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Beneficial Mutations?

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The theory of evolution, as set down in Darwin's **Origin of Species,** is commonly referred to as Classical Darwinism. Classical Darwinism is rejected by the vast majority of evolutionists today. Why? The reason is found by examining an assumption that is inherent in Darwin's work. In Classical Darwinism, all variations that occur in nature were assumed to be simply the result of the slight differences that appear between offspring and parent. These differences, which Darwin assumed were potentially unlimited,[1] were assumed to 'pile up' from generation to generation under the constant supervision of natural selection. Eventually, the number of slight differences would accumulate in such a fashion that the offspring would look nothing like the ancestor. He emphasized over and over again that this process had to be very gradual.

> *'As Nature acts solely by accumulating slight, successive favourable variations, it can produce no great or sudden modification; it can only act by very short and slow steps. Hence the canon of "Naturea non facit saltum," [nature makes no leaps] ...'*[2]

Of course, the fossil record did not support this assumption, but Darwin felt that in time, geological discoveries would add the 'missing links' required to authenticate his theory. This never occurred. Current fossil evidence[3] suggests that paleontologists have uncovered a representative cross-section of the fossil record, and the 'missing links' are still missing.[4] The fossil record, however, is not the most damaging evidence against Classical Darwinism.

The science of genetics, unheard of in Darwin's time, now adequately explains how variations between offspring and parent appear in nature. The information that determines the exact structure of any living organism is contained in the marvellous molecule, deoxyribonucleic acid (DNA). When two organisms reproduce, the offspring's DNA structure (often referred to as the ' genetic code') is the result of a chemical compromise between each parent's DNA structure. Thus, any variation that occurs as the result of normal reproduction is limited. In addition, the new organic structures that must be formed to set one species distinct from another can never occur by this process, since the information in each offspring's DNA is merely a compromise between their parents' DNA which is merely a compromise between their parents' DNA, and so on.

This comes as a deathblow to Classical Darwinism. The proponents of Classical Darwinism could always attempt to explain away the lack of fossils linking one species to another, but how could any new genetic information (which would be required to form new organic structures) result from the simple chemical compromise that occurred in reproduction? Reproduction merely resulted in a shuffling of the information that had always existed within the species' gene pool. In order to make new organic structures (changing fins to arms, gills to lungs, etc.), new genetic information must be 'created'. How could that be accomplished?

A new line of evolutionary thought, referred to as Neo-Darwinism, rose to meet this theoretical challenge. Neo-Darwinists assume that new genetic information appears in DNA as the result of mutations. Mutations are random changes that occur as the result of mistakes made in the DNA replication process. Under normal circumstances, mutations occur about once in every 10,000,000 replications. This seems like a very low probability, but since DNA must replicate itself each time a cell is made, and since there are ten to one hundred trillion cells in the average human body, DNA mutations are not all that uncommon. It is also well known that environmental conditions of high radiation or chemical toxicity can artificially enhance the probability of DNA mutations. Why do Neo-Darwinists claim that DNA mutations can save evolutionary theory?

Well, if DNA mutations are completely random in nature, then an organisms's genetic code can be radically altered after even one mutation. The mutation has as much chance of adding to the genetic code as it has of subtracting from the genetic code. Thus, DNA mutations can add new information that was previously unavailable within the genetic pool of a given species.

The best way to understand genetic mutation is through analogy. DNA is, in its simplest interpretation, a system of information. The genetic code carries information in a language that the body understands. This information tells the body what structures to build and how to maintain those structures. Thus, DNA, as a system of information, should behave analogously to any other information system.

Consider the following information system:

This is a complete sentence made up of ten words. (1)

Like DNA, this system contains information which is encoded in a particular language, the English language. The information is useful and makes sense to anyone who

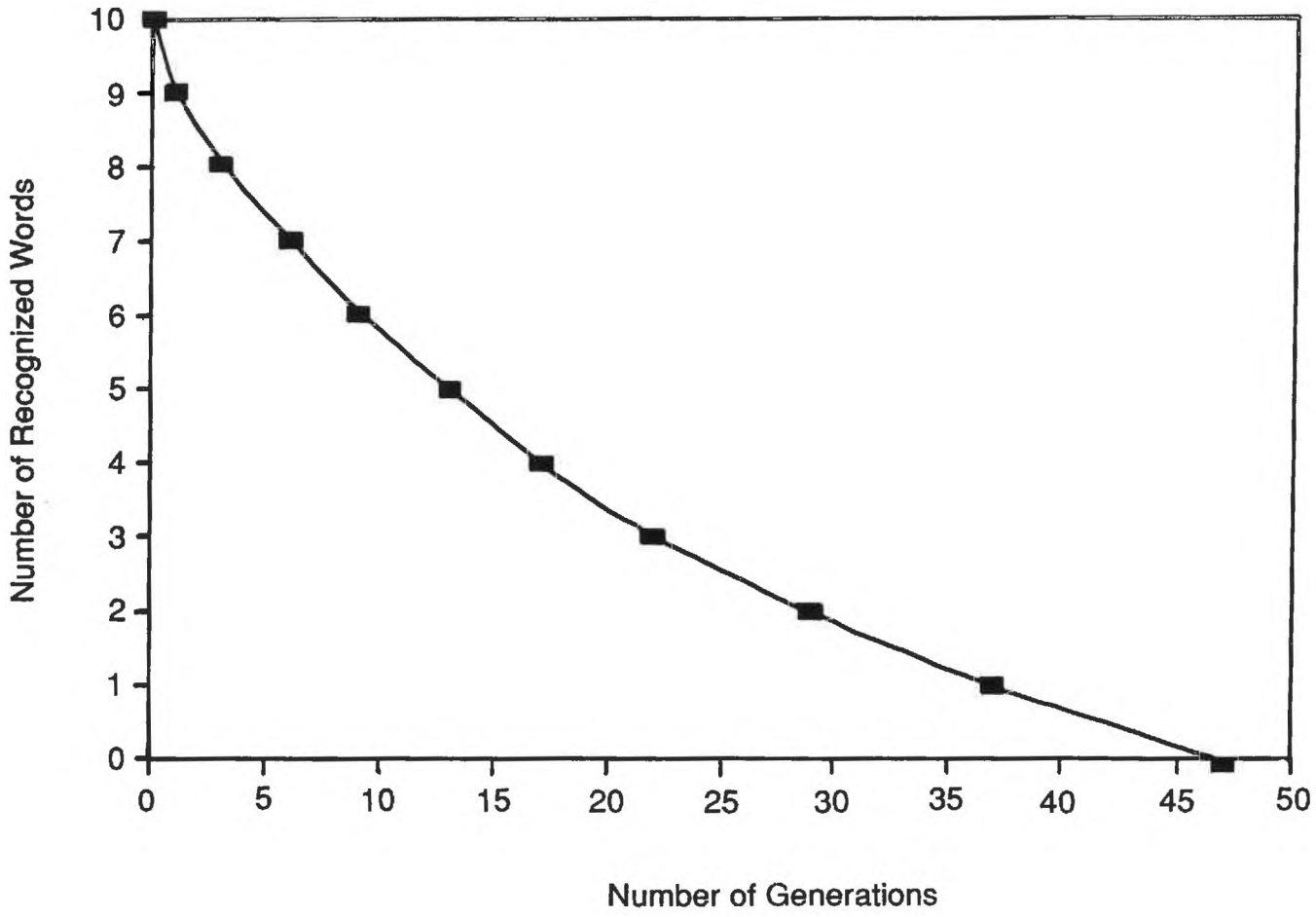

Figure 1. *The effect of mutations on section #**1** showing the rate of information deterioration.*

understands the language. Genetic mutations randomly change the information stored in DNA. In an analogous fashion, a random mutation to our information system (sentence [1]) could result in something like this:

This is a complete syntence made up of ten words. (2)

In this mutation, the first 'e' in sentence (1) was randomly changed into a 'y'. Now, of course, the information system is worse than before. Although someone who understands the English language still might be able to made sense of the information in sentence **(2),** it is more difficult to do so. What could a further mutation do to the information system?

This iw a complete syntence made up of ten words. (3)

Suddenly, it's getting more and more difficult to understand the system of information. The information system under the effects of random mutations would rapidly deteriorate into a meaningless jumble of garble.

In analogous fashion, this has been a persistent creationist argument. In a complex system of information such as DNA, any random changes that occur are destined to hurt the system rather than help it. Thus, any random mutation will, most likely, be bad for a given organism. Indeed, this is what we see experimentally. Although countless genetic mutations have been observed and catalogued, it is difficult to find even one example of a mutation that is unarguably beneficial to the organism. This can also be understood in terms of the analogous information system discussed above. The two above-listed mutations do not completely destroy the information in the system, but they do weaken it. This would be analogous to a slightly harmful genetic mutation. As one considers all of the possible mutations that could occur on the information system, almost all of them seem to weaken the original information to some degree. Of course, there are a few mutations that are interesting:

This in a complete sentence made up of ten words. (4)
This is a complete sentence made up of ten word. (5)
This is a complete sentence made us of ten words. (6)
This is a complete sentence made up of ton words. (7)

Each of these mutations result in a sentence of ten recognizable words, but still, the information in the system is less clear than before.

Evolutionists say that these arguments are valid, but what they ignore is the power of time. Over vast eons of

time, even infinitesimal probabilities become important. Even though the vast majority of mutations are not beneficial, if they are piled on top of each other, something beneficial could result. For example, in our analogous information system, one could imagine that single mutations, performed in precisely the correct order, might result in another completely understandable information system:

That is a completed sentence made up of ten words. (8)

In this example, the 'i' in 'this' was mutated to an 'a', the 's' in 'this' was then mutated to a 't', a space was then added after 'complete', and the added space was finally mutated into a 'd'. After this complex series of mutations (the probability of which on a random basis would be infinitesimally small), little has been added in terms of information. The content is essentially unchanged. Thus, the result of piling several mutations together in a highly improbable series will only result in a benign change to the information system. Any substantial change would seem impossible.

Once again, evolutionists fall back on the excuse of time. They say that these benign changes, after eons of time, could pile up to make substantial changes. This argument is perfect in the sense that it is very hard to test, It is difficult to examine the changes that occur in DNA over countless generations.

It is possible, however, to simulate these processes for analogous systems. For example, it is possible to examine the effects that several random mutations might have on the analogous system of information given in sentence (1). This can be accomplished rather simply by computer simulation. This author has taken the information system given in sentence (1) and stored it as a string of characters in a VAX-8650 minicomputer. The computer then was programmed to cause random mutations, one at a time, into this system of information. The mutation possibilities were as follows:

(a) randomly choosing a position in the sentence and randomly changing the character in that position to a letter or a 'space'.
(b) randomly choosing a position in the sentence and deleting that position.
(c) randomly choosing a position in the sentence and adding a space before that position. Once the sentence length grew beyond 50 characters, the end character was deleted. The maximum length of 50 was used to conserve computer memory.

Each possible mutation was assigned an equal *a priori* probability of occurring each generation. Only one mutation occurred per generation. After each mutation, the resulting information system was checked against a data base of 50,000 English words. The simulation continued until the information system contained no recognizable words. The simulation was performed 1,500 separate times to ensure statistical accuracy. The results, averaged over all 1,500 separate simulations are shown in Figure 1. In this figure, the number of recognizable words are plotted versus the number of generations it required to reach that state. The results are rather discouraging for Neo-Darwinists. As time goes on, the number of recognizable words decrease rapidly until, in just 47 generations, no recognizable information is left. Thus, time, which is supposedly the friend of Neo-Darwinism, actually destroys all information in the system.

Of course, there is one very important thing that this simulation overlooks: natural selection. Any mutation that results in a deterioration of the information in the system would, if the system were DNA, result in a less fit organism. Less fit organisms would be naturally selected to die. Only beneficial or neutral mutations, those that do not deteriorate the original information in the system, would survive. This effect, however, is relatively simple to add to the simulation.

After each mutation occurred, the information system was checked against the database. If all of the words were recognizable English words, the mutation was then accepted and all subsequent mutations occurred on the 'new' information system. If, however, there were any words not recognized by the database, then the mutation was rejected and the information system was reset to its previous structure before subsequent mutation. Another **1,500** simulations were run, each containing **10,000** generations. Of all **1,500** separate simulations, only **123** of them (8.2%) resulted in **any** new system that contained useful information. Sentences 4-7 above are examples of such results. Those sentences, however, still contain less information than the original sentence, because some of the new words are unrelated to the meaning of the sentence. The other **91.8%** of the simulations resulted in such nonsense as:

Thin it an complete sentences ape us on he word (9)

Of all 123 newly-produced information-containing systems, the only one that actually made complete sense was:

This is a completed sentence made up of ten words. (10)

This was the result of two mutations. The first added a space right after 'complete', and 3,475 generations later, the space was changed to a 'd'. Clearly the change in information content is trivial, even after 10,000 generations of mutations.

One final argument was addressed in the simulation. If one examines the genetic makeup of any organism, it is possible to find small sections of the genetic code that are garbled. The fraction of the genetic code that is garbled is very small compared to the total information. Thus, it seems that small sections of garbled information in the genetic code are not detrimental to the organism. This effect was inserted into the simulation by allowing any newly-produced information system to persist as long as at least **90%** of its words were recognizable. Thus, if the first mutation of the information system was as follows:

This is a complete sentence made up of ten aords. (11)

that information system was allowed to survive to the next generation (9 out of 10 words were recognizable), while the mutation

This iswa complete sentence made up of ten words. (12)

was not allowed to survive (only 8 of 9, 88.9% of the words were recognizable). Once again, 1,500 separate simulations, each running for 30,000 generations, were performed, and *not one single simulation produced a sentence that was composed entirely of recognizable words.* What generally happened was that one word was completely garbled, while the only other changes were the types illustrated by the previous simulation. An example of the results is given below:

Trip a a complete sentence axe up on by rrbdprkkpk (13)

Obviously, 'words' was the first word that was mutated, and, since 90% of the words in the sentence were still recognizable, the mutation was accepted. Throughout the **entire** simulation, no recognizable words were produced in place of 'words', thus the only other changes that could occur were trivial.

One very interesting aspect of these simulations is the effect that time had on the information system. As the number of generations increased, the sentence became less and less understandable. The only sentences from which one could ascertain any information at all quickly disappeared. As more and more generations elapsed, the sentence became a string of completely unrelated words. Thus, it seems that time actually serves to deteriorate the information, not bolster it as must be the case for Neo-Darwinian evolution.

In conclusion, the results of the simulation are not surprising to anyone who has studied information theory and the second law of thermodynamics. Information theory states that any highly-developed system of information will be harmed by the random mutation of any of its components.[5] The purpose of the simulation was essentially to show that this theory is, indeed, reasonable when related to genetic evolution. In addition, the effect of eons of time (30,000 human generations correspond to approximately 600,000 years) and natural selection do nothing to damage the conclusions of the theory. Indeed, though the addition of natural selection seemed to aid in the production of recognizable information systems, time had an adverse effect on the information system.

The conclusions reached in this study are far from complete. Several more complex mutation mechanisms are being implemented and more realistic natural selection mechanisms are being considered. In addition, the length of the information system is being substantially increased. The end result, hopefully, will be a rigorously analogous computer-based simulation of the evolution of DNA.

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