

# **EVOLUTION ADDENDUM**

For chapters 18,19,20,21

In the Textbook

# **BIOLOGY**

by

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## Why an Addendum?

An addendum is necessary because the author has written the text around the idea that evolution is the "*unifying concept*" of biology (p.12, col 1, line 40). It should be remembered that biology is the study of living things. It is not necessary to know about an organism's origin: to determine how it functions internally and externally, to how it relates to other organisms and to make predictions about other organisms. Origin of and similarity to other organisms, while interesting, is not necessary to understand the detail functioning of a specific organism.

The term evolution has more than one meaning which leads to many misunderstandings and unsupported conclusions. Sometimes "evolution" means evidence for small-scale changes within species which we can observe in the present day. At other times, claims of "evolution" are based upon extrapolation and speculation about the deep past. Read the next two sections below for an understanding of the problem.

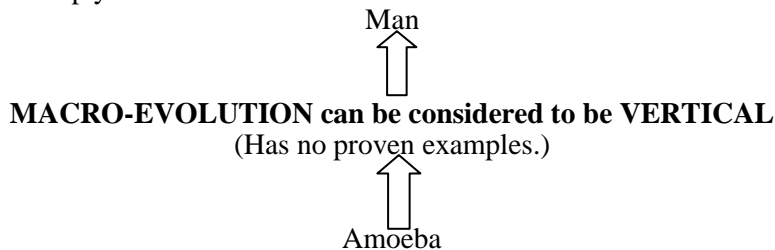
This presentation will provide additional facts concerning evolution so that the student can clearly see problems not answered by the theory of evolution. This addendum presents facts that the student should consider when judging the soundness of the theory of evolution.

Should the student learn about the theory of evolution? Definitely! It is the dominant thinking of today in the fields related to biology.

This paper presents information only on the sections of the text where it is felt that additional information would be helpful. The information is presented as simply and briefly as possible since time is crucial in the classroom. Reference to the textbook will be necessary to completely understand this material.

## What is Evolution? Page 4, column 2, line 39

The textbook author says "*However, evolution is descent with modification.*" This definition is so broad that it will cause confusion between the various aspects of this unit unless it is discussed and more accurately defined. It ignores the fact that there are varying degrees of *modification* or change which are often spoken of as micro and macro evolution. If this is the definition of evolution then certainly it has occurred since things have changed and are changing. As you will learn in Chapter 18, Charles Darwin observed that species change and adapt to their surroundings. He observed that natural selection was a very strong driving force that can and does cause these kinds of changes. He then assumed that these small changes meant that all living organisms could be accounted for through this adaptive or modification process. Wherein this assumption is held by many scientists there is a large number that do not agree with Darwin's assumption. Because of this the term evolution has been broken down into the terms micro-evolution (meaning adaptation) and macro-evolution. Darwin observed the ability of organisms to adapt (micro-evolution) and assumed that on this basis macro-evolution was true. Macro-evolution could be said to occur if a dog became a cat or a dinosaur became a bird. It occurs at the genus or higher level (see page 493) and implies that all life on Earth descended from a few types of cells that somehow came into being in the past. Many scientists do not agree with this hypothesis. The diagram below should help you to understand the differences.



↔ **MICRO-EVOLUTION can be considered to be HORIZONTAL** ↔

It is a change or adaptation at the species level.

(Examples are the number of different types of: cats, dogs, cattle, birds, fish, etc.)

Based upon these definitions it is easy to see that micro-evolution is true but the truth of macro-evolution has not been established. Using the term "evolution" without specifying which type is being discussed is obviously misleading and unfortunate and has caused much misunderstanding among scientists and the public. The term macro or molecules to man evolution should be used in order to clarify the problem. It will be used from this point on in this addendum.

### **Each Species Is Created - Connecting Concepts**

#### **Page 13, column 1, line 15**

The author states, "*Scientific creationism, which states that God created all species as they are today, cannot be considered science because creationism upholds a supernatural cause rather than a natural cause for events.*" The first part of this statement indicates a lack of understanding regarding modern day creationism and creationists. The author also states in Table 18.1, page 283, number 2 under Pre-Darwin View "*Each species is specially created; species don't change, and the number of species remains the same.*"

Creationists in today's world do not believe that God created all species as they are today and that, as stated above, species are unchanging or there is fixity of species as the author repeats several times in pages 280 through 284. These were the concepts that Darwin was fighting but are not a point of contention by modern creationists. The thrust of the above statements is that the creationists do not know what they are talking about and that what they believe in is not science but what evolutionists believe in is science. The definition of what science is reveals that neither "evolution," in the context that it is commonly used (molecules to man), or "creation science" is science. Neither has been demonstrated and cannot be tested, falsified or repeated because they are concerned about happenings in the past that no human observed. A special definition of science must be formulated in order to assert that the general term "evolution" is science unless it is broken down into its two parts micro and macro evolution. Any definition of science that can label the general term "evolution" as science will also include creationism as science. Micro evolution is science but macro evolution is not.

The belief that the Biblical kinds are the same thing as species was a belief in Darwin's time but is not true today. The word "kind" generally is interpreted by creationists to be equivalent to a family and in a very few instances a genus.

## **CHAPTER 18**

### **The Unity of Life Page 280, line 2 (also page 4)**

The author states, "*Descent from a common ancestor explains the unity of life - living things share a common chemistry and cellular structure because they are all descended from the same original source.*" This same general idea is repeated on page 281, line 17. A more accurate statement is "since all organisms must be made from the raw materials at hand and exist in the same environment they should share a common chemistry and cellular structure." The textbook statement could also be worded, "design explains the unity of life since living things share a common chemistry and cellular structure."

### **Fossil Evidence Page 292, column 1, line 8**

The textbook author states, "*For the last two centuries, paleontologists have studied fossils in the earth's strata (layers) all over the world and have pieced together the story of past life.*"

*The fossil record is rich in information. One of its most striking patterns is the succession of life forms over time.*” These statements refer to the geologic column which is given in Table 20.1 on page 326 of the text and are supposed to be proof of macro evolution. There are however many facts from the geological record that tend to challenge this idea. One of them is that many gaps exist in the fossil record (see topic that follows this one). Are these gaps real? Darwin was aware of this problem when he wrote, *“Why then is not every geologic formation and stratum full of such intermediate links? Geology assuredly does not reveal any such finely graduated organic change, and this is perhaps the most obvious and serious objection which can be urged against the theory [of macro-evolution].”*<sup>1</sup> Professor Stephen J. Gould of Harvard University confirmed Darwin's doubts are still valid when he stated, *“All paleontologists know that the fossil record contains little in the way of intermediate forms; transitions between major groups.”*<sup>2</sup>

1. Darwin, Charles R., *The Origin of Species*. Harvard University Press, 1964, p. 280.

2. Gould, Stephen J., *The Return of the Hopeful Monsters*, Natural History, Vol. 86, No. 6, June-July 1977, p. 24.

### **Transitional Fossil Links Page 292, column 1, line 21**

The textbook author lists four fossils that are said to *“serve as transitional links between groups.”* The general consensus is that there are thirty two gaps in the fossil record that need transitional links. This was a major concern for Darwin as is indicated by this comment of his. *“Why then is not every geological formation and every stratum full of such intermediate links? Geology assuredly does not reveal any such finely graduated organic chain, and this, perhaps is the most obvious and gravest objection which can be urged against my theory.”*<sup>1</sup>

Occasionally, in today's world, fossils are found which are proposed to be transitional. At this point in time there are no fossils that are widely accepted as transitional. The textbook author, however, does maintain four fossils are transitional links. The following facts should be considered in evaluating these so called transitional fossils.

Eustheopteron was proposed as transitional between fish and reptile. Many scientists disagree and maintain that this is completely fish although it does have some unusual characteristics.<sup>2</sup>

The Seymouria is said to be an intermediate between amphibians and reptiles. It is dated at 280 million years old.<sup>3</sup> The problem is that the first true reptile is dated at 350 million years old<sup>4</sup> which is 70 million years older than its supposed ancestor. Is it reasonable to assume the ancestor is younger than the offspring?

Protarchaeopteryx and Caudipteryx are reportedly dinosaurs that had feathers and are claimed to be the immediate ancestors of birds. The two strata that they were found in are dated at 120 and 136 million years and the fossil “birds” were reported to be *“more primitive than Archaeopteryx.”*<sup>5</sup> The difficulty is that Archaeopteryx, which is recognized as a true bird,<sup>6,7</sup> is dated at 150 million years old. These so called ancestors of the bird are more than 10 million years younger than the parent. How can they be called an intermediate?

1. Darwin, C.R., *The Origin of Species*. Harvard university Press, 1964, p. 280.

2. Ahlberg, P.E., Luksevics, E. and Mark-kurik, E., *A Near-Tetrapod from the Baltic Middle Devonian*. Paleontology 43 (3), 2000, pp. 533-548.

3. University of California, Berkeley <<http://www.ucmp.berkeley.edu/vertebrates/tetrapods/tetrafr.html>>

4. *Modern Biology*. Holt, Rinehart and Winston, 2002, p 839.

5. Ji Qiang, Currie, P.J., Norell, M.A., and Ji Shu-An, *“Two Feathered Dinosaurs from Northeastern China.”* Nature, Vol. 393 (6687): pp. 753-761, 25 June, 1998.

6. *Modern Biology*. Holt, Rinehart and Winston, 2002, p. 862.

7. Miller, K.R. and Levine, J., *“Biology.”* Prentice Hall, 2002, p. 807.

### **Horse Evolution Page 292-293, column 2, line 25**

The text and figure 18.4 propose that the supposed changes in the horse is an example of evolution. The use of the word evolution in this context is very misleading in that all of the animals except for the Hyracotherium are still horses (see #1 below) so that if they are thought to have evolved they are an example of micro evolution and do not imply macro evolution. Consider the following facts:

1. Hyracotherium has little or no resemblance to horses but is similar to the Hyrax which is alive today.<sup>1</sup>

2. In northeastern Oregon, the three-toed (Neohipparion) and the one-toed horse (Pliohippus) are found in the same strata which means that they lived at the same time in the same place. No transitional forms have been found. One does not seem to be the ancestor of the other as Figure 18.4 proposes.

3. In South America the one and the recessed three-toed horses (Equus and Merychippus) were found together in the Miocene strata (13-25 million years) and the full three-toed horse (Mesohippus) above the other two in the Pliocene strata (2-13 million years).<sup>2</sup> This completely contradicts Figure 18.4.

5. Size cannot be used as an indicator of evolution because today's horses range in size from 16 to 80 inches tall.

5. As late as 1892 three toed horses were reported to be living with the one toed horse in the U.S.<sup>3</sup>

6. A volcano eruption in Nebraska buried a one-toed and a three-toed horse together proving that they lived together at the same time.<sup>4</sup>

7. David Raup, Curator of the Museum of Natural History, where approximately 20% of the world's fossils are housed, comments,<sup>5</sup> ".....some of the classic cases of Darwinian change in the fossil record, such as the horse in North America, have had to be discarded or modified as a result of more detailed information." Note that this comment was made back in 1979.

1. Kerkut, G.A., *Implication of Evolution*. Pergamon Press, London, New York, 1960, p.149.

2. Roemer, A S., *Vertebrate Paleontology*. Third edition, Univ. of Chicago Press, Chicago, 1966, pp. 259-261.

3. Marsh, O.C., *Recent Polydactyle Horses*. American Journal of Science, Vol. 43, 1892, p. 339-354.

4. National Geographic. January, 1981, p.74.

5. Raup, David, *Conflicts Between Darwin and Paleontology*, Field Museum of Natural History Bulletin, Vol. 50, No.1 (1979), p. 25.

## The Pace of Evolution Page 294

The student should notice that gradualism and punctuated equilibrium are both presented as hypotheses. The author does a good job of describing each hypothesis. Only one more factor needs to be made clear. The need for the punctuated equilibrium hypothesis was brought about by the recognized gaps in the fossil record. The Harvard paleontologist Stephen J. Gould, who along with Nile Eldridge and Steven Stanley originated the punctuated equilibrium hypothesis, said, "*The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology. The evolution trees that adorn our textbooks have data only at the tips and nodes of their branches, the rest is inference, however reasonable, not the evidence of fossils.*"<sup>1</sup>

The authors of the punctuated equilibrium hypothesis proposed it to explain the gaps in the fossil record at the species level. Note that this hypothesis has no factual evidence supporting it. The fact that there is no supporting evidence (the gaps) is the proof of the hypothesis. Contrary to the punctuated equilibrium authors wishes, some have extended the hypothesis to include the gaps at higher levels.

Two of the major objections to the hypothesis are:

1. The lack of evidence as established by the gaps. The feeling is that it would be dangerous to let the idea of lack of evidence as proof get started in science.
2. There is no plausible mechanism or explanation for the genetic changes that occur.

1. Gould, S. J., *Evolution's Erratic Pace*. Natural History, Vol. 86 (May 1977), p. 14.

## Homologous Structures Page 296, column 1, line 12

The textbook makes the statement, "*Structures that are anatomically similar because they are inherited from a common ancestor are called homologous structures.*" These similarities are proposed as one of the proofs of macro evolution. The real question is whether things that look similar **necessarily** have the same origin. Would you consider the bones of the same color shown in Figure 18.16 (p. 296) as being similar if you were given all of them in a bag with no labeling? Upon close examination of the animal structures presented in the figure it should be noted that there are bones located in the same relative

location on the limbs but this does not mean that they have the same bony heads and size. Examination reveals they are not similar after all. The bone lengths, diameters and knobby protrusion locations, shape and size are all different. The information in the DNA must be very different to direct the formation of each of these different bone structures.

To further confuse the picture, Sir Gavin deBeer, Director of the British Museum of Natural History, said back in 1971 that, “*Has Dobzhansky explained it when he stresses that there is no one to one relation between a gene and a trait, that evolution does not consist of independent changes of organs or traits; but what changes is the genetic system. Is this also why organs can be homologous in spite of the genes controlling them being different.*”<sup>1</sup> The genes reveal that just because a structure is serving a similar purpose in different animals **it may not have come from an identical gene** and therefore have the same ancestor. Even if the genes were similar it is inconceivable that the many mutations required to produce these differences could have occurred by random chance happenings. For instance, the divisions of the fertilized egg (zygote) up to the stage where a complete sphere is formed (blastula) in reptiles and mammals are so different that it is impossible to conceive of the idea that they descended from the same ancestor even though the forelimbs look similar (homologous).<sup>2</sup> Also, the fore limbs of the newt, lizard and man develop from different parts of the embryo.<sup>3</sup> There are so many instances where similar structures obviously do not mean descent from a common ancestor that biologists call these **analogous structures**. What is it about a structure which determines common ancestry? There is no clearly defined set of guidelines so that, basically, the decision depends upon what the observer is attempting to prove. What is this ancestor? It is not specified so is there one?

Another consideration regarding similarity of structures is whether there is an alternative way to perform a needed function. How many different ways can an appendage like a leg that serves to support an organism be attached to an organism? The requirement that the appendage must have stiffness can only be met in a living organism by bone or cartilage located either in the appendage or on the outside such as insects have. Can you think of another way? Except for the way they are connected together, shouldn't the bones used for support look approximately the same?

1. Sir Gavin deBeer, *Homology: An Unsolved Problem*, 1971, p. 16 (from Readings in Genetics and Evolution, No. 8.)

2. Denton, Michael, *Evolution: A Theory in Crisis*, 1986, p. 145 and Figure 5.4.

3. Ibid. # 2, p. 146

## **Vestigial Structures Page 296, column 1**

Originally, there were thought to be approximately 180 vestigial organs in man. Slowly over the years the number of organs considered vestigial has been reduced to a handful so that present thinking is that a use will be found for these few remaining organs as science progresses. This makes it obvious that just because an organ appears to have no use does not mean that the use will not be discovered later.

The textbook author maintains that our tail-bone is a vestige of another way of life. This is no longer a true statement. It is now known that the human tail-bone serves as an attachment point for muscles that allows humans to walk more upright than the primates.<sup>1</sup> Even the appendix was thought to be vestigial but the medical profession now knows that it plays a functional role in the immune system.<sup>2</sup>

The textbook author's definition of vestigial as “*anatomical features that are fully developed in one group of organisms but are reduced ...in similar groups*” is different from most authors but does allow for the statements regarding bird wings and snakes (see text). Most definitions assume that the organ has no use in the organism.

1. Goss, C.M., editor, *Gray's Anatomy*, 25 th edition, Lea and Febiger, 1948, pp. 408-409..

2. Kawanishi, H., *Immunology*, 1987, Vol.60, p. 19-28.

## **Developmental Patterns Page 296, column 2 and Figure 18.17**

In 1891, Ernst Haeckel produced a series of drawings of vertebrate embryos proposing that they represent a kind of tree of life.<sup>1</sup> The drawings supposedly showed that all vertebrates pass through all of

its macro evolutionary history in arriving at its final state and therefore are a proof of macro evolution. He used the drawings to prove what he called the Biogenetic Law. Haeckel was such an enthusiastic evolutionist that he altered his drawings in order to prove this point. These errors were discovered before he died and he was tried in a court by his fellow professors at the University of Jena in Germany and found guilty of fraud.<sup>2</sup>

Even though it has been known for almost one hundred years that the drawings of Haeckel and the Biogenetic Law are not true very little effort was made to find out exactly what the truth is. Michael Pitman in 1984 reported<sup>3</sup>, "*Had he (Haeckel) started at the logical place, the zygote, he would have realized that different classes of egg differ greatly in yolk content, size and shape, cleavage patterns, blastula, and in the organization which prepares them for gastrulation. Haeckel's series begins at the point when these diverse early stages converge, just before organ formation. This seems, for reasons unknown, to be the only tolerable intermediate stage. Thereafter, divergence again occurs into the diverse adult types.*" In the middle 1990's Dr. Michael Richardson of St. George's Medical School conducted a large scale investigation to determine the truth. He found that Pitman was right and that there was little resemblance between Haeckel's drawings and the truth. What he did find was that **some** embryos "*pass through an intermediate stage in which some of them superficially resemble each other (Haeckel's first stage)*"<sup>4</sup> as reported by Pitman and shown in Figure 18.17. It is important to recognize that this one appearance of similarity is true for this case only indicates nothing since the embryos are very different for earlier and later development stages. Based upon this fact the similarity between the chicken and pig embryos shown in the figure is a gross misrepresentation of the facts.

The textbook author is very misleading in the figure and statement, "*...a chick embryo and a pig embryo have many features in common, which suggests they evolved from a common ancestor.*" Keith Thomson, Chairman of the Yale University Biology Department, said, "*Surely the biogenetic law is as dead as a doornail. It was finally exorcized from biology textbooks in the fifties. As a topic of serious theoretical inquiry it was extinct in the twenties.*"<sup>5</sup>

1 Wells, Jonathan, *Haeckel's Embryos & Evolution: Setting the Record Straight*. The American Biology Teacher, Vol. 61, (May 1999), Num. 5, p. 345.

2. Pitman, Michael, *Adam and Evolution*. London, Rider, 1984, p. 120.

Ibid, fo reference 2, pp. 120-121.

4. Ibid. for reference 1, p. 345.

5. Thomson, K.S., *Ontogeny and Phylogeny Recapitulated*. *American Scientist*, Vol. 76 No.3, May/June 1988, pp. 273-275.

## **DNA and Proteins Contain Evidence of Evolution Page 297**

The author states close to the end of the first paragraph that, "*There is obviously no functional reason why these elements need be so similar.*" The author fails to recognize that the fact that all of these organisms must exist in the same chemical environment so there should be similarities.

In the third paragraph the suggestion is made that examining cytochrome c sequences reveals the macro evolutionary relationships of different organisms. There are many different ways of displaying the cytochrome c differences to try to indicate molecules to man evolution. What is not said is that these differences can also indicate that molecules to man evolution did **not** happen. Strangely, the differences also indicate **no** gradual molecules to man evolutionary steps as implied in Figure 18.18 but rather a sudden change that corresponds with the gaps in the fossil record. A detail study of the cytochrome c differences is beyond a high school class but a few facts will illustrate the problem.

The general order of macro evolution is: bacteria, algae, yeast, plant, insect, lamprey, fish, amphibian, reptile, bird, mammal. Cytochrome c differences strongly disagree with this order. The percent differences in the order of the amino acids is as follows as compared to the bacteria *Rhodospirillum rubrum* C<sub>2</sub> where the numbers indicate the number of amino acids that are not in the same place;

(yeast) bakers yeast-69, (plant) wheat-66, (insect) silkworm-65, lamprey-66, (fish) carp-64, (amphibian) bullfrog-65, (reptile) turtle-64, (bird) pigeon-64, (mammal) horse-64, (Mammal) human-65.

Logically these numbers should get progressively larger as one progresses up the macro evolutionary

ladder. This result is even more startling when it is recognized that in each case there is a different arrangement of the amino acids. The conclusion is that bacteria are a separate entity with no intermediate forms between them and man. If the carp is compared to its evolutionary descendants the results are: lamprey-12, bullfrog-13, turtle-13, pigeon-14, horse-13.

Note once again that the carp is almost equally separated from all of its supposed evolutionary descendants so that the similar numbers in the bacterial comparison do not represent identical amino acid differences. It does not appear that any of these vertebrates descended from the carp. Based upon this data cytochrome c does not agree with the concept of macro evolution.

The studies of cytochrome c confirm that there are gaps at the molecular level just like there are in the fossil record. The gaps between fish, amphibian, reptile, bird and mammal exist at the molecular level and the fossil record.

**Thinking Critically:** The plot in Figure 15.10 is taken from Table 15.2. Why don't the results shown above show up in this plot?

For more information see: Denton, Michael, *Evolution: A Theory in Crises*. Adler & Adler, Bethesda, MD, pp. 277-293.

### **Connecting Concepts Page 298, column 3, line 7**

The textbook says, "*Fossils, comparative anatomy, biogeography, and biochemical data all indicate that living things share common ancestors.*" Certainly this is true at the species level but because it is true at the species level does not mean that it confirms the idea that man descended from random molecules sometime in the past.

### **Bioethical Issue Page 299**

The first sentence says that, "*evolution is a scientific theory.*" Dr. Mader compares evolutionary theory to cell and atomic theories which have been proven to be true within the context presented. This comparison is very misleading. The comparison becomes true only for micro evolution and not for macro evolution. The term macro evolution can be said to be theory although many people prefer the term hypothesis since it has never been demonstrated or observed as discussed earlier in this addendum.

It is disappointing that the textbook author includes this type of discourse in her presentation in a science textbook under the heading of an ethical issue. It is instructive that Dr. Mader feels that evolution is so threatened by creationist ideas that it is necessary to include this section in her textbook. The very fact that this is true indicates that more than one theory or hypothesis should be investigated and taught. If what is being said is not true then the errors should be pointed out in detail rather than hiding behind the idea that it is religion. Creationists and intelligent design advocates look at the same facts and data as the evolutionists do but come to different conclusions. Is this wrong? The textbook article's method of presentation conveys the idea that evolutionists believe that evolution is a theory and no one should be allowed to question their conclusion. In the interest of developing a student's critical thinking skills shouldn't alternative ideas be presented? Almost every discipline allows many hypotheses about how to interpret facts and data. Why shouldn't this be true for evolution?

Dr. Mader criticizes the intelligent design proponents for proposing "*that gaps in the fossil record mean that species arose fully developed with no antecedents.*" Many evolutionists admit that the gaps are real, including Darwin. Paleontologists have not been able to fill in the gaps in over 135 years since Darwin proposed his thesis. As Dr. Mader pointed out on page 294, the punctuated equilibrium theory was hypothesized to answer this problem even though there is no firm evidence to prove it. Since it is agreed that the gaps are real then it certainly seems reasonable to assume the intelligent design hypothesis is plausible and possible. Objection is also raised to the idea "*that DNA could never have arisen*" accidentally. Once again there is much disagreement about how DNA could have evolved and much evidence that it could not have evolved (see the discussion for chapter 20 in this addendum). In both of these cases why is it alright for evolutionists to criticize the standard theories on these subjects but not

anyone else? This certainly is not good science.

Dr. Mader agrees that the intelligent design advocates do not mention the Bible or that God created the world but yet she wants to restrict the teaching of this type of thinking because in her mind it sounds like religion. Should facts be thrown out or ignored because they appear to fit the model dictated by a religion?

## CHAPTER 19

### The Peppered Moth Page 303, Figure 19.2

The author rightfully discusses the peppered moth in terms of adaptation. This is a clear illustration of how natural selection can operate to change the characteristics of an organism. It is important to recognize that the moths are still recognizable as peppered moths. All that has happened is that the moths have adapted to their environment. This example of micro evolution provides no proof or data regarding macro evolution.

Since Kettlewell performed his experiment several facts have come to light that cast a shadow on his results. First, the moths are nocturnal so that release of the moths in the daylight possibly distorted the data. Second, it is now known that peppered moths do not normally rest upon tree trunks.<sup>1</sup> The normal resting place is beneath small reasonably horizontal branches probably high up in the tree canopy.<sup>2</sup> What this means is that the drawings (Figure 19.2) and pictures showing the moths resting on tree trunks have been staged.

1. Wells, Jonathan, *Icons of Evolution*. 2000, pp. 146,149.

2. Mikkola, Kauri, *Biological Journal of the Linnean Society*. Vol.21 (1984), pp. 409-421.

### Genetic Mutations Page 304

The text starts this section with the statement, “*Mutations are the raw material for evolutionary change; without mutations there could be no new variations among members of a population.*” This statement, which is correct, implies that the phenomena is deceptively simple. Recognize that the definition concerns changes in genetic information but that information must be added to the DNA in order to build complexity in organisms. The question to keep in mind is, “**Does the mutation actually increase the information contained in the DNA or decrease it.**” An increase in information is necessary to claim that microorganisms eventually evolved into higher organisms like humans. It is essential that this need for information be understood. Did the transition from the conventional cars of today to the hybrid cars require additional coherent information or is the hybrid car simply a rearrangement of the information required to build a conventional car? Yes, information had to be added. The added information needed concerned electrical motors, drives and frame changes.

The rest of chapter 19 discusses different mutation mechanisms and forces that cause changes in genes and therefore changes in organisms. It must be remembered that just because mutational changes do occur at the species level this does not prove that all organisms descended from a common ancestor. The textbook does not discuss some of the factors that give the reader an understanding of how difficult speciation is and the fact that it cannot explain the phenomena of molecules to man or even amoeba to man evolution.

First of all it must be remembered that the DNA in a living organism contains the complete information necessary to form an identical organism including the instructions of how to make a reader for its own code system. The amount of information stored in the DNA is staggering. Second, the amount of information stored in the DNA of man is 4166 times more than that of the H-39 Mycoplasma - one of the smallest bacteria now called a mollicute.<sup>1</sup> To put this in perspective the mollicute (H-39 mycoplasma) DNA (768,000 base pairs)<sup>2</sup> has the amount of information contained in the first 21 chapters of this text if every page were covered by nothing but print with **no** pictures, graphs or headings similar to this typed page. The information content in the DNA of man (3.2 billion base pairs)<sup>3</sup> is the same as 527 books like this text with

**nothing but text** on the pages as just described. Some might argue that the above numbers are highly exaggerated because of what some call “junk DNA” but it is now known that the so called “junk DNA” is not junk. It is made up of introns, promoters, terminators and telomeres<sup>4</sup> which are functional parts of the DNA. This author mentions introns and telomeres on p. 228 as necessary parts of the DNA. A major question is where did all of this additional information come from to fill the 526½ additional books?

To understand the problem consider the following. There is no known mutational mechanism that will increase the information content of DNA in a meaningful manner. In other words, transposons, point and frame-shift mutations, duplication errors, jumping genes, extra chromosomes, and viral or bacterial invasion do not add meaningful information to the DNA. Think about this problem with respect to this textbook. Does mixing sentences, letters, paragraphs, errors in copying, mixing up chapters or adding two or more identical chapters add information? The textbook may contain more pages but does it contain more information? It is inconceivable that meaningful information can be added to accomplish the bacteria to man requirement of evolution by random chance happenings. It should be recognized that natural selection decreases the information in DNA.

. It is hypothesized that these changes in species ultimately lead to changes at the genus level, the family level and on up to the kingdom level. The great complexity and preciseness found in the DNA and the tremendous increases in DNA information content necessary to evolve from "amoeba to man" make the hypothesis unlikely. When duplication errors, favorable mutations rates and the time necessary to establish a trait are considered this becomes apparent.

**Think Critically:** It has been discovered that the largest bacteria *Epulopiscium fishelsoni* has 85,000 copies of one of its genes and contains approximately 25 times as much DNA as a human cell.<sup>5</sup> Does this confirm the need for added DNA to be meaningful?

It is known that duplication (replication) errors are extremely rare. There is no more than one error in 1,000,000,000 base pairs when copying the DNA (p. 229). The textbook “Biology: The Dynamics of Life” by Biggs, Kapicka and Lundgren (Glencoe, 1995) further complicates the problem when it makes the following statements, “*Sometimes, there is no effect on an organism, but often mistakes in DNA can cause serious consequences for individual organisms*” (p.324). “*Sometimes, the errors caused by point mutations don’t interfere with protein function, but often the effect is disastrous.*” (p.325) “*Proteins that are produced as a result of frameshift mutations seldom function properly.*” (p.325) “*Few chromosome mutations are passed on to the next generation because the zygote (several cells beyond conception) usually dies.*” (p.326) “*Mutations often result in sterility or the lack of normal development in an organism.*” (p.328) Other authors comment that only about one in 1000 mutations “might” be beneficial.<sup>6</sup> Generally it takes about 5 mutations to make a significant physical change in an organism.<sup>6</sup> Note that this does not mean a new species has been formed. Many more than five mutations at a time have been caused on fruit flies [*Drosophila melanogaster*] with only a deformed fruit fly as a result. Dodson proposes that it takes over 300,000 generations for a slightly beneficial recessive gene to increase in frequency from 1 in 1,000,000 to 2 in 1,000,000.<sup>8</sup> **It must also be remembered that a mutation in any cell other than the reproducing cell does not have any influence on succeeding generations.** When all of these probabilities are combined, the question must be asked, “How can macro evolution occur from processes that produce many more negative results than positive results?”

The previous paragraph reads so easily that most people do not realize that these apparently simple statements mean that macro-evolution is extremely unlikely. To get an appreciation of this let us examine these probabilities in more detail.

First, consider the two statements that “*Many random mutations are harmful.*” (only one in one thousand is beneficial) and that “*it takes five mutations to cause a significant change in an organism.*” For the sake of discussion assume that information content can be increased by mutations (a false assumption as previously discussed). The question is, “Can progress be made up the evolutionary ladder of increasing complexity with odds that give predominately negative results?” To illustrate the point, use two pairs of dice to perform the following experiment. If a roll of the dice produces four ones, assume this represents a



the difficulty of establishing a population are all considered, it is inconceivable that man could have evolved from the ape.

Each one of the arguments discussed in the previous paragraphs indicates the macro evolution of man is not likely to have taken place. When all three are considered at the same time it should be apparent that macro evolution is an impossible scenario.

Examples of mutational changes are particularly instructive when it comes to the evolutionary concept. Mice living at the Chernobyl reactor show mutational changes but they and their offspring are still mice. With all the thousands of mutational experiments carried out on the fruit fly (*Drosophila melanogaster*), where the mutational rate was increased by 15,000 percent<sup>10</sup>, none have produced a better fruit fly nor anything other than a fruit fly that survived and reproduced. In fact, an interesting experiment was carried out in 1948 by Ernst Mayr and reported by J. Rifkin<sup>11</sup> that revealed mutations can cause only a limited variation in a species. Starting with a parent stock that had 36 bristles the fruit fly was selectively bred (not a random event) in an attempt to have a fruit fly with no bristles. After 30 generations the number of bristles was lowered to 25 but then the line became sterile and died out. A second experiment was carried out to increase the number of bristles. Once again sterility set in when the number of bristles reached 56. Mayr concludes "*The most frequent correlated response of one-sided selection is a drop in general fitness. This plagues virtually every breeding experiment.*" This addendum's author can confirm this from his experience in raising peaches commercially. The peach trees that produce the prettiest and largest peaches will quickly die if not cared for. This is in direct contrast to wild trees that are seen flourishing around an old abandoned house for years without care. The selective crossbreeding of trees for large fruit with good flavor weakens the ability of the tree to survive. What does all of this mean? It means that when man deliberately introduces mutational changes into the DNA, the probable result is a organism that is not as environmentally adept at coping with the environment as it could originally. Why should an organism be stronger when undergoing random mutations if "controlled" mutations do not do the job?

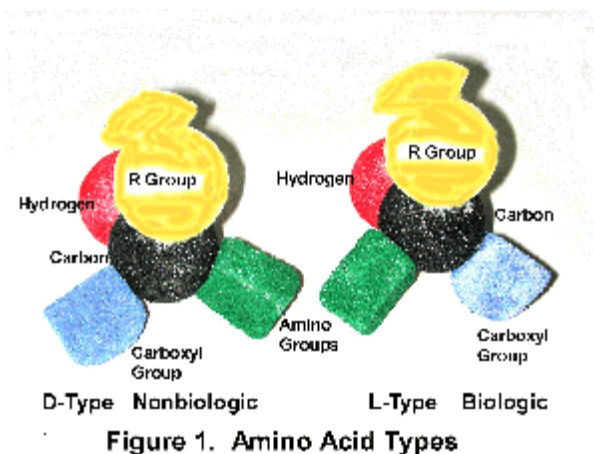
1. Smith and Wood, *Cell Biology*. Chapman and Hall, 1996, p. 121.
2. Smith, *Cell Biology*,. Academic Press (1971), p. 86.
3. Starr and Taggart, *Biology, The Unity and Diversity of Life*. Wadsworth Group, 2004, p. 254.
4. Campbell, N. A. and Reece, J. B., *Biology*. Benjamin Cummings, 2002 (Sixth Edition), pp. 300-309.
5. Randerson, J., Record Breaker. *New Scientist*, Vol. 174, 8 June 2002, p. 14
6. Ambrose, E., *The Nature and Origin of the Biological World*, (1982), p. 120-121.
7. Dodson, E., *Evolution: Process and Product*, (1960), p. 225.
8. Johnson & Raven, *Biology, Principles & Explorations*. Holt, Rinehart and Winston, 2001, p. 197.
9. Smith, *Cell Biology*,. Academic Press (1971), p. 86.
- 10,11. Rifkin, Jeremy, *Algeny*. (1983), p. 134.

## CHAPTER 20

### Origin of Life Page 320, column 1

In order to bring this discussion of the origin of life into correct perspective several facts must be recognized and kept in mind:

(1) A carbon atom, an essential part of an amino acid, has four bonding sites. In forming an amino acid four different elements or compounds join to a central carbon atom as shown in Figure 1<sup>1</sup> below - a Hydrogen atom, a Carboxyl Group (COOH), an Amino Group (NH<sub>2</sub>) and an R Group which is a carboxyl/hydrogen based unit. The composition of the "R Group" largely determines the particular characteristics of the amino acid and therefore its name. Note that the R Groups are very rarely symmetrical



about an axis. The mock up shown in Figure 1 shows this. The number of compounds that can join to the carbon atom at this spot is very large. Estimates are as high as several thousand. In each case the result is called an amino acid. Of all the possible amino acids occurring naturally only 20 are found in living organisms and are called biologic amino acids. This means that the vast majority of amino acids are classified as non-biologic. If one of the non-biologic amino acids joins with one of the 20 biologic amino acids, the result is a compound that is not useful for biologic purposes.

(2) To further complicate the situation, the exact order in which the Hydrogen atom, the Amino Group, the Carboxyl Group and the R Group join to the central carbon atom determines whether the amino acid formed can be used in forming a biologic protein. Amino acids are optical isomers and fall into two structural types --- dextro-rotary (D type) and laevo-rotary (L type). The L and D type molecules are identical chemically but are mirror images of each other just as our hands are. Notice that if the R Group and the H atom are taken as a reference by putting the H atom farthest from to the observer as shown in Figure 1 there are only two different ways the Amino and Carboxyl Groups can join the carbon atom - the Amino Group is either on the left or right of the reference. Only the order shown on the right of Figure 1 above (Amino Group to the left of the line proposed above) is used in forming a biologic protein. Very rarely are D amino acids found in living organisms.<sup>2</sup>

(3) It is important to recognize that the L and D amino acids like that shown in Figure 1 above occur in equal numbers in nature but no known life forms use both types of amino acids.<sup>3</sup> In forming a polypeptide the amino acids join to each other by the Amino Group joining the Carboxyl Group. Since these are common to all amino acids this means that there is no preferential connections of biologic verses non-biologic amino acids in forming poly-peptides. As shown above the difference between the L and D molecules is that the Carboxyl Group and the Amino Group swap places on the central carbon atom. In each resultant molecule the chemical equation is the same even though the shapes of the molecule are different. This is most easily understood by looking at Figure 1 and connecting the Carboxyl and Amino Groups together. This makes the R Groups point in the opposite directions with respect to the polypeptide chain so that the shapes of the chain are different.

(4) If only L amino acids are connected in a chain they form a helix as shown by line "A" in Figure 2. If a single D amino acid is connected into a chain of L amino acids the resultant protein becomes non biologic. Note that not only is the R Group (yellow color) in the opposite direction from that of the L

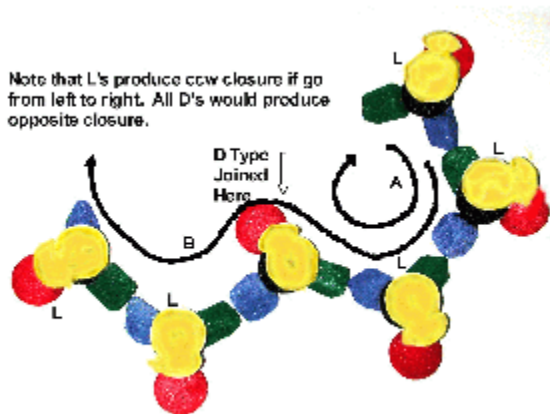


Figure 2. Effect of introducing a D molecule into an L molecule chain..

molecules but the shape of the polypeptide has also changed from the closed circular pattern of an all L chain to the shape shown by line "B". If a single D type molecule gets into the chain of "L"s the shape of the molecule has changed even though the chemical equation is the same. It is very important to recognize that the shape of a molecule determines how it will interact with other molecules. Dr. Mader points this out in her Biology textbook when she says, "*Shape is very important in determining how molecules interact with one another*" and "*Once a protein loses its normal shape it is no longer able to perform its usual function.*"<sup>4</sup>

If a L type sugar were introduced into a chain of D sugars in the DNA strand it would not be able to coil without causing a tangle as illustrated by line "B".. This would be a fatal mistake.

(5) It is also known that nucleotides (DNA) are formed from a deoxyribose sugar molecule bonded to a phosphate molecule and a nitrogen base. RNA has ribose sugars in the place of deoxyribose sugars. The sugars in these nucleotides also occur in L and D type molecules. The arrangement of the sugars in the DNA ladder is shown below in Figure 3. (More details are given in the chapter on DNA.) Two different bases join to form a base pair and make a ladder rung.

How proteins formed originally with only L type amino acids and how sugars in the nucleotides (DNA



3. Ultraviolet light breaks down water, the third building block of amino acids, into oxygen and hydrogen. The presence of oxygen minimized the formation of any amino acids in the atmosphere.

These first three problems point out that any significant amino acid concentration in water could not come from the reaction of gases in the atmosphere. Even if amino acids could somehow be formed in a pool, lake or sea as proposed on page 321, column 1, line 40 there are factors such as those listed below that make the formation of life unlikely. Consider the following problem areas:

4. There are two structural types of amino acids and sugars as discussed earlier--- dextro- rotary (D type) and laevo-rotary (L type). Whenever amino acids and sugars are being formed these two types are formed in equal numbers. No known life forms use both types of sugars and amino acids.<sup>4</sup> Both types of molecules will easily combine chemically with each other but only one of the wrong type of amino acid in a protein or sugar in the DNA will make it biologically useless from a functional viewpoint as pointed out earlier. The proteins of living organisms are made up of L type amino acids and the DNA strands from D type sugars. The duplication process of the cell assures use of only the right type of molecule. There is no other known process for separating and isolating L and D molecules. DNA produces tRNA which promotes the synthesis of L type proteins. There is no evidence that such a separating mechanism was present until the first replicating life form came into existence.

5. Water is a diluting and reacting agent so the question must be answered as to how the amino acids can be concentrated to form polypeptides (chains of amino acids), proteins and, ultimately, organisms. The evaporating pool hypothesis, that evaporation will concentrate the amino acids, has the problem that some of the compounds necessary for protein synthesis evaporate<sup>5</sup> along with the water. Insulin, the smallest protein, requires fifty one L type amino acids (17 different types). It is inconceivable that this many amino acids could be assembled on a molecular basis without the detrimental effects of water, D type or other type of amino acids or other non-biologic compounds interacting. Even if insulin is obtained this does not verify that life could have come about because many more proteins are needed to have even the simplest living organism.

6. Natural selection only takes place in living organisms.

7. Amino acids are quick to combine with other compounds, including those from which they were formed, to form non-biologic compounds.

8. When two or more amino acids unite by the addition of energy to form a polypeptide, a water molecule is produced. This water molecule must be removed immediately because it will unite with the polypeptide. This means that the polypeptide is not stable unless the water is removed.<sup>6</sup> How can the water be removed when everything is in water. Ferris states this scientifically as,<sup>7</sup> "*But it has not proved possible to synthesize plausibly pre-biotic polymers this long (30 to 60 monomers) by condensation in aqueous solution, because hydrolysis competes with polymerization.*"

9. Biochemical compounds tend to break down (decay) when not combined within a living organism. When living organisms die they decompose back into their simplest molecular components. The chemical tendency is away from life.<sup>8</sup> Thus even if a protein were formed it would not have been stable and would not have waited around for a spontaneous combination at some later time with other proteins.

1. Clemmy & Badham, *Oxygen in the Precambrian Atmosphere: An Evaluation of the Geologic Evidence*, Geology, Vol.10 (1982), p. 141

2. Fox, S., & Dose, K., *Molecular Evolution and the Origin of Life*, Freeman and Co., 1972, p. 44.

• Miller, *Production of Some Organic Compounds under Possible Primitive Earth Conditions*, Journal of Am. Chemical Society, Vol.77, (1955), pp. 2351,1361.

3. Clemmy & Badham, *Oxygen in the Precambrian Atmosphere: An Evaluation of the Geologic Evidence*, Geology, Vol.10 (1982), p. 141.

4. Cohen, J., "Getting All Turned Around Over the Origins of Life on Earth." *Science*, Vol. 267 (1995), pp. 1265-1266.

5. Horowitz & Hubbard, *The Origin of Life*, *Annals of Genetics*, 8 (1974), p. 393.

6. Thaxton, Bradley, & Olsen, *The Mystery of Life's Origin: Reassessing Current Theories*, New York:

Philosophical Library,(1984), p. 56.

7. Ferris, et al., *Synthesis of Long Prebiotic Oligomers on Mineral Surfaces*, Nature, Vol. 381, 2 May 1996, pp. 59.

8. Abelson, *Chemical Events on the Primitive Earth*, Proc. National Academy of Sciences, Vol.55 (1966), pp. 1365,1369.

## **The Miller Experiment Page 320, column 2**

The famous Miller-Urey experiment supposedly proved that life could have evolved. The apparatus is shown in Figure 20.1 on p.320. One of the problems of this experiment was that the experiment produced both D and L type amino acids plus other non-biologic amino acids and polymers which were capable of reacting with the desirable biologic amino acids to produce non-biologic compounds.<sup>1</sup> Miller had to use a trap to isolate the products of his experiment and keep them from getting back to the original gases since the biologic amino acids formed would react readily with the excess gases and form non-biologic compounds. As necessary as it is, there is no mechanism in nature that can perform this needed isolation.

Their experiment came up with a total of only 10 biologic amino acids and 25 non-biologic amino acids, sugars and other compounds all mixed together. Insulin, one of the smallest of proteins, consists of 51 amino acid bonds and requires 17 different biologic amino acids. This simplest of proteins could not have been formed had there been nothing but the Miller biologic amino acids present. Other scientists<sup>2</sup> have done similar experiments with other sources of energy and formed many other biologic and non-biologic compounds but with similar results. As Dr. Mader reports, still other scientists have devised experiments which have produced still other compounds in living organisms. All of the cited experimenters results still involve L and D amino acids and sugars plus other non-biologic amino acids and sugars so that the peptides formed are not indicative of life.

1. Thaxton, Bradley, & Olsen, *The Mystery of Life's Origin: Reassessing Current Theories*, New York: Philosophical Library,(1984), pp. 52-54.

2. Thaxton, Bradley, Olsen, *The Mystery of Life's Origin: Reassessing Current Theories*, New York: Philosophical Library, (1984), pp. 20-39.

## **RNA Chain Formation Page 321, column 2, line17**

As discussed earlier an RNA nucleotide consists of a base, a phosphate and a ribose sugar. The sugar can be in either the "L" or "D" form which considerably complicates the problem because only "D" or right handed sugars are present in living organisms. If a left handed ribose sugar appears in the chain then the RNA chain that might be formed is non-biologic. Since RNA chains have been observed to form as reported in the text but the real question is whether the initial conditions of the experiment truly represent conditions that would actually occur in a real life situation. It should also be recognized that chains of RNA may be able to make copies of themselves but are of no use unless they are able to make a biologic protein. The formation of a biologic polypeptide is of no consequence compared to the complexity of the first living organism.

## **Polymers Evolve Page 321, column 1**

The origin of life is discussed in such a manner that the textbook reader might believe that it was very simple and obvious. Nothing could be further from the truth. The rest of chapter 20 discusses the appearance of the different organisms as though man came about through the random assembly of many chemical compounds. There is no clear evidence that macro evolution has ever occurred when all of the previously cited facts are considered. The evidence is that it is impossible.

It is very easy to over simplify the idea of early life being primitive. The complexity of even the simplest life form is far from simple or primitive. One of the smallest prokaryotes (H-39 strain of mycoplasma, a bacterium) consists of 640 proteins whose average length is 400 amino acid bondings.<sup>1</sup> This means that it has 256,000 amino acids arranged in a very specific order. These amino acid bonds are coded in the DNA by means of 768,000 base pair bondings in a specific order and 1,536,000 sugar-phosphate pairs. If we add all of this together, we find that there are 4,864,000 individual chemical

entities that must come together to form this "simple" bacterium (2x768,000 bases+1,536,000 sugars+1,536,000 phosphates+ 256,000 amino acids). Under ideal conditions, the odds of this many amino acids coming together in the right order are approximately the same as winning the Power Ball Lottery every week for the next 640 years. This neglects the L and D factors and other chemical compounds. How could this have happened accidentally? The step from inanimate organic compounds to a living organism is beyond man's ability to create.

It is further noted in the textbook that even though science has demonstrated other ways in which vital organic compounds might have been formed there is a vast gap between the forming of individual compounds and their assembly into the precise order necessary to obtain a living organism. As just stated, the H-39 mycoplasma has 4,864,000 compounds which have to be assembled in a precise way. This assumes there are no wrong L or D amino acids or sugars, no non-proteinous amino acids and other compounds such as were formed in the Miller-Urey experiments present. The addition of these unusable compounds greatly increases the already astronomical odds that organic compounds did not form spontaneously so that the Miller-Urey experiment added additional problems for the evolutionist.

Recent experiments concerning the formation of polypeptides do not enhance the chances of macro evolution taking place unless the polypeptide is one that can be used in the particular organism. If it cannot be used then it is only making macro evolution less likely since it introduces an additional non-usable compound. If it is usable then it must be included in exactly the right place in the protein being formed - a very unlikely scenario.

1. Smith, *Cell Biology*, Academic Press (1971), p. 86.

## The Unbreakable Cycle

There is an unbreakable cycle in all cells and bacteria that makes any possibility of macro evolution impossible. Part of the problem is that DNA by itself is useless unless the information can be read and acted upon. Another problem is that a cell without any DNA cannot duplicate itself and so does not lead anywhere. The fact that the mechanisms (enzymes) for duplication of cells and reading DNA is contained in the organism but the instructions on how they are to operate and how to form these mechanisms is in the DNA poses another difficulty. In other words, if the reading enzymes somehow came into existence without something to read (the DNA) plus instructions on what to do with the information obtained, they would be useless. They should have been eliminated according to standard evolutionary theory. In a similar manner, what good are the replication enzymes if operating instructions are not present. All of this information is in the DNA but serves no purpose by itself without some means to read it. The net result is that the DNA and the rest of the organism had to form at the same time. Any one by itself is a dead end. This means that the formation of the first living organism could not have occurred in steps. There is no theory of evolution which can account for the origin of biological structures which have multiple interdependent parts. Darwin recognized this for living organisms when he said, "*If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down.*"<sup>1</sup> If this is true for living organisms it is also true for nonliving organisms where natural selection does not function. There is no known way for origin of life theories to account for the origin of the first functional genetic code in a living cell.<sup>2</sup>

**Thinking Critically:** If all of modern science and technology have been unable to create life, are we to believe it happened by purely natural processes? Support your answer.

1. Darwin, Charles, *The Origin of Species*. Harvard University Press, 1964, p. 179.

2. Trevors, J.T. and Abel, D.L., "Chance and Necessity Do Not Explain the Origin of Life." *Cell Biology International*, Vol. 28, pp. 729-739.

## Cambrian Fossils Page 329, column 1

Dr. Mader says “*All of today’s groups of animals can trace their ancestry to this time and perhaps earlier according to new molecular clock data.*” This is called the Cambrian Explosion and is one of the mysteries of geology in that, as the author states, so “many of the modern day phyla appeared.” The author fails to comment that this is a most unusual happening and is one of the mysteries of geology in that most animal phyla appeared during about ten million years of this time period. The real problem is that these organisms seem to appear suddenly without any ancestors. Richard Dawkins, author of *The Blind Watchmaker*, puts it this way, “...*the Cambrian strata of rocks, vintage about 600 million years, are the oldest in which we find most of the major invertebrate groups. And we find many of them already in an advanced state of evolution, the very first time they appear. It is as though they were just planted there, without any evolutionary history.*”<sup>2</sup> For instance, the trilobite is an extremely complex organism with a segmented body and legs including a complex nervous system and one of the most complex eyes known. Science News puts it this way regarding trilobite eyes, “...*the most sophisticated eye lenses ever produced by nature.*”<sup>3</sup> There are trilobites in the pre-Cambrian strata but they show no signs of being related to the Cambrian trilobites. Even Charles Darwin recognized the Cambrian Explosion problem and had this to say on the subject, “*The case at present must remain inexplicable; and may be truly urged as a valid argument against the views here entertained.*”<sup>4</sup>

1. Dawkins, Richard, *The Blind Watchmaker*. New York: W. W. Norton, 1987, p. 229.

Concurring: Stephen J. Gould of Harvard . *A Short Way to Big Ends*, Natural History, Vol. 95 (January 1986), p. 18.

2. Shawver, Lisa J., *Trilobite Eyes: An Impressive Feat of Early Evolution*. Science News, Vol.105, (2 February, 1974), p. 72.

3. Darwin, Charles, *On the Origin of Species*. 1859, p. 308.

## CHAPTER 21

### Human Evolution Page 341

The textbook author states in line 4 that “... *modern humans and apes evolved from a common apelike ancestor.*” The entire section 21.1 is devoted to pointing out similarities between humans and other primates. Just because two animals look somewhat alike and have similar characteristics does not necessarily mean they came from a common ancestor. This is a repeat of the homology argument discussed earlier.

Consider the following facts in deciding whether or not man and chimpanzee “*evolved from the same apelike ancestor.*” A recent article in the Proceedings of the National Academy of Sciences suggests that there is approximately a 5% difference between the DNA of chimpanzees and humans.<sup>1</sup> This information was obtained by comparing approximately 1% of the genome and considered substitutions, insertions and deletions. The much publicized number of 1.4% is obtained by considering only substitutions. This information was obtained by comparing approximately 1% of the genome and considered substitutions, insertions and deletions. As more of the genome is considered the difference has risen to 7.7%<sup>2</sup> and even 13.3%. It has even been estimated to be as high as 20%.<sup>3</sup>

Any of these numbers amounts to a staggering amount of information in the DNA. If the human and chimpanzee genomes are both considered to have 3,200,000,000 (in spite of the chimp having 2 more chromosomes than the human and 10% more DNA)<sup>4</sup> the 7.7% amounts to a 246,000,000 base pair difference. This is the amount of information contained in a book whose thickness is equivalent to about 46 books such as this textbook if it contained nothing but full pages of print from cover to cover. This is a lot of informational difference in the DNA and does not include the 10% additional DNA and two chromosomes the chimp has more than the human. Remember that all of these mutations had to occur in the zygote (one cell) that actually takes place in reproduction.

**Critical Thinking:** If the chimp has 10% more DNA than a human how can it be said that there is only a 7.7% difference? Which of the differences given above is the most reasonable?

If this much information difference exists in the DNA between the chimpanzee and the human the difference between man's ancestor and man must be much larger. Where and how did this vast amount of additional information come about when, as stated earlier, it is recognized by the SETI project that additional coherent information does not come about by accident? It is completely inconceivable that this much coherent information could have been accidentally changed in the DNA of a member of the ape family to get man when the mutational problems discussed earlier are considered. If the transition from ape to man is to be accomplished by mutations, it is apparent that there should be plenty of fossil evidence. Where is the fossil evidence?

There is much disagreement over whether or not "Lucy" is in the ancestral lineage of man. Many reputable paleontologists maintain that she is only a pygmy chimpanzee similar to ones alive today. Paleontologist Adrienne Zihlman, University of California at Santa Cruz says, "*Lucy's fossil remains match remarkably well with the bones of a pygmy chimp.*"<sup>5</sup> Evolutionists such as Charles Oxnard, Sir Solly Zuckerman, William L. Jungers, Jack T. Stern, Jr and Randall L. Susman all concur.<sup>6-9</sup>

1. Britten, R.J., *Divergence Between Samples of Chimpanzee and Human DNA Sequences Is 5% Counting Indels.* Proceedings of the National Academy of Sciences, USA, Vol. 99, 2002, pp. 13633-13635.
2. Watanabe, H. et al, *DNA Sequence and Comparative Analysis of Chimpanzee Chromosome 22.* Nature, Vol. 429, 27 May 2004, pp. 382-388.
3. Weissenbach, Jane, *Differences With Relatives.* Nature, Vol, 429, 27 May 2004, pp. 353-354.
4. Hacia, J. G., *Genome of the Apes.* Trends in Genetics, Vol.17 #11, 2001, pp. 637-645.
5. Zihlman, A.L., "*Pygmy Chimps, People, and the Pundits,*" New Scientist, Vol.104, No.1430, Nov.1984, pp. 39.
6. Oxnard, Charles E., *University of Chicago Magazine,* Winter 1974, p. 11.
7. Zuckerman, Solly, "*Beyond the Ivory Tower,*" London: Taplinger Press, 1970, p. 78.
8. Jungers, "*Lucy's Limbs: Skeletal Allometry and Locomotion in Australopithecus Afarensis,*" Nature, Vol. 297, 24 June 1982, pp. 676-678..
9. Stern and Susman, "*The Locomotor Anatomy of Australopithecus Afarensis,*" American Journal of Physical Anthropology, Vol. 60, March 1983, pp. 279-317.

## Conclusions

What has been covered in this addendum should be kept in mind as one reads through the rest of the textbook. As stated at the beginning of this addendum the author assumes that macro-evolution is true and uses this assumption occasionally to make unsubstantiated statements addressing the origin of different organisms. The reader should always keep in mind the problem of increasing the information content of the DNA when thinking about whether or not these changes are reasonable and/or possible.

Several conclusions should be obvious at this time:

1. It is very misleading to use the term evolution without specifying whether it is micro or macro evolution being discussed.
2. Adaptation or micro evolution occurs at the species level and is provable using conventional scientific tests and principles. It is a fact.
3. The fact that adaptation of species (micro evolution) is true does not imply or prove that molecules to man evolution (macro evolution) occurs any more than the first cool days of October imply or prove that an ice age is beginning or because a person learns something from watching PBS for an hour imply or prove that watching PBS continuously will produce a genius. The major problems that Darwin recognized with his hypothesis are still true plus new ones as science has advanced. Some of these are:
  - Gaps in the fossil record.
  - Cambrian explosion
  - The fossilization process demands catastrophic happenings more violent than what we see today.
  - Similar genes do not necessarily produce similar structures.
  - How new meaningful information can be added to the DNA by random chance happenings.
  - Optical isomers preclude life evolving.
4. Other explanations for what is observed on earth should be examined.