**Farid Gazizov**

**Impact of Evolution on Human Thought**

**Evolution**

Evolution by definition of Webster dictionary is a gradual development of simple matters into more complex. When most of the people hear “evolution” it associates with development or history of the earth. History of the earth compiles of gazillions of steps. The very first step in our history is a birth of the earth, which took place over 4 billion years ago.

 “Powerful telescopes reveal new stars coalescing from galactic dust, just as our sun did more than 4.5 billion years ago. The earth itself formed shortly thereafter, when rock, dust, and gas circling the sun condensed into the planets of our solar system. Fossils of primitive microorganisms show that life had emerged on earth by about 3.8 billion years ago (Teaching about evolution and the Natural of Science, ch. 1).”

 Many people throughout the centuries have been trying to find explanations to the questions like: Why are surrounding us things the way they are?; why some type of animals resemble another one? It was hard to answer these questions without proper tools, experience and background knowledge. Even nowadays, not all questions are answered. Darwin was the first human who succeeded in responding to these questions. He was the first one who put discovered facts and knowledge available by his time in one big picture. In attempts to explain the history Darwin created the most outstanding achievement of human beings that had enormous impact of our thinking—evolutionary thinking. Ernest Mayer, in his book “One Long Argument” says following about impact of Darwin’s work on human thinking.

“It is almost impossible for a modern person to project back to the early half of the nineteenth century and reconstruct the thinking of this pre-Darwinian period, so great has been the impact of Darwinism on our views (E. Mayr, pp. 1)

For our further discussion, one should explicitly distinguish between evolution and evolutionary theory. Evolution (history) is a serious of facts that occurred since the birth of the earth, while evolutionary theory is the best way available nowadays to explain why evolution happened the way it happened, but not otherwise. Both evolution and evolutionary theory make series of claims. Some of them are secondary and some are primary. Primary claims if proved wrong, would change entire theory.

## Primary Claims of Evolution

The earth is over 4 billion years old. In the past when technology was not very developed it was hard to prove age of the earth. Scientists had been aging by measuring the rate of sedimentation. Another method of defining age, which was used in 1800s, is noticing what kinds of fossil rocks have. Currently it is done by chemical analysis of composition of fossil.

“Some elements such as uranium, undergo radioactive decay to produce to produce other elements. By measuring the quantities of radioactive elements and elements into which they decay in rocks, geologists can determine how much time has elapsed since the rock cooled from initially molten state (Teaching About Evolution and the Nature of Science).”

 Life on the earth did not appear right after appearance of the earth. The first sings of life were dated about 550 million years ago according to the oldest fossils. This fact does not specifically mean that where was not life forms before that time. Life forms were very simple and lacked hard parts like bones or shells and could rarely preserve in the fossils.

“However, a few pre-Cambrian organisms left traces of their existence. Some ancient rocks contain stromatolities—the remnants of bacteria that grew in columns like stacked pancakes (Teaching About Evolution, ch. 3, pp. 2)

Extinction is a major feature of biological evolution. It is in a tight connection with natural selection. Natural selection works only by means of surviving of changes, in some sense useful, and therefore, striking root. In the consequence, fast increase of the numbers of all organic matters in geometrical progression, every natural habitat already filed to the limits by its habitants. From this it follows those more adapted forms will increase in numbers and less adapted, will decrease in numbers and become rare. Rarity of the form is a predecessor of the extinction. Every form represented by small numbers of individuals has big chances for a complete extinction in consequence of significant climatic swings within a year or in consequence of temporary increase of enemies. Species, most abundant of individuals, have the biggest chances for appearance at any particular time of favorable changes. Rare individuals will at any particular time change and perfect at a slower pace and in consequence of that will be defeated in a life struggle with changed and improved descendants of more common individuals. From this it follows that since with a passage of time natural selection “creates” new species, than other species become more rare, and finally extinct.

For example, during laying eggs season, sea turtles hay hundreds of thousands eggs. While hatching and getting to the ocean most of the generation becomes easy pray of sea birds. Since just hatched turtles do not have a hard cover that could protect them, many of them dye in the ocean. By maturity time only about one out of thousand turtles stay alive. Currently there are billions of living organisms that inhabit the earth, but they represent only around one percent of all living organisms that have ever lived on the earth since its birth. Ninety nine percent dyed out.[[1]](#footnote-1)

 Another example that mechanisms of evolutionary change are observable and verifiable is the one described by Henry Walter Bates.

“In 1862, Henry Walter Bates made brilliant use of the Darwinian mechanism of natural selection asking why it is that some species of butterfly very closely mimic species of butterfly, essentially quite different, Bates proved beyond doubt that the answer lies in adaptive advantage brought about by natural selection. The mimicked insects are highly distasteful to birds who think that they belong to distasteful species. Bates showed experimentally that birds learn to avoid distasteful insects, and that the closer the mimic, the less change there is that the insect will be eaten.”

### Secondary Claims of Evolution

When the earth appeared for the first time it was very different from its current conditions. The surface of the earth was represented by bare bedrock. At the time of its birth, the earth represented cold matter, close by its composition to meteorites. Material it was mad of, contained radioactive elements. In consequence of the heat excretion while radioactive decomposition of the core and gravitational compression. However, because of continuous loss of heat through he surface and lack of radiation heat complete melting of the earth did not happen. In result of earth’s melting, water and different gases were brought up to the surface. This water began formation of hydrosphere.

Location of continents and oceans were very different. According to Wegener’s hypothesize, which he later supported by evidence, earth’s continents used to be a single land, which was called Pangea. About two hundred million years ago Africa and South America slowly began their movement toward their current location. Wegener supported his hypothesize by geological and biological evidence. At the place where the continents were aligned, were found fossilized animals and plants dated more than two hundred million years old. Besides, if Africa and South America had always been separate continents as they are now, both of them would have had very different flora and fauna, which are not.

 Starting at 1950 up to 1970 evidence begin exposing to the world that support hypothesis of continent’s slow movement. Sonar mapping of the ocean floor showed winding, continuous ridges system around the planet. The ridges appeared where molten matter was coming up from the earth’s inside.

Not only topography of the earth has changed, but composition atmosphere has changed as well. Current atmosphere contains a lot of oxygen, which is result of existence of life. During photosynthesis, green plants consume water and dioxide and release oxygen in atmosphere. This is considered to be a secondary claim because even if the earth would not developed as it considered, it would have no impact on evolutionary theory.

Origin of human being was an interest of human more than origin of plant and animals. Attempt to understand and explain origin of humans is expressed in religions, legends of all kind of trails and folks. For a long period of time science knowledge were abrupt and incomplete in order to solve a problem of human origin. Only in 1857 Darwin expressed hypothesis, and in 1871 in his book “The Origin of man and relation to sex,” convincelly proved that humans originate from pre-existing humanlike, but were not created by intelligent designer. Role of social factors, which was pointed out by Darwin, was detailly described by Fredrik Engels in his book “Role of labor in the process of turning ape into humans.” (1896)

Human and vertebrates commonness is strongly supported by similar arrangement of internal organs: skeleton, nerve system, blood system, respiration, and digestion.

Rudiments and atavisms are very important evidences of human relatedness to animals. There are about 90 rudiments in human body: coccyx bone (remaining of the reduced tail); folds in the corner of the eyes (remaining of the blinking tympanum; thin body hair (remaining of the hair). All these rudiments are inherited from an animal ancestor. An external tail, which sometimes people are born with, is related to atavisms. Another atavism is abandon hair on the face and body.

Common details of the body arrangement are evidence of close relativeness of human and anthropoids: wrist with flat nails, shape of eyes and years, the same number of canine and molar teeth, complete change of baby teeth, and so forth. Physiological commonness is very important: the same blood groups, diseases (tuberculosis, fly, smallpox, cholera, AIDS, pneumonia) and parasites (louse). Besides numerous common features, there is a number of explicit differences evidencing that its current stage, human is considered to be different species. Only human has ability of upright walking and related to that peculiarity of structure of the S-shaped backbone with explicit neck and lumber bend, low extended pelvis, and etc. Human skull is higher and more rounded without superciliary arch; brain part of skull is in most part dominated by facial; high forehead, weak jaws with small canine. Human brain is about two and half times bigger than one of humanlike apes, and 3-4 times heavier.

 Human being evolved from other pre-existing species. Even in ancient times it has been noticed that humans have a lot of in common with a other animals just like other animals human had the same internal organs (heart, lungs, liver etc.). Ancient Greeks had a scale of living organisms known by their time. Human being was placed at the end of the scale. Below were higher animals like houses, sheep and so forth, but it is hard to believe that humans were next step in the biological evolution of living organisms right after higher animals. Only by the eighteenth century ape-like being became known to Europe. This discover shed light on a huge gap between higher animal and humans (Darwinism defended, Ruse, pp. 230). After that some scientists (for example Huxley) assumed that humans descended from apes. Later, having examined all differences between apes and humans, Huxley came to conclusion that humans and apes descended from a common ancestor. One would probably ask why our common ancestor did split into two branches, apes and Australopithecus afarensis (which is considered to be an ancestor of all hominids). There is a scientific explanation, which relates to climatic changes in Africa. Our ancestor was used to live in the area of heavy precipitation. With a passage of time climate started turning into dry one and forestlands began retreating, leaving behind Savannah’s. Some species stayed in dwindling forests. Others (our ancestors) started advancing toward opened spaces.

With a change of place of inhabitation, there were some changes in diet of our ancestor. Anthropologists suggested that tooth reduction took place because our ancestor started to use grass seeds and the like as a food source (Darwinism Defended).

A. afarensis

A. africanus

H. habilis

A. robustus

H. erectus

H. sapiens

### Major Claims of Evolutionary Theory

Natural selection is the major moving factor of the evolution of the living organisms. Almost at the same time, several English naturalists arrived at the idea of existence of natural selection (P. Mathew (1831), A. Blight (1935), A. Wallace (1858), C. Darwin (1858)), but only Darwin succeeded in exposing of the meaning of this phenomenon as the major factor of evolution and created the theory of natural selection. On the contrary, to artificial selection held by humans, natural selection is conditioned by influence of surrounding environment upon the organisms. According to Darwin natural selection is survival of the most accommodated organisms, in consequence of which, on the basis of undefined inherited changeableness in the series of generations evolution occurs.

In process of natural selection species more accommodated to surrounding environment survive, those who do are not, go extinct. Explicit example of that is our ancestors that had advantage of standing upright to look out and look for possible object of prey. Natural selection does not specifically have to lead to perfection. It leads only to surviving of species that can survive. If entire kind of particular animals can not survive in changed environment, entire kind will dye out.

“Organisms in nature topically produce more offspring that can survive and reproduce given the constraints of food, space, and other resources in the environment. These offspring often differ from one another in ways that are heritable—that is, they can pass on the differences genetically to their own offspring. If competing offspring have traits that are advantageous in a given environment, they will survive and pass on those traits. As differences continue to accumulate over generations, populations of organisms diverge from their ancestors.”

Process of natural selection consists of two steps: the first one is reproduction of genetically different species; the second step is surviving of the most adopted individuals in surrounding environment. An example can be nest of birds in which some nestlings have a little bit different coloring than others. If this coloring better matches the tree these birds in habit, this will give them advantage of better hiding from predators, which leads to increase in changes of reproduction. Below are example that Wallace, Alfred Russle uses in his book “Contributions to the theory of Natural Selection” to demonstrate natural selection.

“The Duke of Argyll, in his “Reigh of Law,” has pointed out the admirable adaptation of the colors of the woodcock to its protection. The various browns and yellows and pale ash-color that occur in fallen leaves are all reproduced in its plumage, so that when according to its habit it rests upon the ground under trees, it is almost impossible to detect it. In snipes the colors are modified so as to be equally in harmony with the prevalent forms and colors of marshy vegetation. Mr. J.M.Lester, in a paper read before the Rugby School Natural History Society, observes: --“The wood-dove, when perched amongst the branches of its favorite fir, is scarcely discernible; whereas, were it among some lighter foliage, the blue and purple tints in its plumage would far sooner betray it. The robin redbreast too, although it might be thought that on its breast made it much easier to be seen, is in reality not at all endangered by it, since it generally contributes to get among some russet or yellow fading leaves, where the red matches very well with the autumn tints, and the brown of the rest of the body with the bare branches.”

Core of natural selection is variation within the kind. If variation does not exist either entire kind will survive and stay unchanged or it will go extinct. But what it a source of variation? The ultimate source of variation is mutations in genes. If new traits gained through mutation leads to successful survival and reproduction than new traits will be inherited and spread within the population. Mutation is random, but natural selection is not.

 All living organisms that currently inhabit the earth share common ancestry. Through the history by means of natural selection and variation first, simple forms of life were evolving into different, more complex forms. How to prove it?

“The discovery of the structure of DNA by Francis Crick and James Watson in 1953 extended the study of evolution to most fundamental level the sequence of the chemical basis in DNA both specifies the order of amino acids in proteins and determines which proteins are source of both change and continuity in evolution. The modification of DNA through occasional changes or rearrangements in the base sequences underlies the emergence of new traits, and thus of new species, in evolution. At the same time, all organisms use the same molecular codes to translate DNA base sequences into Protein amino acid sequences. This uniformity in genetic code is power evidence for the interrelatedness of living things.” (Teaching About Evolution and the Nature of Science, ch. 2, pp. 4)

 Another powerful argument that supports common ancestry is a fact that man is developed from an ovule, about the 125th of an inch in diameter, which does not differ from the ovules of other animals. At a very early period, the embryo can hardly be distinguished from another member of vertebrate kind.

In order to convince one that evolution happened the way evolutionary theory describes it evidences must be presented. Major evidence and argument of evolutionary theory is that all of the mechanisms of evolutionary theory change are currently observable. Let us take for example main mechanism of evolutionary change—natural selection. Nowadays our society is facing serious public health problem. Bacteria that medicine used to successfully fight with antibiotics is becoming more resistant to one. This means that week bacteria go extinct and only strong (more resistant to antibiotics) bacteria survived. (Teaching about evolution, ch. 2, pp. 5) “continued use and overuse of antibiotics has had the effect of selecting for resistant population because the antibiotics give these strains and advantage over non-resistant strains”

# Bibliography

1. “Long Argument,” Ernest Mayr, Harvard University Press, 1991.
2. “Darwinism defended,” Michael Ruse, Addison-Wesley Publishing Company, 1982.
3. “The Descent of Man and Selection in Relation to Sex,” Charles Darwin, 1974.
4. “Wonderful Life,” Stephen Jay Gould, W.W. Norton & Company, 1989.
5. “Contributions to the theory of natural selection,” Wallace, Alfred Russel, AMS Press, 1973.
1. Teaching about Evolution [↑](#footnote-ref-1)