLOGICAL, LINNÆAN, ETC., SOCIETIES;
AUTHOR OF 'JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE
ROUND THE WORLD.'

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

Darwin's Five Major Theories of Evolution (Mayr, 2002)

1. The non constancy of species (the basic theory of evolution)
2. The descent of all organisms from common ancestors
3. The gradualness of evolution (no saltation, no discontinuities)
4. The multiplication of species (the origin of diversity)
5. Natural selection

A Two Part Theory (Sober, 2009)

1. The Tree of Life (The Theory of Evolution)
2. Natural Selection (The Mechanism)

Two Significant Elements:

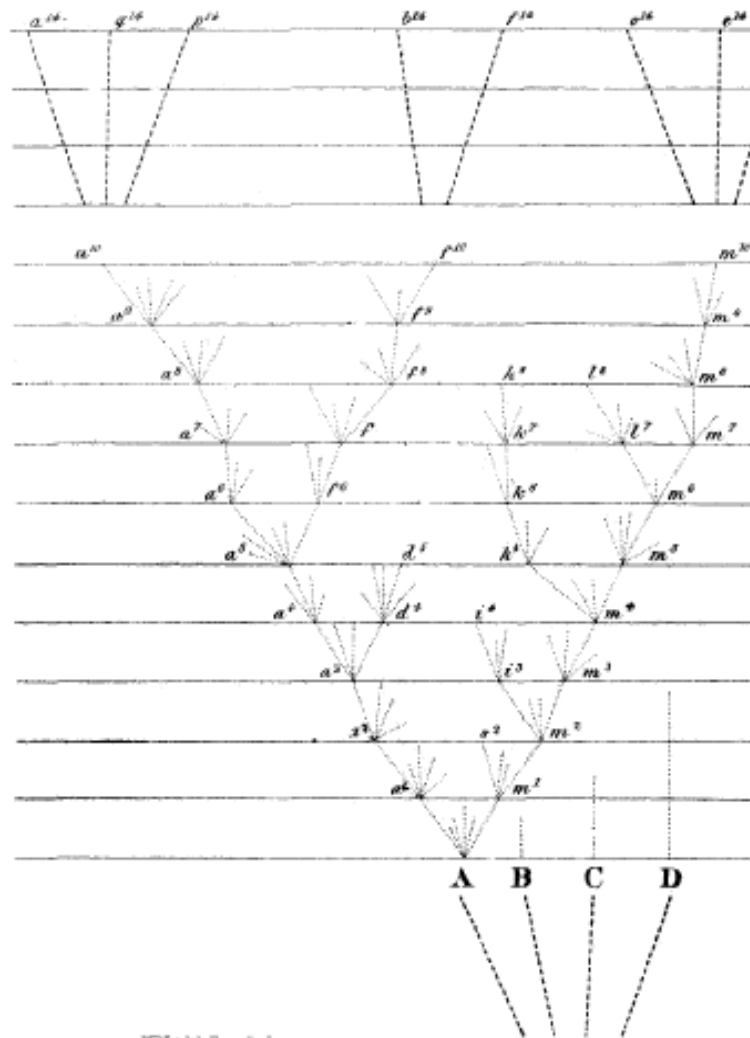
1. Common Descent (The Theory of Evolution)
2. Natural Selection (The Mechanism) Waters,

- **Evolution:**
 - The idea that biological life on Earth developed from simple forms to more complex ones.(tree of life)
 - A major development in evolution, usually one species changing into another species (Transmutation), or evolution of an organism from a common ancestor (**macroevolution**). and changes or mutations in a species that do not result in transmutation. The result of these changes or adaptations may be the formation of a new variety of the species (**microevolution**).
- **Evidences:**
 - The Fossil Record, Geographic Distribution of Living Things, Homologous Body Structures, Similarities in Early Development

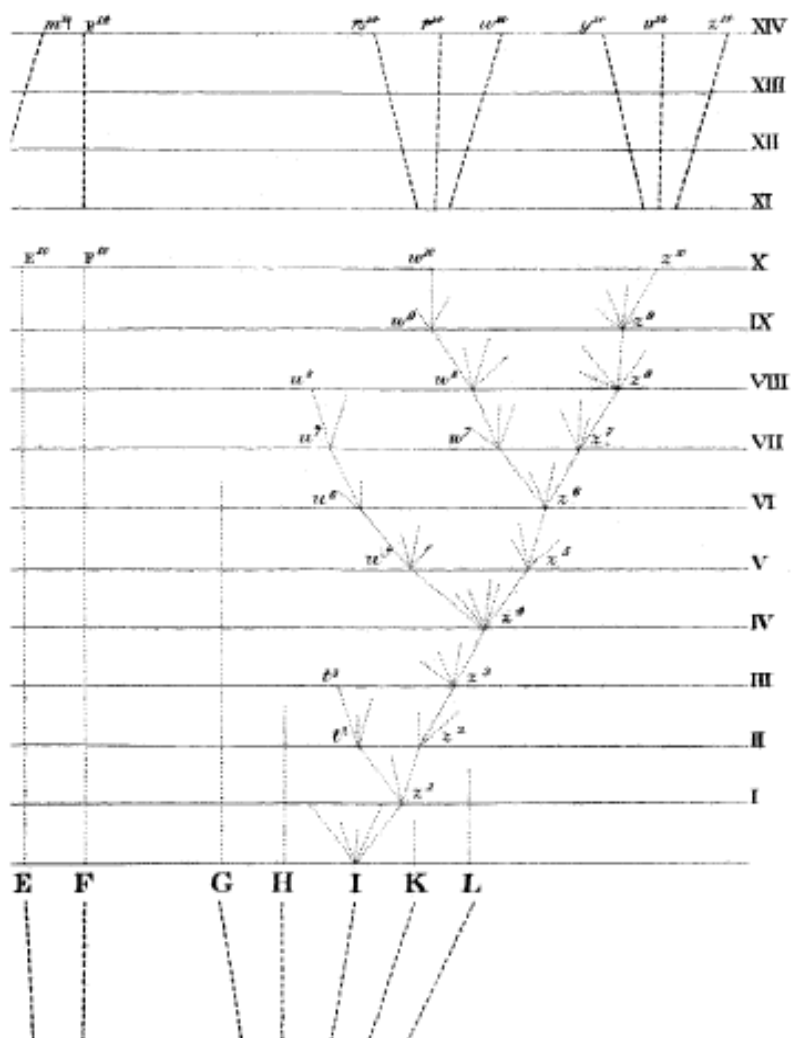
- **The Fossil Record**-Layer show change
- Geographic.
- **Geographic Distribution of Living Things**-similar environments have similar types of organisms
- **Homologous Structures**-structures that have different mature forms in different organisms, but develop from the same embryonic tissue
- **Similarities in Early Development**

Comparative Embryology





Walter Ick, Benziger-Verlag



Observation 1:
Populations have the potential to increase exponentially.

BUT

Observation 2:
Populations generally remain stable once they reach a certain size.

AND

Observation 3:
Natural resources are limited.

Ecology

Observation 4:
Individuals in a population are not identical, they vary in many characteristics.

AND

Observation 5:
Many characteristics are heritable (i.e., are passed on from parent to offspring).

Heredity



Inference 1:
Not all offspring that are produced survive and reproduce, because of a struggle for resources.

AND

Inference 2:
Some individuals are more likely to survive and reproduce than others because of their heritable traits.



Inference 3:
Differences in survival and reproduction among individuals are non-random, with some traits being passed on at a higher rate than others and increasing in proportion in the population from one generation to the next.

Evolution by natural selection

Fig. 1 The basis of natural selection as presented by Darwin (1859), based on the summary by Mayr (1982)



Mayr, Ernest, (1904 – 2005)



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- Evolution is not merely an idea, a theory, or a concept, but is the name of a process in nature, the occurrence of which can be documented by mountains of evidence that nobody has been able to refute. It is now actually misleading to refer to evolution as a theory, considering the massive evidence that has been discovered over the last 140 years documenting its existence. **Evolution is no longer a theory, it is simply a fact** (Mayr, 2002, 319).

Natural Selection

I have called this principle, by which each slight variation, if useful, preserved, by the term of **Natural Selection**, in order to mark its relation to man's power of selection. (1859, 61)

can we doubt (remembering that many more individuals are born than can possibly survive) that individuals having any advantage, however slight, over others, would have the best chance of surviving and of procreating their kind? On the other hand, we may feel sure that any variation in the least degree injurious would be rigidly destroyed. **This preservation of favorable variations and the rejection of injurious variations, I call Natural Selection.** (1859, .80–81, 83–84)

Evidence: Artificial selection and Natural Selection

Natural Selection

It may be said that natural selection is daily and hourly scrutinizing, throughout the world, every variation, even the slightest; rejecting that which is bad, preserving and adding up all that is good; silently and insensibly working, whenever and wherever opportunity offers, at the improvement of each organic being in relation to its organic and inorganic conditions of life. **We see nothing of these slow changes in progress, until the hand of time has marked the long lapse of ages, and then so imperfect is our view into long past geological ages, that we only see that the forms of life are now different from what they formerly were.**

I am well aware that this doctrine of natural selection, exemplified in the above imaginary instances, is open to the same objections which were at first urged against Sir Charles Lyell's noble views on 'the modern changes of the earth, as illustrative of geology.(1859, 108 -109).

Unconscious Natural Selection

Over all these causes of change, the accumulative action of selection, whether applied methodically and quickly, or unconsciously and slowly, but more efficiently, seems to have been the predominant power.(1859, 31)

As man can produce, and certainly has produced, a great result by his methodical and unconscious means of selection, what may not natural selection effect? Man can act only on external and visible characters: **Nature, if I may be allowed to personify the natural preservation or survival of the fittest, cares nothing for appearances, except in so far as they are useful to any being. She can act on every internal organ, on every shade of constitutional difference, on the whole machinery of life.**(1859, 85)

Unconscious Natural Selection

By this process long-continued, which exactly corresponds with what I have called unconscious selection by man, combined, no doubt, in a most important manner with the inherited effects of the increased use of parts, it seems to me almost certain that **an ordinary hoofed quadruped might be converted into a giraffe.**(1859, 209).

The comparison would be in every way fairer with the effects which follow **from unconscious selection, that is, the preservation of the most useful or beautiful animals, with no intention of modifying the breed;** but by this process of unconscious selection, various breeds have been sensibly changed in the course of two or three centuries.(1859, 309)



The Power of Natural Selection

Let an architect be compelled to build an edifice with uncut stones, fallen from a precipice. The shape of each fragment may be called accidental; yet the shape of each has been determined by the force of gravity, the nature of the rock, and the slope of the precipice, -- events and circumstances all of which depend on natural laws; but there is no relation between these laws and the purpose for which each fragment is used by the builder. **In the same manner the variations of each creature are determined by fixed and immutable laws; but these bear no relation to the living structure which is slowly built up through the power of natural selection...** *The Variation of Animals and Plants Under Domestication*, Darwin (1868, p. 236).



Natural Selection

- Although I am fully convinced of the truth of the views given in this volume under the form of an abstract, I by no means expect to convince experienced naturalists whose minds are stocked with a multitude of facts all viewed, during a long course of years, from a point of view directly opposite to mine. **It is so easy to hide our ignorance under such expressions as the ‘plan of creation,’ “unity of design,”** (1859, 480–482)



Natural Laws

- It has been said that I speak of natural selection as an active power or Deity; but who objects to an author speaking of the attraction of gravity as ruling the movements of the planets? Every one knows what is meant and is implied by such metaphorical expressions; and they are almost necessary for brevity. **So again it is difficult to avoid personifying the word Nature; but I mean by nature, only the aggregate action and product of many natural laws, and by laws the sequence of events as ascertained by us. With a little familiarity such superficial objections will be forgotten. (1859,Chapter 4).**
-
- These laws, taken in the largest sense, being Growth with reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less improved forms. (1859,Chapter 15).

Natural Selection, Mayr

Evolution is the result of both chance and necessity. There is indeed a great deal of randomness ("chance") in evolution, particularly in the production of genetic variation, but the second step of natural selection, whether selection or elimination, is an anti chance process. The eye, for instance, is not a chance product. (Mayr, 167).

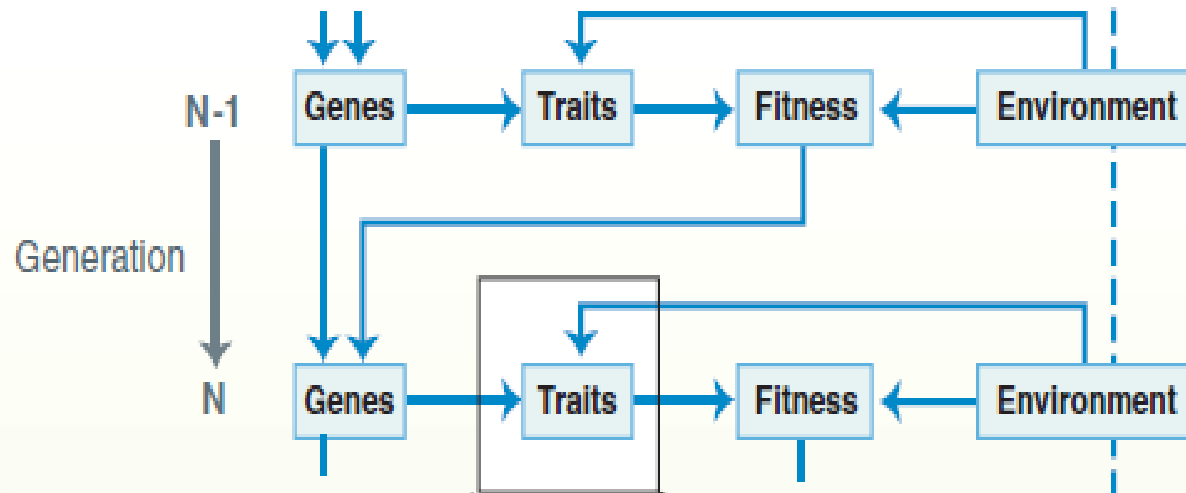
Yet the claims of natural theology ran into considerable difficulties.... Consideration of how God could have carried out his task of Creation raised even more serious difficulties. The manifold adaptations of structure, activity, behavior, and life cycle for each of the millions of species of organisms were far too specific to be explained by general laws. On the other hand, it seemed quite unworthy of creator to believe that he personally arranged every detail in the traits and life cycles of every individual down to the lowest organism. (Mayr, 179)

The Cause and Effect in Biology, Mayr, Science, 134

... chose the wrong word. The word *purpose* is singularly inapplicable to evolutionary change, which is, after all, what Darwin was considering. If an organism is well adapted, if it shows superior fitness, this is not due to any purpose of its ancestors or of an outside agency, such as "Nature" or "God," who created a superior design or plan. Darwin "has swept out such finalistic teleology by the front door," as Simpson (9) has rightly said.

A

Evolution



Development

