DARWINISM IS PHYSICAL AND MATHEMATICAL NONSENSE

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In this article, new and vastly important evidence is presented concerning the mechanical theory of organic evolution which was popularized by Charles Darwin and developed by his followers; and it is shown, far beyond any reasonable doubt, that this theory is nothing more than physical and mathematical nonsense.

The great error of the Darwinians suggests that a suitable place in history for Darwin should be a word added to our vocabulary for a scale of errors which goes as follows: little boo-boo, boo-boo, small error, error, big error, colossal error, and now far larger, Darwinian error, which is the Mount Everest of errors. To say, "Some one made a Darwinian error," means that the person was as wrong as possible in a matter of great importance.

*During the past two thousand years, the mechanical theory of organic evolution was the **darwinian error** of the human race, the highest peak in a whole mountain chain of great and related errors, which includes the philosophy of materialism, making H-bombs, parts of the theories of both Capitalism and Communism, and some other things.*

*It is a fact of history that Darwin's **The Origin of Species,** published in 1859, started a vast revolution of thought in Western culture. At that time, critics were not well prepared to refute Darwin's arguments on which he had spent years of time. His attack came as a complete surprise. Some say he exploded a bomb-shell, and the result was that he and his followers won the first battle. But then they made the serious but common error of thinking that they had won the war; they nearly abandoned research on weapons, and even allowed the old ones to rust.*

Now it is time to start the counter-revolution. During uneasy years of peace, due to efforts of quite a few people, a new and greatly improved weapon has been invented; indeed a multi-megaton "intellectual H-bomb" has been designed. This time it will be the Darwinians who are surprised, and this time they will lose the war.

Machines and Organisms

In the mechanistic theory of organic evolution, it is postulated as obviously true that complex designs may be produced by random changes and selection. The purpose in the following discussion is to examine this postulate from the point of view of an experimenter and designer who knows a little mathematics. The conclusion is that the postulate is false, and therefore that the whole mechanistic theory of evolution is false.

That organisms and machines are similar in some aspects is generally accepted, and most people have heard or read the metaphor, "Man is a machine." We understand machines far more completely than organisms, and therefore we can be far more certain in thinking about our own designs than about those in nature. Is it theoretically possible to obtain the designs of complex machines by making random changes, testing them, and selecting the better? We shall see that this is not possible for the reason that improvements are far too improbable.

Need for Mathematics

Since designs must be produced in limited time and space, and with a large but limited number of atoms, the investigations must be somewhat quantitative. It is not possible to think correctly in matters involving chance without using, at least to some extent, the mathematical theory of probability. Can any person imagine that 10 people can pass in single file through a door in exactly 3,628,800 different ways, and that 15 people can similarly pass in more than 1.3 million million ways? These cannot be imagined, but they are both true. Since the necessary mathematics may be found in many books, it is not required to develop it here, or even to give references. The Darwinian error was caused by the failure to use necessary mathematics.

Generalized Concept of Operations

Engineers are familiar with the idea of operations in making things: for example, drilling a hole, reaming it, and making threads are considered three operations. The idea of operations as small, elementary actions may be extended to acts of nature: the collision of two grains of sand in surf, the making of a simple chemical bond, the breaking of such a bond, the emission of a quantum of radiation, the beat of a gnat's wing, the bumping of two gas molecules, the fracture of a rock by frost, and so on may all be considered operations.

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Googol of Operations

So far as we know, there are no instantaneous operations, and it is evident that a finite number of entities in finite time can perform only a finite number of operations regardless of how they are counted. It is important to find a number which is known to be greater than the total number of operations which have been performed on earth during its entire past. The mass of the sun is greater than the mass of the earth, so let us start with the mass of the sun which is approximately 2.0×10^{30} kilograms. The atomic mass unit is 1.66×10^{-27} kilograms. Therefore the mass of the sun is

$$2.0 \times 10^{30} / 1.66 \times 10^{-27} = 1.2 \times 10^{57}$$

atomic mass units.

Let us now imagine that each one of these mass units is an entity which can perform operations, that these are performed at the high rate of 10^{21} per second for 10^{11} years, and that a year is 10^8 seconds. With these extreme assumptions, the total number of operations is

$$1.2 \times 10^{57} \times 10^{21} \times 10^{11} \times 10^8 = 1.2 \times 10^{100}$$

In their book, *Mathematics and the Imagination,* Kasner and Newman have named the large number, 10^{100}, a "googol," and it is convenient to use this term in discussing what may be done with a vast number of operations.

Total Number of Mutations

A googol is much larger than the total number of mutations which might have taken place in the past. We do not have much information to use in estimating this total: we know the size of the earth and its approximate age, and something about the size of living cells. The area of the earth is 197×10^6 square miles. Let us imagine that there is a layer of living cells one foot deep over the entire earth, and that there are 10^{13} cells per cubic foot. Assume also that at any one time there is one mutation per 1,000 cells. With these assumptions, at any one time there are

$$197 \times 10^6 \times 5280^2 \times 10^{13} \times 10^{-3} = 54.8 \times 10^{24}$$

mutations. We may assume that this condition lasts for one billion years, and at the end of each hour the 54.8×20^{24} mutations are replaced by the same number of different mutations. These assumptions give a total of

$$54.8 \times 10^{24} \times 10^9 \times 365 \times 24 = 4.8 \times 10^{38}$$

mutations. These assumptions, of course, may be greatly in error, but in making them judgment has been weighted in favor of obtaining many mutations, and it is evident that we can not find a basis for a much larger number.

These numbers of operations and mutations are important because we can obtain from them a fair estimate of what can be done in a long time by chance. Many people have jumped to the conclusion that almost everything can happen by chance in the vast ages of the earth's existence, and these include the eminent physicist, Werner Heisenberg, who stated, "The enormous time interval of roughly 4,000,000,000 years that has elapsed since the formation of the earth has given nature the possibility of trying an almost unlimited variety of structures of groups of molecules." Heisenberg apparently lapsed into irrationality when he was writing this statement, for if he had given the matter even a few minutes of concentrated thought he should have known that it is false. Similar lapses into irrationality are common, and we all must be on guard against them.

Practical Meaning of Googol

From the point of view of counting, a googol is a very large number, but from another point of view it is small: a table of factorials shows that 70-factorial equals 1.198×10^{100}. In mathematics, it is shown that the number of permutations of N distinct objects, taken N at a time, is N-factorial. It follows that if a design problem involves placing more than 70 objects into a definite order by random methods, it cannot be solved in a googol of trials.

Some mechanical devices make use of the principle of permutations: any competent mechanic can construct a lock with 100 different tumblers which may be arranged in 100-factorial different ways. A table of factorials shows that in a googol of trials there is only one chance in approximately 10^{58} of finding the one key which will open the lock.

Let us observe that 10^{58} is about ten times larger than the number of atomic mass units in the sun. Sir Arthur Eddington introduced a famous number into mathematical physics for the total number of electrons and protons in the entire physical universe: it is approximately 3.145×10^{79}. Since 100-factorial is about 9.3×10^{157}, it is obvious that there is far from enough matter in the entire universe to make the complete set of keys for trying in the lock.

And if a key is made and tried, and then the material is used to make a new key, there would not be enough matter in the entire universe to use in keeping records. From this it is obvious that Heisenberg's statement quoted above is completely false; he too lapsed into irrationality, and made a truly "Darwinian error," in the sense previously coined.

It is so easy to make mechanisms involving the principle of permutations that it seems useless to use more space in describing them. One more is enough. Consider the little wheels in the odometer of the ordinary automobile for showing the miles which the machine has traveled. We may place 100 of these wheels, without indexing mechanisms, on a single shaft not more

than 50 centimeters long. Let each wheel be two centimeters in diameter, and let us consider that each wheel is a solid disk except for the hole in the middle for the shaft, and another hole, two millimeters in diameter drilled five millimeters from the center axially in line with some numeral.

If these disks are placed in the proper position, a beam of light can be made to pass through all of them at once. The probability of finding this position by chance is one in exactly 10^{100}. If every electron and proton in the entire universe had its own number, this number could be shown on this device. More wheels can be used similarly to have vastly greater numbers of permutations.

Heisenberg's statement may be corrected to read as follows: So vast is the number of the varieties of structures of molecules, that in the enormous time interval of roughly 4,000,000,000 years that has elapsed since the formation of the earth, nature has been given the possibility of trying only an infinitesimally small fraction of them.

Further evidence that this is a true statement comes from recognizing that a designer often makes his selections from infinitely many possibilities. Geometrical forms are infinite in number, and this infinity is greater than that of the integers; infinitely many ellipsoids are possible, and these are only one class of infinitely many classes. Sizes also are infinite in number, and the result is that the designer, having selected a form for a part of a machine or instrument, has free choice in regard to size. Simple geometrical forms, and forms of different sizes may be joined to make complex forms, and the joining may be done in many ways. The important conclusion is that selecting by chance a particular form and a particular size from the infinities of forms and sizes has only infinitesimal probability.

Probability is defined in the mathematical theory of probability as a fraction, and when we have a finite numerator and an infinite denominator, the probability is infinitesimal.

Compound Microscope by Chance

Let us consider the compound microscope, an instrument much used by biologists, and let us consider that it has eight lenses in the objective assembly and two in the ocular piece. A single lens, like the ones used in optical instruments, is only one of infinitely many geometrical forms.

After the designer has made his selection of the lens from the infinity of forms, he has free choices of the two radii of curvature. He must also choose the thickness of the lens, and its diameter, and both of these choices are made from infinitely many possibilities.

The materials from which the lenses are made must be transparent and free from optical flaws.

The materials must have proper optical constants; and there are very many known materials which are not at all suitable for lenses, with the result that selecting materials by chance to give good lenses certainly has a probability of less than one in many thousands.

In the compound microscope, several lenses must be designed to be placed properly in relation to each other. When the instrument has ten lenses, one lens can be placed arbitrarily, and then for each of the other nine, selections must be made of x-, y-, and z-dimensions to determine the positions of the lens centers, and of an angular dimension, for the axes of the lenses must lie along one line.

This makes a total of 36 spatial dimensions, and there is not one chance in a thousand for obtaining any one of them by random choices, that is, less than one chance in a googol for the combination. The various mechanical parts of the instrument are selections from the infinity of geometrical forms.

This analysis shows that if the selections of forms, materials, and dimensions are made at random, the probability that one set of selections will result in a microscope in infinitesimal, and this means that it is infinitesimal for any finite number of selections. This is an awkward way for saying that it is impossible to produce a microscope by chance.

A simple illustration shows that the method of random change and selection is an exceedingly inefficient way for obtaining a result. Let us assume that we have a poem in which a typographical error has caused one word to be written where another should be used, that the poem has 2,000 words and that a dictionary has 500,000 words.

To correct the error, a word is selected from the poem, and the probability that the right word is selected is one in 2,000; then a word is selected from the dictionary, and the probability that the right word is selected is one in 500,000. Therefore the probability for correcting the error in one exchange of words is 1 in 2,000 X 1 in 500,000 or only one in a billion.

Infinitesimal Probability of Machines

Our general conclusion is that the works of man, buildings, bridges, ships, machine tools, airplanes, computers, and many other things have only infinitesimal probability when considered as productions by chance. In some cases we recognize this clearly enough: without violating any physical laws, it is possible for nicely formed arrowheads to be produced naturally. There is plenty of flint, chert, and obsidian, and there are adequate forces for breaking off flakes,

Nevertheless when we find an unmistakable arrowhead, we draw the conclusion that it was

made by human hands. We recognize that while it is not impossible for the arrowhead to have been formed naturally, it is only *infinitesimally probable* that this is ever the case.

To make the arrowhead, a large number of forces must be applied with excellent control of magnitudes, directions, and positions, and not at random. Therefore, we refuse to believe that in the entire time during which the earth has existed even one well-shaped arrowhead has been formed naturally. The belief that complex designs can be produced by random changes and selections is absolutely false; it is a modern superstition.

Designs of Organisms

Let us now consider the theory of organic evolution as developed by Darwin and his followers. In his recapitulation and conclusion to *The Origin of Species,* Darwin stated his theory as follows:

> That many and serious objections may be advanced against the theory of descent with modification through variation and natural selection, I do not deny. I have endeavored to give them their full force. Nothing at first can appear more difficult to believe than that the more complex organs and instincts have been perfected, not by means superior to, though analogous with, human reason, but by the accumulation of innumerable slight variations, each good for the individual possessor. Nevertheless, this difficulty, though appearing to our imagination insuperably great, cannot be considered real if we admit the following propositions, namely, that all parts of the organization and instincts offer, at least, individual differences—that there is a struggle for existence leading to the preservation of profitable deviations of structure or instinct, and lastly, that gradations in the state of perfection of each organ may have existed, each good of its kind. The truth of the propositions cannot, I think, be disputed.

But they can be disputed and shown false in an important way.

Darwin's theory is completely qualitative, and therefore nothing quantitative can be deduced from it: it can give no explanation of the size or form of any organism, or of any part of any organism, and therefore it must be judged, whether true or false, as incomplete. Since his theory contains no geometrical postulates, no geometrical descriptions of any part of any organism can be deduced from it.

Although Darwin intended his theory to be mechanical, and excluded Mind as the cause of organisms, he made almost no use of the physical science of his time, and almost no use of mathe-

matics. He postulated nothing about time, and therefore time rates of change cannot be deduced from his writings. The ideas of variations and selection must have been in the minds of plant and animal breeders for many thousands of years. So Darwin's book might just as well have been written at the time of Aristotle or earlier.

In this article, I am making no attempt to evaluate the evidence from paleontology to determine whether or not there has been slow progressive change in organisms. Darwin had his theory in mind years before he wrote his book, and it is a practical certainty that he used it in making his selection of things to observe. He did not first have a lot of data, and then start to search for a theory which would give a unified explanation.

He had the theory very early in his work. He thought that he had proved that there must be progressive upward change, and very many people have accepted his theory, as modified into neo-Darwinism, as valid. Thus, there must have been considerable bias among researchers ever since Darwin, and the new evidence of this article makes it necessary to reconsider the whole matter. It is now known that nature uses, at least in some cases, means other than the struggle for existence to control the number of individuals in a species. We should search for other explanations.

A very serious objection to the theory that the designs of organisms have been produced by random mutations and natural selection is that this theory is so vague and flexible that almost any conceivable change in organisms can be explained by it. A scientific theory should state something so clearly and definitely that it can be tested by observations and experiments in a way which show without doubt whether it is true or false.

The people who think that their first ancestor was a chemical accident ask us to believe that mutations and natural selection can explain the long neck of the giraffe and the short neck of the pig; the hard shells of some turtles and the soft shells of others; the great size of the whale and the small size of the shrew; the warm blood of mammals and the cold blood of reptiles; the graceful flight of the eagle and the awkward flight of the great blue heron; the gliding of the snake and the jumping of the frog: the bright colors of some birds, and the drab colors of others; why some birds eat carrion and why others will not touch it; the great speed of the jackrabbit and the slow speed of the woodchuck; and so on. It should be recognized that such a general explanation, intended to cover all such things, actually explains nothing at all.

Infinitesimal Probability of Organic Designs

We have seen that the design of a fairly simple instrument, the compound microscope, has only infinitesimal probability when considered as a product of chance. No long study is needed to show that the designs of organisms also have infinitesimal probability.

The skeleton of a mammal has a plane of symmetry; each bone is a complex geometrical form, and if organisms were formed by chance, the symmetry would have only infinitesimal probability. It is not possible in a googol of operations to select at random, from the possible infinity of forms, the shapes and arrangements of the dextral and the sinistral bones of even one mammal.

The various parts of organisms, as well as those of machines must have proper dimensions, and it is evident that in a complex organism many thousands of compatible dimensions must somehow be determined. Let us recognize that if a result depends upon a hundred factors, and if the probability of getting each one right is one in ten, then the probability of getting the whole hundred right is only one in a googol.

Auditory powers involve the complex mechanism of the ear and some kind of harmonic analysis: man-made devices for recording and analyzing sounds for their harmonic content are certainly infinitesimally probable, and it is not plausible that animal structures for doing the same thing are finitely probable. The auditory nerve in man has about 5,000 fibers which may be connected to the brain in 5,000-factorial ways, of which it is plausible that only one is correct.

The situation is still more difficult with the optic nerve which has about 1,000,000 fibers, which may be connected to the brain in 1,000,000-factorial different ways. All of these things, and very many more, show that a higher organism must be considered an infinitesimally probable state of matter which could not have been produced in a googol of operations of random mutations and selections. And we have seen that there must have been far less than a googol of operations for all of the living things.

Additional Evidence Against Darwinism

Let us consider additional evidence which reveals the vast complexity of organisms, for the established facts about this aspect of organisms are hopelessly contradictory to the mechanical theories of evolution. The great complexity of the human body with hundreds of muscles shows the necessity for extremely complex quantitative controls.

Consider the case of a man running over rough ground (or better that of a mountain sheep), where each step must be properly placed within a tolerance of a few inches at most. Perhaps he is dodging among trees, jumping from one irregularly spaced stone to another, and perhaps balancing a load.

Such motions require accurate and rapid observations and extremely fast data processing. Moreover, the data are extremely numerous since they include many measurements of the positions of joints and the tensions of muscles, and they are necessarily quantitative, as every engineer will recognize.

On the basis of the data processing, extremely complex quantitative controls must be arranged to give accurately controlled forces in hundreds of muscles. We know from what we do that setting up the quantitative controls requires only a small fraction of a second. I myself, when younger, did not hesitate to run across small streams at full speed on irregularly spaced boulders when I knew that they would not roll under my feet.

The ability of our hearing to distinguish the sound of a single instrument in an orchestra requires fast harmonic analysis of some kind, and comparisons with remembered sounds. Our visual ability to distinguish patterns also requires fast data processing. When I was young, I could walk across a field of clover, and in an hour or so have a handful of four-leaved clovers. Developing this ability required practice.

Data collecting by our senses, data processing, and then the harmonized regulation of thousands of elements takes place unconsciously at a speed which is very great in comparison with that of our conscious minds. We know next to nothing about the way it is done. The only possible analogy we have at present is the electronic computer, but we know that the analogy is not close.

It is not good thinking to compare the mind with a computer for which it is the cause. We realize that it would require an extremely complex computer with many elements to accomplish any one of the things which we do with ease, and such a computer could not be designed by random methods and selection.

According to biologists, there are something like 10,000,000,000 cells in the cerebral cortex. If an engineer were to attempt to reproduce such a thing, he would need spatial information for the location of each cell, for he must not dump in the cells helter-skelter. Having this information would be the first step in stating how the cells should be connected, since the cells would be designated by their positions.

To state the position of the center of gravity of each cell would require 30,000,000,000 numbers. Since cells are small, and since the locations would have to be stated quite accurately, each number would have to be about as long as an average English word, and if we assume that

a fairly large book contains 250,000 words, we should need a library of 120,000 volumes merely to state positions.

But this is only a beginning; according to biologists, there are several trillion nerve connections between cells in the brain. If we guess that there are twelve trillion—they certainly have not been counted—we should certainly need more than 48,000,000 volumes of 250,000 words each. The conscious mind of man is incapable of dealing with this amount of factual information, and it is preposterous beyond words to believe that a computer requiring 12,000,000,000,000 connections could have been designed by random changes and selections in a googol of operations.

The human body (and organisms generally) involves extremely complex organic chemistry. It has been estimated by organic chemists that the straight chain $C_{40}H_{82}$ has about 6.25×10^{13} isomers. Many organic molecules are known to be far larger than this, and therefore to have vastly more isomers than stated above. It is evident that a molecule with a googol of isomers will be much smaller than many organic molecules. To produce these large molecules many chemical operations must be performed, presumably, in ordered sequences. The principle of permutations applies to these operations, and if the order of the operations is changed the resulting molecules will be changed also. Heisenberg should have recognized that it would be impossible for the whole human race working full time for 4,000,000,000 years to study all of the isomers of a single organic molecule of no great size.*

Charles Darwin

Charles Darwin was a rich man's son who was a weak student generally and especially in mathematics. Under parental pressure, he studied to become a clergyman, but he was not ordained, and he eventually became the world's greater leader in agnosticism.

Extremely unlike Aristotle, the world's first great biologist whose interests were universal, Darwin was an unusually narrow man. He had little education in science, and his formal education was finished at about the age when most students now receive their first degree. As he himself realized, he had little capacity for philosophical and abstract reasoning, and this is proved definitely by the lack of depth in his books.

A person cannot have more than a superficial understanding of physics and chemistry without understanding mathematics at least through the level of differential equations, the level that is commonly required for engineering students. Many engineers know considerably more than this, while physicists usually know still more.

Leaders always have followers, and physicists since the time of Sir Isaac Newton, one of the world's very greatest mathematicians, have followed his leadership into learning much higher mathematics, with excellent results in the progress of physics. On the other hand, those who follow the leadership of Darwin are satisfied with studying physics without calculus at a level which engineers do not consider sufficiently rigorous for their profession. This deficiency in quantitative areas has persisted among biologists at large down to our present day.

Darwin's Philosophical Error

Sir Isaac Newton's "Rules for Reasoning in Philosophy" were violated by Darwin who probably did not know of their existence, for he did not discuss this important matter. Following are the first two rules:

Rule 1: We are to admit no more causes of natural things than such are both true and sufficient to explain their appearances.

Rule 2: Therefore to the same natural effects we must, so far as possible, assign the same causes.

As shown from the previous quotation from Darwin, he started out to find two causes for similar things: for the infinitesimally probable things made by man, human reason he considered the cause; for the infinitesimally probable designs of organisms, variations and natural selection he considered the cause. Thus, according to Darwin, we have two very different causes for similar appearances, a violation of Rule 1 (which is often called Occam's Razor) and of Rule 2.

A very great amount of human experience has been concentrated in these two rules, and they should never have been discarded lightly. The ancient and famous argument in Theology called the Argument From Design is based upon these rules. To account for the designs of organisms, we assign a cause far greater than but analogous with human reason.

Darwin's great fame comes from appearing to many people to have destroyed the argument from design. We need to examine his reasoning in detail to find out what went wrong, for we have seen far beyond dispute, that the infinitesimally probable designs of organisms could not have been produced in a googol of operations of random change and selection.

In order to discuss what Darwin had in mind, we should start with his own statements in the first paragraph of the fourth chapter of his *The Origin of Species:*

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*Editor's Note: Some of the complexities of organic chemical molecules were vividly portrayed by Dr. Oscar Brauer in his recent article, "Organic chemistry reflects God's infinite knowledge," C.R.S. *Quarterly,* 8(1):9-12.

Can it, then, be thought improbable, seeing that variations useful to man have undoubtedly occurred, that other variations useful in some way to each being in the great and complex battle of life, should occur in the course of many and successive generations. If such do occur, 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 injurious would be *rigidly destroyed.* This preservation of favorable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection or the Survival of the Fittest. Variations neither useful nor injurious would not be affected by natural selection. . . ."
(Emphases added)

It is reasonable to believe that Darwin after working for many years on his theory would be as careful and accurate as possible in stating it. He recognized that variations may be divided into three classes: 1) beneficial, 2) detrimental, and 3) neutral, that is entirely harmless and without benefits. But this idea needs more analysis than he gave it, and this is evidence that he was indeed a weak abstract thinker.

His statements which show what he considered the differences between beneficial and detrimental variations are surely false. With the beneficial variations, he used the term, "best chance," but with the detrimental he used the term "rigidly destroyed."

Surely there is not this great difference between the effects of a small beneficial variation and a small detrimental variation. Life, as we know it so well, is hazardous, with the result that we must often use statistical reasoning. It is not at all in accord with experience that organisms with obvious detrimental variations are "rigidly destroyed," for we know that they often live long enough to procreate.

So we must correct Darwin on this important point as follows: A small beneficial variation gives the organism which has it a slightly greater probability of leaving offspring, while a small detrimental variation would give it, not "rigid destruction" but a slightly smaller probability of leaving offspring.

It is certainly not true that there is a sharp discontinuity in effects between small beneficial and small detrimental variations. In every case, survival and death are matters of probability and never of certainty; the probability of survival is greater for some variations than for others.

After Darwin's time, biologists observed that there are sometimes large changes in organisms which they called mutations, and so they abandoned long ago the idea of slight variations. Their studies of mutations led to their important theory of the gene. For the present analysis, the important point is that mutations are inherited, whether beneficial, detrimental, or neutral. This inheritance of mutations greatly changes the situation from that imagined by Darwin: as we shall see, it destroys the whole theory.

In order to make our reasoning clear, let us consider a mechanical problem: a large number of pumps of various capacities pump water into an elevated reservoir for supplying a city. In order to know whether the level of water in the reservoir will go up or down, we must know how many cubic feet per second are pumped by each pump and add them to determine the rate at which water is added to the reservoir. Then we must know the rate at which water leaves the reservoir.

If it leaves through a single pipe, it is sufficient to measure the rate of flow in it, and give no attention to what happens to the water beyond this point. If the rate of flow from the reservoir exceeds the rate at which water is pumped in, the level will go down; if the opposite is the case, the level will go up. This is a quantitative matter which cannot be decided by qualitative observations and thinking.

The matter of conceivable or hypothetical change in organisms is also quantitative, but the state of our knowledge is such that quantitative descriptions cannot be made. We recognize roughly that mutations are small and large with many gradations, but we are far from being able to give quantitative measures. A single extremely beneficial mutation in a species may overcome the effects of many detrimental mutations, and oppositely.

Now that we know there are mutations we cannot decide from any broad principle what will take place in a species, for we must know the details, and these we cannot know. In a species there may be greater complexity of organs or greater simplicity; greater or less size, better or worse vision; greater or less speed in an animal, and so on, all depending upon the kind and magnitude of mutations.*

A truly mechanical theory of evolution must start from the facts, conceptions, and principles of physical science. Then a physically possible model must be formed, and it must be shown by rigorous deduction that there are mutations in a

*Editor's Note: C. R. S. readers realize that certain quantitative aspects of mutation and natural selection have been analyzed by Howe and Davis, C. R. S. *Quarterly,* 8(1):30-43.

species, and that the beneficial mutations in their total effects are greater than the combined effects of all detrimental mutations. The present state of knowledge is so limited that such a theory cannot even be started.

Darwin did not claim to know the causes of variations, but he made the assumption, which he did not justify either by facts or theory, that among variations there are those which are beneficial. This is a very important point in his theory, for if there are no beneficial variations, there certainly cannot be upward change. It is conceivable that all variations are detrimental.

Many people are now familiar with the little rock tumblers used by amateur lapidaries for producing small polished stones. The action of the tumbler produces variations in the stones: every stone becomes less massive and angular, and also smoother. We recognize that the variations are all in one direction, and from this it is evident that the mere fact that there are variations does not show that there are any beneficial variations. Charles Darwin and Alfred Russel Wallace merely assumed that there are beneficial variations.

Darwin's Logical Error

Then, later, after mutations were discovered, it was merely assumed that the beneficial mutations in a species outweigh detrimental mutations. But this is something which must be demonstrated from a sound theory of evolution, and from this we see that the Darwinians and Darwin himself fell into the logical error of *petitio principii.*

We cannot take it for granted that there are little jumps upward in organic trends. From many experiences, engineers have learned that there is a great difference between making designs worse and making them better. Making things worse requires no imagination, no research, no careful weighing of alternatives, no insight, and no mathematics; all that is required to obtain worse designs is to change things in a random manner. To reach perfection is indeed difficult, but imperfection can be reached without effort.

Biologists have found that they can produce mutations in the laboratory by using x-rays, but they have given no clear evidence that mutations beneficial to the organism can be produced in this way. Nor have they shown that beneficial mutations produced in a species by hard radiations will outweigh in their total effect the numerous and obviously detrimental variations.

The second law of thermodynamics has been firmly established in physics and chemistry. According to this law, physical and chemical systems spontaneously go from less probable to more probable states. Buildings, roads, bridges, dams, and machines are all destroyed by acts of nature, consistently with this law. As a result, it is not possible for a physical scientist to accept without convincing evidence the idea that natural events, considered blind and mindless, ever make beneficial mutations. Only the detrimental effects of mutations are consistent with the second law. This matter is complex and it needs more thought than it has ever been given.

For the sake of emphasis upon the extremely low probability of organisms considered as products of chance, let us consider the case of placing the bones of the human skeleton into place. Surely the probability of the whole body is far less than that of any of the internal organs: that of two eyes to send two images over two cables of 1,000,000 conductors each to form one image is less than that of one eye; and surely that of one eye is much less than merely taking the bones of the skeleton and placing them into their proper positions. We can calculate this last probability.

There are, at minimum count, 206 bones in the human skeleton, and we may assume that they are in a random pile. Number these bones from one to 206, and give the same numbers to the proper positions for the bones. Now try placing the bones into position by random procedures. The principle of permutations applies to the situation: the probability of placing the bones into their correct positions (merely the center of gravity) in one trial is one in 206-factorial, or one in approximately 5.6×10^{388}.

From this it is evident that a googol of trials fails to give a significant probability of success. Even the enormously greater number of trials of a googol times a googol times a googol, that is, 10^{300} gives only one chance in 10^{88}, and this most certainly is not significant.

Some biologists believe that the only problem is to explain the origin of the first cell, and that everything from this point on is explained by mutations and natural selection. This is not the case: each beneficial mutation in the direction of greater complexity goes from low probability to much lower probability; in other words, each beneficial mutation requires a miracle of chance. We can no more believe that such miracles take place by chance in great numbers than we can believe that natural events, without the help of human hands, turn vast quantities of flint arrowheads.

Conclusion

I believe that I have given sufficient evidence to justify the title of this article: Darwinism is physical and mathematical nonsense, and it is logical nonsense as well, for a sound thinker does not assume anything which must be deduced from his theory. Darwinism is, indeed, far more a blunder than a theory, and physical scientists

should have shown this clearly and effectively decades ago.

It is not surprising that Darwin, with his weak scientific education should fall into error; but it is surprising that the great physicists and chemists of his time and following should not have taken time enough to point out the errors effectively. But this sort of thing happens, as in the case of Archimedes who came so near to discovering the calculus and failed to do so.

Physical scientists, who know higher mathematics and are capable of analytical thinking, should never have allowed the thoroughly mis-

taken mechanical theory of evolution to reach such a degree of apparent certainty in the thoughts of nearly every one.

Let us recognize that although the human mind is capable of discovering highly reliable scientific truth, it is also capable of generating dangerous superstitions through ignorance, careless and incomplete observations, numerous biases, and generalizations not justified by evidence. It is ironical that the Darwinians, who have made great efforts to destroy superstitions, should themselves be responsible for one of the worst superstitions of all time, the mechanical theory of evolution.

A QUAIL: COTURNIX COTURNIX

WILLIS E. KEITHLEY*

Figure 1. Illustration of natural camouflage of *Coturnix* quail.

Figure 2. Young *Coturnix* quail.

God's grace and also His judgment was demonstrated in sending quail to feed His people on their way from Egypt to Canaan. In Exodus 16, quails were provided in connection with the manna. But in Numbers 11, they appeared in such a teeming multitude that the people foundered in their voracious gluttony.

Flying at about three feet above the earth (they were not piled that deep!) they could be easily captured, and it is recorded in Numbers 11:32 that the least any man gathered was 860 gallons. It is not known how many persons

gathered such a tubful, but even that was a lot of quail!

We might wonder at such statistics until we examine the fertility and potential of the *Coturnix* quail. It has been said that in their migration across the Red Sea, their numbers blacken the sky. This incredulous anomaly of propagation becomes understandable when we discover that they are capable of laying an egg per day all through a year, and begin laying at the age of six weeks.

This fact, coupled with their secretive nature and the natural camouflage as evidenced in the illustration, makes it possible for them to feed a multitude even yet today. This actual descendent of "Pharoah's quail" gives ample evidence of the veracity of God's Word.

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