Chance or design?

The long search for an evolutionary mechanism

By Ariel A. Roth

In the face of a futile search, should we not turn to the biblical model?

After working late into the night, my friend was exhausted. He got into his car and started the long trip back to the college he was attending. He was driving along a sparsely traveled country road when weariness overcame him, and his car plunged into the waters of a stream beside the road. He survived the ordeal with severe injuries. With the nerves in the lower part of his spinal cord severed, he no longer had control of his legs. He was destined to a wheel chair for the rest of his life.

Healing took a long time. Fortunately, my friend was no ordinary person. He was not going to let his severe problems turn him into a burden on society. He decided to be a help to others and, in spite of all the obstacles he faced, he finished college. His engaging personality, perseverance, and dedication to God helped him as he successfully served as a teacher, editor, chaplain, and pastor. Many were blessed by his friendliness and understanding. Unfortunately, his legs continued to deteriorate to the point where they had to be be amputated.

Interdependent parts[1]

My friend's problem illustrates how the various parts of living organisms are dependent on other parts. We can illustrate this on a simple level. If we have a muscle moving a bone in a leg, that muscle will not work unless there is a nerve going to that muscle to activate it. But neither the muscle nor the nerve will work unless there is a system in the brain to control the activity of the muscle. The controlling mechanism in the brain sends impulses by way of the nerve to cause the muscle to contract and move the bone. The three parts—the muscle, the nerve, and the controlling mechanism—are examples of *interdependent parts*. They need one another in order to function. These are systems where nothing works unless everything works. Some scientists refer to such systems as having *"irreducible complexity."*[2] The word *complexity* refers to systems whose various parts are related to one another. Systems with interdependent parts are abundant in all living things, and are usually much more complex than the simple example mentioned above. In our bodies we have at least 50,000 to 100,000 different kinds of enzymes. Most of these enzymes function in governing chemical changes related to other chemical changes performed by other enzymes. As such, they represent a vast array of interdependent parts.

The randomness of evolutionary changes

If 20 children are let loose in a toy shop, something is certain to happen. Assuredly, the well-ordered stock of toys will become less organized. The longer the children are reveling in the store, the more mixed up the stock will become. Active things naturally tend to mix.

The tendency of things toward becoming mixed up in nature runs counter to evolution, which postulates changes from randomly distributed molecules to "simple" life forms that, although small, are actually highly organized. Evolution is then further assumed to have formed much more complicated organisms with specialized tissues and organs that include flowers, eyes, and brains.

Some evolutionists suggest that the occasional self-organization of simple matter such as seen in the formation of a salt crystal, or the rare wave pattern that sometimes forms when chemicals migrate through solid matter, might be a model for the self-organization of matter into living things. But there is a vast chasm between simple crystals and the complexities of living systems. The development of interdependent functional complexity runs counter to the general tendency in nature toward chaotic mixing. This is one of the major problems of the theory of evolution.

Evolution usually places emphasis on the occasional random change in an organism's heredity mechanism (DNA). Such changes, called mutations, combined with natural selection, are considered to be the basis for evolutionary advancement. But such random events would usually tend to mix things up, not organize them. Neither random mutations nor natural selection have the foresight to plan ahead so as to guide the evolutionary process in the gradual development of systems with interdependent parts. Furthermore, mutations are almost always detrimental to living organisms. An estimate of one favorable mutation out of a thousand is being generous to evolution. In dealing with complex systems with interdependent parts, just a small change (mutation) can cause the whole system to stop working. It is somewhat like severing the nerves to the legs of my friend; it ruined the whole of his legs. Likewise, it is much easier to ruin a watch than to make one. Few would argue that there isn't a tendency towards randomness in nature. Naturalistic evolution needs to explain the opposite.

Natural selection: a problem for evolution

Charles Darwin developed the concept of natural selection. He observed that there is variation in living organisms. There is also overproduction of offspring that results in shortages of food and space; hence, there is competition for survival. Darwin proposed that only the fittest of new varieties of organisms would survive, and they in turn would produce similarly fit offspring. Thus the fittest survive through the process called *natural selection*. This mechanism is often used to explain evolutionary advancement, despite the trend in nature toward randomness. While it appears that natural selection does function in nature as a means of eliminating weak or aberrant organisms, it faces a major problem when it comes to the evolution of interdependent systems, which represent most of everything that is alive.

That my friend had his legs cut off illustrates one basic problem faced by Darwin's natural selection model. Useless structures can be cumbersome impediments. We can usually get along better without them. The problem for evolution is that many parts of gradually evolving organs or systems would be useless impediments, like my friend's legs, until all the necessary interdependent parts had evolved. Until that time, organisms would get along better without these extra parts, and natural selection would tend to eliminate them. Only after *all* necessary interdependent parts are present can these parts work and thus provide any reason for survival through the natural selection process.

If evolution is for real, we should expect to see many examples of new developing organs or systems, like legs, eyes, livers, or new kinds of organs trying to evolve in those organisms that have not yet evolved them. Yet as we look at well over a million species that have been identified over the surface of the Earth, we do not seem to see any. This is a major indictment against the evolutionary concept. In a broader context the question is: How can mostly detrimental random mutations, which have no foresight, gradually produce complex biological systems that have no survival value until all interdependent parts are present? If evolution has a way around this problem we should find many new organs and systems in the process of evolving, but they are not there.

The long search for an evolutionary mechanism

There has been a long and arduous search for a plausible evolutionary mechanism that would produce complex organized life. We shall look briefly at the past two centuries of this search. A summary is provided in Table 1.

Lamarckism. The French scientist Chevalier de Lamarck (1744-1829) devised a mechanism for evolution based on his law of use and disuse. He proposed that use of an organ accentuated its development, and this improvement was passed on to the next generation. For instance, deer-like animals needing to reach leaves on the highest branches of a tree would, after stretching their necks for many generations, acquire longer necks and eventually emerge as giraffes. Similarly, he declared that if the left eye of children were removed for a number of succeeding generations, eventually there would be individuals born with only the right eye.

Years later the German evolutionist August Wiseman proved Lamarck wrong. He cut off the tails of hundreds of mice over many generations. The mice, however, continued to produce offspring with full-length tails. He concluded that this series of experiments proved that there is no inheritance of characteristics acquired during an individual's life.

Darwinism. Darwin proposed natural selection (discussed above) as an evolutionary mechanism. Darwin also stressed the broad theory of the evolution of all organisms from the simplest to the most complex. In this process, he placed special emphasis on the significance of minute changes, a concept that was soon challenged.

Soon after the publication (1859) of Darwin's book, *Origin of Species*, many scientists accepted the general idea of evolution. However, many of Darwin's ideas were questioned then and are still being challenged today. The biological historian Charles Singer candidly states that Darwin's "arguments are frequently fallacious."[3] Among the most serious criticisms is the lack of survival value of small changes that are not useful unless they can function in a complex whole that has not yet evolved. Darwin was quite concerned about the evolution of the eye, which has a number of systems with interdependent parts. He suggested that natural selection was the answer to the problem, but did not address the question of interdependent parts.

The concept of "survival of the fittest" itself has also been severely criticized, possibly at times unfairly. However, survival of the fittest does not demonstrate evolution, as is sometimes purported. The concept cannot be easily tested; which, however, is not the same as saying it is false. But obviously the fittest would survive whether they evolved by themselves or were created by God. Despite these flaws, Darwin's basic idea receives support from many evolutionists.

Mutations. The Dutch biologist, Hugo de Vries (1848-1935), vigorously challenged the idea that minute changes provided the basic evolutionary mechanism. He argued that these small changes meant nothing, and larger changes, called mutations, would be necessary to respond to the environment. De Vries found support for his views around Amsterdam, Holland, where the evening primrose imported from America had gone wild and some specimens were found to be dwarfs. He considered this change to be a mutation.

De Vries conducted experiments by breeding thousands of plants, and noted major changes that he attributed to mutations. He believed these "new forms" to be steps in a protracted evolutionary process. Unfortunately for de Vries' theory, the changes he noted were only the result of combinations of traits

Table 1

The search for an evolutionary mechanism

Designation and dates	Main proponents	Characteristics
Lamarckism 1809-1859	Lamarck	Use causes the development of new characteristics that become inheritable.
Darwinism 1859-1894	Darwin, Wallace	Minute changes are acted upon by natural selection causing survival of the fittest.
Mutations 1894-1922	De Vries, Morgan	Emphasis on larger mutational changes. Natural selection not as important.
Modern Synthesis (neo-Darwinism) 1922-1968	Chetverikov, Dobzhansky, Fisher, Haldane, Huxley, Mayr, Simpson, Wright	Unified attitude, changes in populations important. Mutations acted upon by natural selection.
Diversity Period 1968-present	Eldredge, Gould, Grassé, Henning, Kauffman, Kimura, Lewontin, Patterson, Platnick	Multiplicity of conflicting ideas. Dissatisfaction with the Modern Synthesis. Search for a cause for complexity.

Table 2

Books by scientists, who do not believe in Creation, criticizing various aspects of Evolution

- Behe, Michael. *Darwin's Black Box: The Biochemical Challenge to Evolution.* New York: Free Press, 1996.
- Crick, Francis. *Life Itself: Its Origin and Nature.* New York: Simon and Schuster, 1981.
- Denton, Michael. *Evolution: A Theory in Crisis.* London: Burnett Books, 1985.
- Goodwin, Brian. *How the Leopard Changed Its Spots: The Evolution of Complexity.* New York: Charles Scribner's Sons, 1994.
- Hitching, Francis. *The Neck of the Giraffe: Where Darwin Went Wrong.* New York: Ticknor and Fields, 1982.
- Hoe, Mae-Wan and Peter Saunders. *Beyond Neo-Darwinism: An Introduction to the New Evolutionary Paradigm.* London: Academic Press, 1984.
- Søren Løvtrup. *Darwinism: The Refutation of a Myth.* London. New York: Croom Helm, 1987.
- Ridley, Mark. *The Problems of Evolution.* New York: Oxford University Press, 1985.
- Shapiro, Robert. *Origins: A Skeptic's Guide to the Creation of Life on Earth.* New York: Summit Books, 1986.
- Taylor, Gordon Rattary. *The Great Evolution Mystery.* New York: Harper and Row, 1983.

already present in the genetic makeup of the plants, and not new mutations.

Nevertheless, the concept of mutations, which represent new hereditary information, became accepted, largely because of the work of the American, T. H. Morgan. In experiments with fruit flies, Morgan found new permanent changes that are passed on from one generation to the next. However, the changes observed were largely degenerative instead of progressive, including loss of wings, bristles, and eyes.

Many non-harmful mutations would be required to produce a single useful structure. The problem is how to get these very rare events to occur simultaneously in an organism in order to produce a functional structure that might have some survival value. The noted French zoologist, Pierre P. Grassé, who suggests another evolutionary mechanism, affirms some of the same concerns and states: "No matter how numerous they may be, mutations do not produce any kind of evolution."[4]

Modern Synthesis. As evolutionary thought developed in the early part of the 20th century, several influential scholars helped shift the focus from mutations back to natural selection. The most important proponents were S. S. Chetverikov in Russia, R. A. Fisher and J. B. S. Haldane in England, and Sewall Wright in the United States. This time, the emphasis was on the process of evolution within populations of organisms, rather than in individual organisms.

The modern synthesis combined the efforts of a number of brilliant evolutionists, including Theodosius Dobzhansky of Columbia University, biologist Sir Julian Huxley in England, and Ernst Mayr and George Gaylord Simpson at Harvard University. The concept was dominant from the 1930s to the 1960s. The name "modern synthesis" originated with Huxley,[5] the grandson of Darwin's champion Thomas Huxley, as he lauded the "final triumph" of Darwinism.[6] Basically, it synthesizes variation by mutations with Darwin's concept of natural selection by survival of the fittest as applied to populations.

Many of the leaders of the modern synthesis stressed that, by the accumulation of relatively small changes, one could produce the major changes needed for large evolutionary steps like the change of a lizard-like animal into a turtle. However, the basic mechanism for complex evolutionary advancements remained unsolved. The modern synthesis may have been more an attitude of success than a precise synthesis.

Meanwhile, the disquieting voices of the paleontologist Otto Schindewolf in Germany and the geneticist Richard Goldschmidt in the United States were being systematically ignored. In contrast to Darwin's minute changes and the relatively small mutations suggested by architects of the modern synthesis, both were proposing rapid, large changes and different mechanisms. Schindewolf, who was familiar with fossils, suggested very sudden developmental jumps to bridge the large gaps between major fossil types. Goldschmidt, who was professor of genetics at the University of California at Berkeley, completely disagreed with the idea that small changes within species could slowly accumulate and produce major evolutionary changes. He considered intermediate stages to be useless for survival and felt they would not be favored by natural selection. Among the examples he cited were the formation of a feather, segmentation of body structure as seen in insects, the development of muscles, the compound eye of crabs, etc. Goldschmidt and Schindewolf raised important questions and soon, for a number of evolutionists, the modern synthesis no longer seemed tenable. The Swedish embryologist Søren Løvtrup, who supports evolution, points out: "And today the modern synthesis—neo-Darwinism—is not a theory, but a range of opinions which each in its own way, tries to overcome the difficulties presented by the world of facts."[7]

Diversity Period. New ideas about evolution soon appeared, some of them quite speculative. Recent discoveries, especially in molecular biology and genetics, indicated that older, simpler genetic concepts were no longer valid. All of this contributed to a variety of thought that prevails to the present. This stage—which can be collectively designated as the *diversity period*—represents an assortment of new and often conflicting ideas. They revolve around a number of basic questions, such as: (1) Can one identify the evolutionary relationships of organisms? Some have argued that the only way to tell if two organisms are really evolutionarily related is if they have similar but unique characteristics (*synapomorphies*). Such characteristics are hard to find. (2) Are evolutionary changes gradual or sudden? Some suggest sudden, but quite small, changes as reflected in some parts of the fossil record (punctuated equilibrium model). These small sudden changes do not answer the problem of the major gaps in the fossil record such as those found between animal phyla and plant divisions. (3) Is natural selection important to the evolutionary process? A number of evolutionists are suggesting that there are neutral mutations that they consider very important in the evolutionary process. Since these mutations are neutral, they are not subject to the influence of natural selection. (4) How does complexity evolve? Some computer-based studies have addressed the problem, but biologists have criticized these attempts as too simplistic. Biological systems are very complex, and we don't know all that much about many of them.

In the past two decades a significant number of scientists, who do not believe in the biblical creation account, have written books criticizing evolution, or major themes thereof. Table 2

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lists some of them. In general, these scientists believe in some kind of evolution, but admit to major problems. Darwin's model has been especially criticized. In the meantime, the search for an evolutionary mechanism continues.

Conclusion

Scientists often show firm support for evolution. While they generally agree that evolution is fact, there is much less agreement when details are being considered. Some of the most heated battles in evolutionary biology followed the modern synthesis. The well-known writer Tom Bethell emphasizes that "especially in recent years, scientists have been fighting among themselves about Darwin and his ideas."[8] These disputes are seldom heard of, much less understood, by the general public. There is quite a contrast between the internal intellectual battles of the academic community, as found in the research literature, and the simple authoritative style of textbooks and newspaper articles. Some simplification in textbooks may be helpful in facilitating learning, but students should become more aware of the varied views in the evolutionary debate.

One can only look with a degree of respect at the persistent efforts of evolutionists to find a plausible mechanism for their theory. Their perseverance is commendable. One theory after another has been proposed over a period of two centuries. The general failure raises a sobering question: Is evolutionary thought more a matter of opinion than of hard scientific data? After such a long and virtually futile search for an evolutionary mechanism, it would seem that evolutionary scientists should give serious consideration to creation by God as described in the Bible. There, God, as the designer of all, creates various life forms, including their complex systems of interdependent parts.

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Notes and references

1. For a discussion of the various issues considered in this article, related topics, and many literature references, see Ariel A. Roth, *Origins: Linking Science and Scripture* (Hagerstown, Maryland: Review and Herald Publ. Assn., 1998), pp. 80-115, 130-144. The book will soon be available in French, Spanish, Portuguese, and Russian. To locate the various publishers contact the author.
2. M. J. Behe, *Darwin's Black Box* (New York: Free Press, 1996).
3. C. Singer, *A History of Biology to About the Year 1900*, 3rd rev. ed. (New York: Abelard-Schuman, 1959), p. 303.
4. P. P. Grassé, *Evolution of Living Organisms: Evidence for a New Theory of Transformation*. B. M. Carlson and R. Castro, trs. (New York: Academic Press, 1977), p. 88. Translation of *L'Évolution du Vivant*.
5. J. Huxley, *Evolution: The Modern Synthesis* (London: Harper & Brothers, 1943).
6. S. J. Gould, "Darwinism and the Expansion of Evolutionary Theory," *Science* 216 (1982), pp. 380-387.
7. S. Løvtrup, *Darwinism: The Refutation of a Myth* (London: Croom Helm, 1987), p. 352.
8. T. Bethell, "Agnostic Evolutionists: the Taxonomic Case Against Darwin," *Harper's* 270 (February 1985) pp. 49-52, 56-58, 60, 61.