EVOLUTION ADDENDUM

For Chapters 1, 2, 4, 8, 10, 12, 13, 14
In the Textbook

Biology:
Living Systems

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Why an Addendum?

An addendum is necessary because the authors have written the text around the idea that evolution is an essential part of biology. It should be remembered that "*Biology is the study of life*." (Page 1) 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 first section on evolution in this addendum (page 1) 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 1
What is Evolution? Page 20. (Unity Within Diversity)

The statement, "*Change in an organism over time is the meaning of evolution*" is a very broad definition that is very deceptive. This definition is very misleading in that it ignores the fact that there are varying degrees of *modification* or change which are often spoken of as micro and macro evolution. Darwin observed that species change or adapt to their surroundings. He also observed that natural

⟺ **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.)

selection was a very strong driving force that could 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. The textbook says on page 21, "*The first forms of life gradually gave rise to other new forms, which in turn evolved into still other kinds of organisms."* This defines macro evolution.

Man

⇧

MACRO-EVOLUTION can be considered to be VERTICAL

(Has no proven examples.)

⇧

Amoeba

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 377) 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.

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.

Chapter 2
Laws and Theories Page 42.

The authors state, "*For example, Charles Darwin's explanation of how evolution occurs through natural selection is known as a theory because it guides scientists in their understanding of how changes in organisms occur."* This statement is completely correct if the word "micro evolution" is substituted for "evolution." As will be brought out later it is necessary to add information to the DNA of an organism if it is to go up the so called evolutionary ladder. Natural selection is a passive phenomena that has nothing to do with the existing DNA. It therefore can only operate or select from the characteristics present as a result of the existing DNA. It cannot add information to it and so has relevance only to micro evolution. For a better understanding of the problem refer to the discussion for Chapter 10 on mutation on the bottom of this page and for Chapter 12 on natural selection on page 9.

Chapter 4
The Cell Theory Page 91.

The statement, "*The cell theory fits the theory of evolution. All organisms are descendants of an original organism, which was a single cell.*" does not follow from the definition given on this page. The "cell theory" as given in the textbook is a statement of observable fact and does not address the question of how or why the cells are the way they are found. It does not address the problem of their origin.

Chapter 5
Evolution of Eukaryotes - Summary Pages 136-7, 140.

The student should have the information from Chapter 9 to fully understand the implications of what is proposed. The authors partially address the problem when they comment on page 137, "*This model of the origin of eukaryotes is logical and appealing but incomplete. How, for example, did the nuclear membrane, the various membrane-bound organelles, and the other eukaryotic cell structures evolve? These questions have not yet been answered."* The Table 5.2 indicates the tremendous differences between the prokaryote and eukaryote.

Thinking Critically: Is it logical to think that all of the changes in Table 5.2 could have come about by random chance happenings?

Chapter 10
Mutation Page 261.

In order to properly understand the process by which organisms change and its implication regarding the theory of evolution it is necessary to review this section from Chapter 10.

The text defines a mutation as "*when mistakes in the replication of genetic material occur, a daughter cell will contain genetic material different from that of its parent cell.*" This statement is misleading in that it implies the phenomena is deceptively simple. Since mutations are supposedly the source of information for evolution it is mandatory to clearly understand exactly what they are and what they are not. Recognize that the definition concerns changes in genetic information but that meaningful coherent 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 10 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 imply or 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 (macro-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 that that of the H-39 Mycoplasma - one of the smallest bacteria now called a mollicute.[1] To put this in perspective the mollicute (H-39 mycoplasma) DNA (768,00 base pairs) [2] 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) [3] 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 "nonfunctional DNA" (p. 258) but it is becoming more and more apparent that the nonfunctional DNA is really "functional" and is not junk. It is not good science to label something is nonfunctional on a biologic organism just because its function is not known or understood at the time. It is now known that some DNA does not code for functional polypeptides. It is made up of introns, promoters, terminators and telomeres [4] which are functional parts of the DNA. These segments are made up of introns and exons (p. 253) which are 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, deletions, transposons, point and frameshift 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, adding two or more identical chapters or adding a chapter from another book add new meaningful information? The textbook may contain more pages but does it contain more meaningful information? No! 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 may decrease the information in DNA but it cannot increase it.

. 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.[5] 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. 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. [6] Generally it takes about 5 mutations to make a significant physical change in an organism. [6] 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. [7] **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 favorable mutation. The odds of doing this are 1295 to one. This is about the same as the odds mentioned above for a beneficial mutation. All other combinations on the dice represent unfavorable or neutral mutations. The textbook indicates that a majority of mutations are fatal so assume that any time four of any number, other than one, comes up on the dice the organism dies instantly. This means that only five out of the 1296 mutations are considered to be instantly fatal. Compared to the textbook statements this is a very generous assumption. The rest of the combinations represent unfavorable or neutral mutations which do not normally kill the organism but if enough of these mutations do occur then the organism will be weakened and die. Assume twenty unfavorable or neutral mutations will kill the organism so that if twenty rolls of the dice do not yield four ones or four of a kind then the organism dies and the evolutionary process must be started over. To keep track of your progress use the line below. The point A represents the original organism and point B represents the organism after 5 mutations. Remember that arriving at point B does not signify a new species.

A----------x----------x----------x----------x----------**B**

Do you think that you can ever get to point B? Try it! You will quickly convince yourself that it is essentially impossible. The odds of getting to the first x is one in 1295 and for getting between points A and B the odds are one in 3600 trillion if done in 5 *consecutive* dice rolls. The odds of winning the Power Ball Lottery are much better than this. Remember that even if you do feel you could get to point B this does not prove evolution because this has to happen **many** times to get a new species. If twenty mutations were necessary to have a new species there is only one chance in 100,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000 of having it happen. Winning the Power Ball Lottery six consecutive times has about the same odds. When only these two facts are considered it should be apparent that macro-evolution is unlikely, if not impossible.

Next, let us reconsider the statement that "*This proofreading prevents most errors in DNA replication. Indeed, only one error in 1,000,000,000 nucleotides typically occurs.*" [8] It must also be recognized that unless the mutation occurs in a **sexually reproductive cell** (gamete) **that has been fertilized** the change in information will **not** be passed on. The mutation must occur in an egg, sperm, seed, pollen, etc. Even in one of the smallest organisms like the H-39 mycoplasma (a bacterium now called a mollicute [1]) the odds of this happening are unbelievably small. Consider the following: H-39 mycoplasma contains about 256,000 amino acid bondings in a particular order (human has about one billion) to

make 640 proteins having an average of 400 amino acid bondings each.[9] Since there must also be DNA if the mycoplasma is to replicate there must 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.

Another factor that must be considered is the amount of time necessary to establish a trait after it has evolved. For instance, apes are all flat footed. If enough mutations occur at one time to make an ape with an arch like humans have, how long will it take to establish a small population of apes with arched feet? This ape 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 of inbreeding before this trait will begin to show up with any regularity unless the apes 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 ape family) and there are 150,000,000 mutations required to result in man (see section on human Evolution on page 18 of this addendum) then 300 million years would be needed under very unusual and unique conditions for man to have come from the ape family. Not nearly enough time has elapsed to have established a small population of man under this condition since evolutionists claim that the supposed ancestor of modern man came on the scene about 4 million years before man. 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 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[10], 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 [11] 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.
10,11Rifkin, Jeremy, *Algeny.* (1983), p. 134.

The Fossil Record Page 307 and Figure 12-1.

Many gaps exist in the fossil record (see punctuated equilibrium discussion). 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]."* [1] 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*." [2]

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.

Homologous Parts Page 309

The textbook makes the statement, *"The commonality suggests that these and other vertebrate animals are all related. They probable evolved from a common ancestor that had the same basic limb structure."* Homology is one of the proofs proposed for 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 12-3 (p. 309) as being similar if you were given all of them in a bag with no labeling? Upon close examination of the differences in 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 length, 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."* [1] 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).[2] Also, the fore limbs of the newt, lizard and man develop from different parts of the embryo.[3] 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 unnamed ancestor? Does it exist?

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?

Thinking Critically:
1. Look carefully at the differences in the bone structure of the various organisms in Figure 12.3. Can these differences be achieved via chance based evolutionary processes?

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 310

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 that its use will not be discovered later.

The authors maintain that the human appendix is a vestige of another way of life. This is no longer a true statement. The appendix is also listed as being vestigial but the medical profession now knows that it plays a functional role in the immune system. [1]

It is also reported that the whale has vestigial pelvic bones. It is now known that the supposed vestigial legs are not legs but anchor points for specific organs and therefore not vestigial. In the male whale they are an anchorage for the male reproductive organs and in the female an anchorage for the vaginal expulsion muscles.
For a more complete discussion of the supposed existence of legs on a whale see reference 2 below.

The textbook asserts that the two pig toes that are shorter than the two toes on which they walk have no purpose and are therefore vestigial. Actually the so called "extra toes" serve the purpose of strengthening the leg for running just as they do for a horse. This concept is used today in plywood. The laminating process strengthens the wood so that it can be used in places where high strength is required but the space does not allow for larger pieces of wood.

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

Evidence from Embryology Page 312 and Figure 12-5.

In 1891, Ernst Haeckel produced a series of drawings of vertebrate embryos proposing that they represent a kind of tree of life [1] as the authors point out. The drawings supposedly showed that all vertebrates pass through all of its macro evolutionary history in arriving at its final state and therefore 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. [2]

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 [3], "*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 Hackel'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)" [4] as reported by Pitman and shown in Figure 12-5.

It is important to recognize that this one appearance of similarity is true for this case only and indicates nothing since the embryos are very different for earlier and later development stages. Based

upon this fact the similarity between the human and pig embryo shown in the figure is a gross misrepresentation of the facts.

The textbook author is very misleading in the figure and its statement, *"If you viewed an early human embryo and an early pig embryo side by side under a microscope, you'd have a hard time telling them apart."* 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."* [5]

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

Comparative Biochemistry Page 312

The author uses a relative comparison of hemoglobin to infer that macro evolution has taken place with the statement, "*It appears then that humans and chimpanzees have a more common ancestor than do humans and dogs."* To use just one factor such as hemoglobin for comparison of different organisms is very misleading and inaccurate since it is such a small portion of the whole genome. Dr. Jonathan Marks of the Department of Anthropology at the University of California, Berkeley points this out very clearly with the following:[1] *"The focus on base pair mismatch itself is misleading, for it encodes a number of archaic assumptions about genetics and evolution. In fact, it ignores what is quite possibly the most significant development in biology in the last quarter-century - namely, the complexity of genome structure.*

If humans and chimpanzees are over 98% identical base for base, how do you make sense of the fact that chimpanzees have 10% more DNA than humans? That they have more alpha-hemoglobin genes and more Rh bloodgroup genes, and fewer Alu repeats, in their genome than humans? Or that the tips of their chromosomes contain DNA not present at the tips of human chromosomes?

Obviously there is a lot more to genomic evolution than just nucleotide substitution. But the percentage comparison renders that fact invisible, and thus obscures some of the most interesting evolutionary genetic questions."

Based upon the remarks of Dr. Marks it should be obvious that the statement by the textbook author is highly speculative at best.

1. Jonathan Marks, *What It Really Means To Be 99% Chimpanzee*. Annual Meeting of American Anthropological Association. November 20, 1999. <http://personal.uncc.edu/marks/interests/aaa/marksaaa99.htm>

A Basis for Relationships Page 314 and Figure 12-7

The previous discourse on Comparative Biochemistry also applies to the statements and figure in this section. The reader should also read the section on Human Evolution on page 17 of this addendum.

Direct Observation Page 314

The changes referred to in this section regarding bacteria becoming resistant to antibiotics, weeds and insects becoming resistant to pesticides proves that the gene pool of these organisms is large enough to allow the changes necessary to continue their existence. They have adapted or changed at the species level. It must be recognized that the bacteria, weeds and insects are still recognizable as being the same species or variety and therefore are not examples of macro evolution nor do they indicate that macro evolution is possible.

Natural Selection Page 320

The authors aptly point out that what Darwin observed was natural selection. It has taken place over the centuries and is an observable fact. Living organisms do adapt to their environment because of

environmental conditions. This is what is called natural selection and operates only at the species level or in some cases the genus level due to classification difficulties. It must be recognized that natural selection has no direct effect upon the DNA. The authors Campbell, Mitchell and Reece point this out on page 9 of *Biology: Concepts and Connections* (Addison Wesley, 2000) with the statement, "*Here we see that natural selection is not a creative process, but an editing mechanism*." It simply selects from the existing gene pool. It definitely cannot directly add DNA which has meaningful information to what already exists, a very necessary happening if macro-evolution is to take place. **It only affects micro-evolution**. Actually, natural selection restricts or may remove information from the gene pool. It acts to stabilize a species and provide for its survival.

Earth's Early History and The Origin of Life Page 324

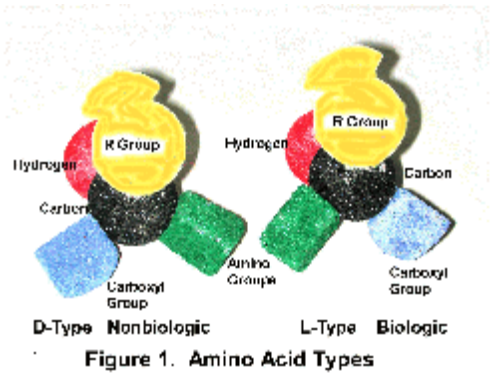

Figure 1. Amino Acid Types

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[1] below - a Hydrogen atom, a Carboxyl Group (COOH), an Amino Group (NH_2) and an R Group which is a carboxyl/hydrogen based unit. The composition of the "R Group" 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 1below 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 which 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. [2]

(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.[3] 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 1and 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 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

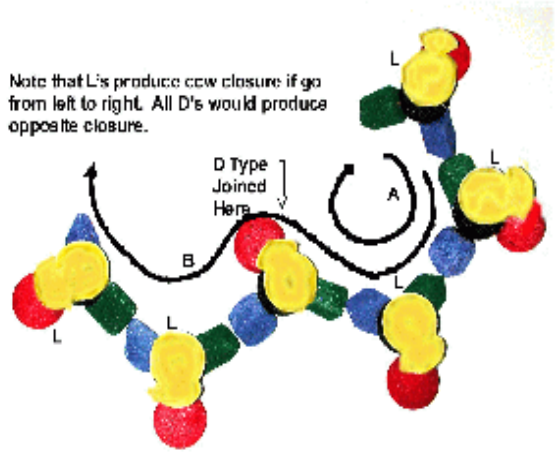

Figure 2. Effect of introducing a D molecule into an L molecule chain .

biologic. Note that not only is the R Group (yellow color) in the opposite direction from that of the L 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."* [4]

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.

---D sugar---Phosphate---D sugar---Phosphate---D sugar---Phosphate---D sugar---Phosphate--
# # # #
base base base base
pair pair pair pair
# # # #
---D sugar---Phosphate---D sugar---Phosphate---D sugar---Phosphate---D sugar---Phosphate--

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." 1991,21, pp.59-111.
4. Mader, S.S., *Biology*. McGraw Hill, Seventh Edition, 2001, p. 37 and 47.

Early Atmosphere Page 324

It is instructive to consider this and the next topics regarding the origin of life even though the previous discussion indicates molecular evolution is impossible.

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. [2] 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. Oparin did not include oxygen as an atmospheric gas because amino acids react readily with oxygen to form non-biologic compounds. His hypothesis led to the Miller- Urey experiments. There is, however, abundant evidence that oxygen was in the early atmosphere. Miller-Urey did prove by their experiment that the gases Oparin listed (methane, ammonia, hydrogen and water vapor) can be made to form amino acids (see next section). Most of the amino acids formed were not biologic. This makes the formation of a biologic compound impossible for reasons given in #4 below. Some more 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 metallic 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 [1] so that the formation of amino acids in any significant concentration in the atmosphere and therefore in the ocean was not possible.[3]
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 because the no oxygen hypothesis implies there was no ozone layer to reduce the ultraviolet intensity.
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 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 [4] 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 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 [5] 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 evolution could take place 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. [6] How can the water be removed when everything is in water. Ferris states this scientifically as,[7] *"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. [8] 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*, Annuals 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, etal., *Synthesis of Long Prebiotic Oligomers on Mineral Surfaces*, Nature, Vol. 381, 2 May 1996, p. 59.
8. Abelson, *Chemical Events on the Primitive Earth*, Proc. National Academy of Sciences, Vol.55 (1966), pp. 1365, 1369.

The Miller Experiment Page 325

The famous Miller-Urey experiment supposedly proved that life could have evolved. The apparatus is shown in Figure 12-15 on p. 325. 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. [1] 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 [2] have done similar experiments with other sources of energy and formed many other biologic and non-biologic compounds but with similar results. 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.

Polymers Evolve Page 326

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 12 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. As mentioned earlier one of the smallest prokaryotes (H-39 strain of mycoplasma, a bacterium) consists of 640 proteins whose average length is 400 amino acid bondings. [1] 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 poly-peptides 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 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." [1]* 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.[2]

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.

An Explosion of Life Page 329

The author describes an explosion of life that occurred in the Paleozoic Era. What is not brought out is that this explosion occurred over a relatively short time (generally considered to be 5 to 10 million years) at the beginning of the Paleozoic Era. It is called the Cambrian Explosion.

The Cambrian Explosion is one of the mysteries of geology in that, as the authors state, *"most animal phyla evolved."* They fail to comment that this is a most unusual happening and is one of the mysteries of geology in that these 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.*" [1] 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*." [2] 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.*" [3]

1. Dawkins, Richard, *The Blind Watchmaker.* New York: W. W. Norton, 1987, p. 229.
• Stephen J. Gould of Harvard . *A Short Way to Big Ends*, Natural History, Vol. 95 #1 (January 1986), p. 18 - 28.
2. Shawver, Lisa J., *Trilobite Eyes: An Impressive Feat of Early Evolution.* Science News, Vo1.105, (2 February, 1974), p. 72.
3. Darwin, Charles, *On the Origin of Species.* Harvard University Press, 1964, p. 308.

Chapter 13

The first two sections of this chapter describe different things that influence or determine how and when speciation (micro evolution) occurs. It must be recognized that this offers no actual support of or proof of "molecules to man" (macro) evolution. In order for "molecules to man" evolution to occur there must be additional meaningful information added to the existing DNA. Polyploidy (page 346) does not add information but repeats information already existing in the DNA. The results are therefore still recognizable as variants of the existing species from which they came. Please note that the examples of Darwin's finches and the Hawaiian honeycreepers are simply examples of adaptations within a species which are still recognizable as being within the original species from which they came.

Punctuated Equilibrium Page 350

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 has been brought about by the recognized gaps in the fossil record. The Harvard paleontologist Stephen J. Gould, who along with Niles 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." [1]

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.

Human Evolution Pages 352

The textbook author states on page 352 that "*Humans are products of evolution by natural selection."* The entire section 13-3 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 a common 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.[1] This information was obtained by comparing approximately 1% of the genome and considered mutational substitutions, insertions and deletions. As more of the genome is considered the difference has risen to 7.7% [2] and even 13.3%. It has even been estimated to be as high as 20%.[3] The much publicized number of 1.4% was obtained by considering only substitutions.

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 base pairs (in spite of the chimp having 2 more chromosomes and 10% more DNA than the human) [4] the 7.7% amounts to 246,000,000 base pairs different. 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**. 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? The gap is real.

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.*" [5] Evolutionists such as Charles Oxnard, Sir Solly Zuckerman, William L. Jungers, Jack T. Stern, Jr and Randall L. Susman all concur. [6-9]

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 #21, 2002, pp. 13633-13635.

2. Watanabe, H. et al, *DNA Sequence and Comparitive 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.

Chapter 14
Classifying Based on Structure (The Horse Series) Page 370

The author states and Figure 14-4 supposedly indicates that, "*The fossil record shows clearly the evolution of the horse."* There is much evidence against such a statement as is indicated below to the extent that reputable evolutionists believe it should be discarded. 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.[1]

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 14-4 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).[2] This completely contradicts Figure 14-4.

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. [3]

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. [4]

7. David Raup, Curator of the Museum of Natural History, where approximately 20% of the world's fossils are housed, comments ,[5] "*.....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.

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.

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.

