

EVOLUTION ADDENDA  
For chapters 9 and 10  
For the Textbook

**BIOLOGY: Visualizing Life**

by  
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## Why an addendum?

An addendum is necessary because the textbook has been written around the idea that evolution is a major unifying concept of biology. 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 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.

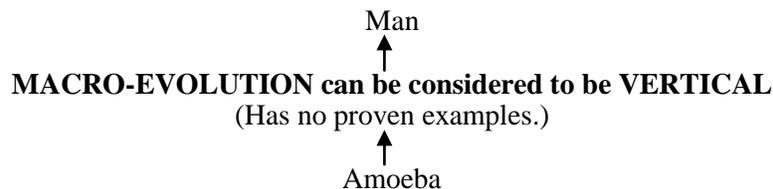
Should the student learn about the theory of evolution? Definitely! It is the dominant thinking of today in the fields related to biology.

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.

## CHAPTER 9

### What is Evolution? Page 178, column 2, last sentence

The textbook author defines evolution as, "*Change in species over time is known as evolution.*" 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. If this is the definition of evolution then certainly it has occurred since things have changed and are changing. However, in today's world this definition is very misleading. 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 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 449) 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

An illustration occurs at the bottom of the textbook page where the author discusses changes in the beaks of finches due to environmental factors. The text implies that the finches have evolved. The finches have adapted to changes in their environment and may be said to have gone through a micro evolutionary change but they are still finches and therefore have not gone through a macro evolutionary change. It cannot be stated that any other types of organisms came into being because of these changes in the finches.

### **The Fossilization Process (The Fossil Record) Page 180**

Based upon macro evolutionary thinking, the order of the fossils in the various layers (strata) has been used to construct a geologic time scale often called the Geologic Column as shown on page 209. This Geologic Time Scale is given as one of the proofs of macro evolution. It was essentially in its present form by 1840. If macro evolution is accurate then the order presented by geology and many biology books is what would be expected in the fossil record. However, there are facts that tend to nullify this assumption. One of them is that many gaps exist in the fossil record. 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, Vo1.86, No.6, June-July 1977, p.24.

### **The Horse Fossils Page 180, column 2, lines 14-32 and Figure 9.5**

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 (Plihippus) 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.

4. 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.

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. 260-261.

3. Marsh, O.C., *Recent Polydactyle Horses*. American Journal of Science, 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.

## Homologous Structures Page 182, column 1, line 11

The textbook makes the statement, "*Homologous Structures are structures that share a common ancestry.*" Homology is 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 shown in Figure 9.6 (p. 182) 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? What is the ancestor? It is not specified. There is no clearly defined set of guidelines so that, basically, the decision depends upon what the observer is attempting to prove.

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 done 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? If the design is good then why shouldn't it be used in multiple applications? After all, this is what good design engineers do.

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

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

3. Ibid. reference number 2, p. 146.

## **Vestigial Structures Page 182, column 1 and Figure 9.7**

Originally, there were thought to be approximately 180 vestigial organs in man. Slowly over the years the number of organs 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 that its use will not be discovered later.

Some people maintain that our tail-bone is a vestige of another way of life. This is no longer a true statement in that 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>

Figure 9.7 reports that the blue whale has vestigial pelvic bones. It is now known that the supposed vestigial legs are not legs but anchor points for specific organs. In the male whale they are an anchorage for the male reproductive organs and in the female an anchorage for the vaginal expulsion muscles.

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

2. H. Kawanishi, *Immunology*, 1987, Vo1.60, p.19-28.

## **Developmental Patterns Page 185, column 1 and Figure 9.8**

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 their macro evolutionary history in arriving at its final state. 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 of 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 9.8. 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 human embryos shown in the Figure 9.8 is a gross misrepresentation of the facts.

The textbook author is very misleading in his figure and statement, "*The similarity of these early developmental forms strongly suggests that the process of development has evolved.*" Advances in embryology have shown that the slits (more properly creases or skin folds) seen under the head of the human embryo are not gill slits as they are in fish. The idea that the human embryo is similar to that of a fish or chicken has been rejected by many scientists.<sup>5</sup> It is now known that the bulge just below the head develops into the thymus gland, the second bulge becomes the parathyroid gland, the next one becomes the middle ear and the fourth becomes the tonsils. Keith Thomson, Chairman of the Yale University Biology Department, said, "*The biogenetic law as a proof of evolution is valueless.*"<sup>6</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.
3. Ibid. for reference 2, pp. 120-121.
4. Ibid. for reference 1, p. 345.
5. E Beck, DB. Moffat and D.P. Davies, *Human Embryology*, 1985, p.172.
6. K. S. Thomson, *Ontogeny and Phylogeny Recapitulated*. American Scientist, Vol. 76, No. 3, May/June 1988, pp. 273-275

## **DNA and Proteins Contain Evidence of Evolution Page 183, column 2**

The author states, "...an organism's history is written in the sequence of nucleotides making up its DNA." In the second 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 macro evolution. What is not said is that these differences also indicate that macro evolution did not happen. Strangely, the differences indicate no gradual macro evolutionary steps 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 in the cytochrome c:

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

Isn't it logical that 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 silkworm moth is compared to its descendants the results are:

lamprey-30, carp-25, turtle-26, pigeon-25, horse-27.

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 silkworm moth and the carp are almost equally separated from all of their 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 its supposed ancestor. Based upon this data cytochrome c does not agree with the concept of macro evolution. The conclusion from the above data is that bacteria, silkworm moths and carp are separate entities with no intermediate forms between them and man. Gaps exist just as they do in the fossil record. Based upon this data, Cytochrome C does not agree with the concept of macro-evolution.

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

## **The Giraffe and Natural Selection Page 187, table 9.1**

The giraffe is truly a marvel of design. The development of such a long neck without the necessary protective features inherent in the animal would be fatal. The basic problem arises because of the tremendous differences in the blood pressure when the giraffe has its head up and when it is drinking

water or eating grass. When the head is up the blood pressure in the arteries carrying blood to the brain is highest in the lower part of the neck. In order to get the blood up to the brain the heart must be large in order to furnish the necessary pressure. When the head is down there is not only the pressure due to the larger heart but also the increased pressure due to the weight of the column of blood in the neck. This increase in pressure will cause the giraffe to have a stroke which would disable it or kill it. There are several adaptations which must all be functional to protect the giraffe. They are:

1. The muscle fiber in the vessels is greater as the head is approached. This allows constriction of these vessels in order to control blood flow and pressure provided nerves are properly wired into the brain.
2. Pressure sensors are located along the vessels in order to detect pressure changes and relay this information to the proper muscles. This means the pressure sensors must be connected to the brain and the brain properly programmed to handle this information. This is not a situation of trial and error.
3. The number of valves in the veins of the neck is increased to control venous back pressure.
4. All of the neck arteries do not supply blood to the brain. A single vessel supplies blood to the brain through a network of very small vessels so that the brain is protected from surges.

**Thinking Critically:** Are any of the above requirements not necessary? How can natural selection account for the necessary genetic changes listed above?

### **The Peppered Moth Page 188**

There are several very misleading statements and experimental errors presented in this discussion of the peppered moth as will be discussed in the next paragraph. However 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. If the term evolution must be used, this is an example of micro evolution and 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, it should be recognized that the moths are nocturnal so that release of the moths in the daylight possibly distorts 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 9.10) 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 Linnaean Society*. Vol.21 (1984), pp. 409-421.

### **How Species Form Page 190 and Figure 9.12**

Care must be taken to recognize that the sparrows presented in Figure 9.12 are ecological races or subspecies as the author states in the last line of the first column of page 191. This means that they can interbreed. The fact that they may at some future time become separate species is an illustration of micro evolution. Because this is possible does not prove that macro evolution is true.

### **Does Evolution Occur in Spurts? Page 192**

The student should notice that gradualism and punctuated equilibrium are both presented as hypotheses. The author does a reasonable job of describing each hypothesis. Only one more factor needs to be mentioned. The need for the punctuated equilibrium hypothesis has been brought about by the recognized gaps in the fossil record. The Harvard paleontologist Stephen J. Gould, who along with Niles Eldridge 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 exist) is the supposed proof of the hypothesis. Contrary to the punctuated equilibrium authors’ wishes, some have extended the hypothesis to include the gaps at higher than the species level.

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 this idea get started in science.
2. There is no plausible mechanism or explanation for the genetic changes that occur.

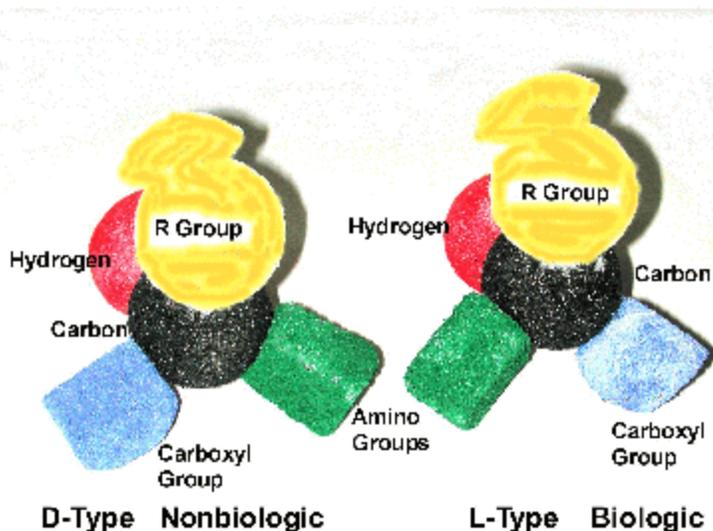
1. Gould, S. J., *Evolution’s Erratic Pace*. Natural History, vol. 86 (May 1977), p. 14.

## CHAPTER 10

### Life’s Building Blocks Page 200, 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, *“readily forms four covalent bonds with other elements.”* In forming an amino acid four different elements or compounds join to a central carbon atom as shown in Figure 1 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 below<sup>1</sup> shows this. The



**Figure 1. Amino Acid Types**

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 which fall into two structural types --- dextro-rotary (D type) and laevo-rotary (L type). The L and D type molecules are mirror images of each other just as our hands are but identical chemically. Notice that if the R Group

and the H atom are taken as a reference by putting the H atom farthest from 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 type of amino acids.<sup>3</sup> In forming a polypeptide the amino acids join to each other by the Amino Group joining with the Carboxyl Group. Since these are common to all amino acids this means that there is no preferential connection of biologic versus 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. Even though the each resultant molecule has the same chemical equation the shapes of the

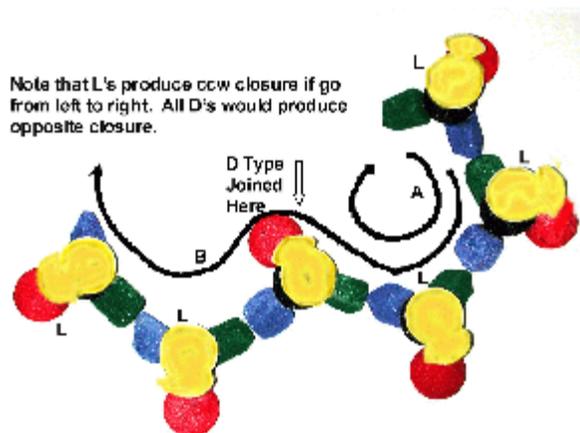


Figure 2. Effect of introducing a D molecule into an L molecule chain

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 which makes the polypeptide shapes different.

(4) Figure 2 shows why a single D amino acid in a chain of L amino acids can cause the resultant protein to be non biologic. Note that not only is the R Group in the opposite direction from that of the L molecules but the shape of the polypeptide has also changed from the closed circular pattern dictated by an all L chain. The three L molecules on the right side of the chain show this circular tendency. It is very important to recognize that the shape of a molecule determines how it will interact with other

molecules.

The textbook Modern Biology (Holt, Rinehart and Winston, 2002) states on page 56 that *“The different shapes allow proteins to perform many different roles in the chemistry of living things.”* This text continues on page 193, *“The function of a protein depends on its ability to bind with other molecules within a cell; that is, the function depends on the protein’s three-dimensional structure, which is determined by its amino acid sequence.”* Dr. Mader states, *“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>

(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.

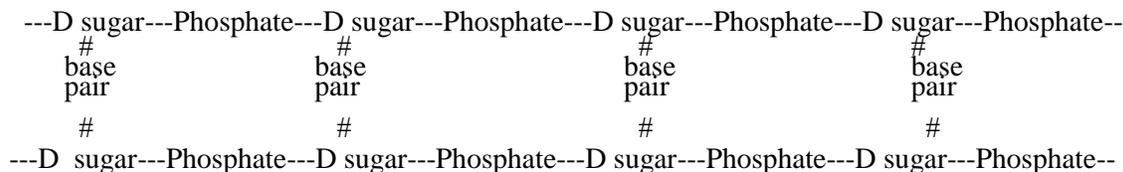


Figure 3. DNA Structure

How proteins formed originally with only L type amino acids and how sugars in the nucleotides (DNA and RNA) formed originally with only D type sugars is an unanswered question. This is particularly puzzling when it is remembered that L and D type sugars occur in equal numbers naturally and show no preference in uniting with phosphates. The same holds true for amino acids. A human chromosome consists of about 65 million base pairs on average which means that there are 130 million D type sugars in the DNA of one chromosome. The human genome contains 6,000,000,000 D type sugars.. Logically, half of these should be L type sugars but there are none.

**Question:** What do the L and D type molecules and the great number of possible amino acids do to the origin of life concept? Support your answer.

1. Idea suggested by Figure 2-16 (p.44) of G.J. Tortora, B.R. Funke, C.L. Case, *Microbiology: An Introduction*. Benjamin Cummings, 1989, Third Edition.
2. Tortora, G.J., Funke, B.R., Case, C.L., *Microbiology: An Introduction*. Benjamin/Cummings, 1989, Third edition, p. 44.
3. Cohen, J.. "Getting All Turned Around Over the Origins of Life on Earth." *Science*, Vol. 267 (1995), pp. 1265-1266.
- Bonner, W., "Origins of Life." 1991, Vol. 21, pp. 59-111.
4. Mader, S.S., *Biology*. McGraw Hill, Seventh Edition, 2001, p. 37 and 47.

### **Early Atmosphere Page 200, column 1, line 25**

The geologic evidence does not back up the statement of the author, "*At this time, there was no oxygen in the air, instead, the atmosphere was rich in hydrogen and many other gases that spewed out from the many volcanos.*" Many primordial sediments contain red minerals which are metal compounds of oxygen indicating oxygen was present at the time of their formation. There is geologic evidence that the earliest rocks (dated at 3.7 b.y.) existed in an oxygenic atmosphere<sup>1</sup> so that the formation of amino acids in any significant concentration in the atmosphere was not possible since amino acids combine readily with oxygen.

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

### **The Miller Experiment Page 200, column 2**

The famous Miller-Urey experiments supposedly proved that life could have evolved. The apparatus is shown in Figure 10.2 on p.200. One of the problems of this experiment was that the experiment produced both D and L type amino acids and 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 from getting back to the original gases since the biologic amino acids formed would react with the excess gases and form non-biologic compounds. There is no mechanism in nature that can perform this separation task.

Their experiments 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 the author reports, still other scientists have devised experiments which have produced still other compounds in living organisms. All of the cited experimenter's 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. Ibid, pp. 20-39.

### **RNA Chain Formation Page 201 and Figure 10.3**

Figure 10.3 oversimplifies and incorrectly represents the problem of assembling RNA chains. First it should be recognized that Figure 10.3 does not represent nucleotides but only the base part of a nucleotide. An RNA nucleotide consists of a base, a phosphate and a ribose sugar which can be in either the "L" or "D" form. This considerably complicates the problem because only "D" or right handed sugars are present in most living organisms. If a left handed sugar appears in the chain then the RNA chain that might be formed is non-biologic. This drawing is very misleading in that it represents a non-realistic situation. The general idea of the figure is correct in that RNA chains have been observed as reported 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 that may be able to make copies of themselves are of no use unless they are able to make a biologic protein. Even the formation of a biologic polypeptide is of no consequence compared to the complexity of the first living organism.

### **Coacervates Page 202, column 2**

Dr. Johnson suggests that because coacervates appear "much like the lipid bi-layer of the cell membrane" they must have been a part of the early evolutionary process. Creationists disagree with this reasoning and point out that the need for an enclosing membrane simply reinforces the incredible complexity of living organisms that could have come about only by design. The membrane enclosing cells is much more complex than a balloon for instance in that it has openings which allow certain chemicals to pass in and out and reject others. Fox, et al. point out that coacervates are readily dissolved with changes in PH, heat and dilution and are easily broken up by agitation.<sup>1</sup> What this means is that coacervates occur under laboratory conditions and are rarely, if ever, found in nature. It should also be recognized that the difference between the cell membrane and the coacervate is unbelievably large. If a cell were placed inside a coacervate instead of its own membrane it would not live because there would not be any way to get nutrients into and waste out of the cell.

1. Fox, Harada, Krampitz, Mueller, *Chemical Engineering News*. June 22, 1970, p. 80.

### **Early Life in the Sea Page 203**

The origin of life is not discussed except in a very superficial manner which leads the textbook reader to believe that it was very simple and obvious. Nothing could be further from the truth. The rest of this chapter discusses the appearance of the different organisms as though macro evolution is true. There is no clear evidence that macro evolution has ever occurred when all of the previously cited facts are considered.

The textbook hypothesizes that the beginning of early life on earth was very primitive as evidenced by the statement that "*the first organisms to appear on the planet were bacteria, which are single-celled prokaryotes.*" (Top of page) 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. How could this have happened accidentally? The step from inanimate organic compounds to a living organism is beyond man's ability to create.

In the world as it presently exists, life could not have evolved. Why? The presence of oxygen in the atmosphere precludes the formation of amino acids and the formation of polypeptides, proteins, ATP, nucleic acids in DNA and lipids.<sup>2</sup> Oparin attempted to solve this problem by proposing that if the atmosphere contained water vapor, hydrogen, methane and ammonia without any oxygen then energy from the sun and lightning would cause amino acids that would drop into the oceans and form a primordial soup from which life might have evolved. This is what led to the Miller-Urey experiments. Even though there is abundant evidence that oxygen was in the early atmosphere (see #1 below). The only part of Oparin's hypothesis that has been proven by experiment is that the gases he listed (methane, ammonia, hydrogen and water vapor) can be made to form amino acids. Most of the amino acids formed are not biogenic. Some of the problems regarding the origin of life under this hypothesis are:

1. The geologic evidence indicates that the necessary atmosphere **without any oxygen** was not present. Many primordial sediments contain red minerals which are metal compounds of oxygen indicating oxygen was present at the time of their formation. There is geologic evidence that the earliest rocks (dated at 3.7 b.y.) existed in an oxygenic atmosphere<sup>3</sup> so that the formation of amino acids in any significant concentration in the atmosphere and therefore in the ocean was not possible<sup>2</sup>.
2. Ultraviolet light breaks down the Oparin gases methane and ammonia, two of the three necessary building blocks of amino acids. The concentrations of these building blocks would have been reduced quickly to such a low level that they could not have played an important part in amino acid formation.
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 in section 10.2 (page 203) 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 amino acids<sup>8</sup> and sugars. 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. There is no natural process for separating and isolating L and D molecules. 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. 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 evolution to take place evaporate<sup>4</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 accurately 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 evolution could take place because many more proteins are needed to have even the simplest living organism.

6. Natural selection only operates 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>5</sup> "*But it has not proved possible to synthesize plausibly prebiotic 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>7</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.

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 stated earlier, 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 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.
2. S. Fox & K. Dose, *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 American 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. Horowitz & Hubbard, *The Origin of Life*, Annuals of Genetics, Vol. 8 (1974), p. 393.
5. Ferris, et al., *Synthesis of Long Prebiotic Oligomers on Mineral Surfaces*, Nature, Vol. 381, 2 May 1996, pp. 59.
6. Ferris, et al., *ibid.* number 5.
7. Abelson, *Chemical Events on the Primitive Earth*, Proc. National Academy of Sciences, Vol.55 (1966), pp.1365,1369.
8. Cohen, J.. "Getting All Turned Around Over the Origins of Life on Earth." Science, Vol. 267 (1995), pp. 1265-1266.

## The Unbreakable Cycle

There is an unbreakable cycle in all cells and bacteria that makes any possibility of macro evolution coming about 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.

## Dawn of the Eukaryotes Page 204

The rest of this chapter presents the appearance of different organisms as though it was routinely going on. In order to have different organisms there must be changes in the DNA. The generally accepted theory is that mutations are responsible for changes in species over long periods. It is believed 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. Some simple reasoning will show why.

It is known that duplication (replication) errors are extremely rare. There is no more than one error in 4,000,000,000 units when copying the entire human DNA (genotype).<sup>1</sup> 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>2</sup> Generally it takes about 5 mutations to make a significant physical change in an organism.<sup>2</sup> Note that



be 1,536,000 bases in the DNA (human has 3,000,000,000). There is also a sugar and a phosphate for each base. A mutation in the amino acids, sugars or phosphates will not be passed on since the mutation must be in the bases of the DNA to be passed on. So the odds of having a mutation occurring in the "right place" is much less than one in 1,536,000. Add to this the fact that only one mutation in one thousand is beneficial and it becomes clear that duplication errors do not provide an abundant source of mutations for evolutionary change.

Consider these facts relative to the supposed ascent of a complex organism like man from the ape family. Many sources report that the DNA of man and his supposed ancestor differ by only 1%. This means that the DNA of man has 30,000,000 base pairs different than his supposed ancestor (1% times 3,000,000,000 base pairs). This amounts to the amount of information contained in eleven textbooks like this one. It is assumed that the human genome consists of three billion base pairs as the text maintains. Where and how did this vast amount of additional information come about? It is completely inconceivable that this much coherent information could have been accidentally added to the DNA of a member of the ape family by purely random mutations when most mutations are not beneficial. If the transition from ape to man is to be accomplished by mutations, it is apparent that there should be plenty of fossil evidence. The evidence is very limited.

Another factor that must be considered is the amount of time necessary to establish a trait after it has evolved. For instance, chimpanzees are all flat footed. If enough mutations occur at one time to make a chimpanzee with an arch like humans have, how long will it take to establish a small population of chimpanzees with arched feet? This chimpanzee will mate with one who does not have the same gene and according to Mendel's laws of heredity probably will not have an offspring with the same characteristic. It will be quite a few generations before this trait will begin to show up with any regularity unless the chimpanzees with the arched feet gene only mate with each other. This is very unlikely. If a mutation could become dominant in 10 years (an actual impossibility for members of the chimpanzee family) and there are 30,000,000 mutations required to have man then 300 million years would be needed under very unusual and unique conditions for man to have come from the chimpanzee family. Since evolutionists claim that the supposed ancestor of modern man came on the scene about 4 million years before man not nearly enough time has elapsed to have established a small population of man under this condition. If the number of mutations, the small probability of a beneficial mutation and the difficulty of establishing a population are all considered, it is inconceivable that man could have evolved from the chimpanzee.

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>6</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>7</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 paper'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 an 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. Hickman, Hickman, and Hickman, *Integrated Principles of Zoology*, C. V. Mosby Co., (1979), p.872.
2. Ambrose, E., *The Nature and Origin of the Biological World*, (1982), p.120-121.
3. Dodson, E., *Evolution: Process and Product*, (1960), p.225.
4. Smith and Wood, *Cell Biology*. Chapman and Hall, 1996, p. 121.
5. Smith, *Cell Biology*. Academic Press (1971), p.86.
- 6,7. Rifkin, *Algeny*. (1983), p.134.

## 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 authors assume that macro-evolution is true and use 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.

Now that the end of this addendum has been reached several conclusions should be obvious such as:

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. .