EVOLUTION ADDENDUM

For Chapters 3, 4, 28, 29
In the Textbook

BIOLOGY

AN EVERYDAY EXPERIENCE

by

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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. This book is unique in that it does not mention the word evolution until chapter 29 out of a total of 32 chapters. It does, however, introduce concepts in earlier chapters which are not completely true as stated but that are considered fundamental to evolution theory. These need to be elaborated upon in order to be fully understood.

It should be remembered that biology is the study of living things. Is it 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? Many biologists agree that the 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 Unit 5 defining evolution in this addendum (page 4) 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 some of this material.

Chapter 3
3.3 How Scientists Classify Today
Other Evidence Used in Classifying Page 58, Figure 3-7

The textbook authors state that, "*Similar body structures often show that living things have common ancestors. This is important in classification. You can see in Figure 3-7 that the front limbs of a human (a), a cat (b), a horse (c), a bird (d), and a bat (e) are similar in their bone structures. These similarities show a common ancestor.*" It is true that similar body structures are used in classifying living things but this does not show that a common ancestor is indicated. This is an assumption and not fact. Consider the following.

If you were given all of the top bones shown in Figure 3-7 in a bag would you consider them to have a common ancestor? Upon close examination of the differences in the bones it should be noted that they are not similar at 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. It should be noted that similar genes do not necessarily form similar structures as is documented on the next page.

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. The similarities supposedly noted are also explainable as the result of design.

Note: The following paragraph contains word usage and information that exceeds the background of the student at this point in the textbook but should be remembered later on in the course and is included so that the reader will know that genetic information exists to substantiate the idea that visual similarity in structure does not indicate common ancestry.

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 have found it necessary to develop the special term analougous structure to describethem. 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.

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

Chapter 4
Section 4.2, Monera Kingdom - Traits of Bacteria Page 80

The textbook authors state, "*Some bacteria move with a long, whip-like thread called a* ***flagellum*****."** It should be pointed out that "other bacteria" move by means of motors. Research has shown that the motors that drive these flagella and the accompanying control mechanisms require about forty different proteins beyond what is found in eukaryotic flagella. The motor has two bearings, is reversible, varies in speed between 9,000 and 18,000 rpm but the flagellum only rotates between 300 and 600 rpm. The motor is almost 100% efficient and yet is so small it cannot be clearly seen in a light microscope. [1]

Thinking Critically: Could this motor and its control system have been formed by random single steps or must it have come about by multiple steps occurring at the same time?

1. Behe, Michael, *Darwin's Black Box*. Touchstone Press (Simon & Schuster), 1996, pp.69-73.
! Lipkin, R. *A New Twist on Bacterial Rotary Engines*. Science News, Vol. 144, December 1993, P. 388.
! Blair, David, *Testing the Limits of Flagellar Motors*. Biophysical Journal, Vol. 65, November 1993, pp. 1751-1752.

Chapter 28
Section 28.1, The DNA Molecule - DNA Structure Page 586

Note to the teacher or reader: This material is beyond the scope of this elementary Biology textbook but possibly could be useful in answering some questions.

The sugars that connect the ladder rungs in a DNA molecule and the amino acids that make up the proteins of living things are optical isomers which are called chiral molecules. The proteins which make up living things are made up of amino acids which are chiral molecules. A chiral molecule is one that can exist in one of two forms but has the same chemical equation. The two molecules are mirror images of each other just as our hands are mirror images of each other. These molecules may be referred to as being either right or left handed. A more detailed explanation of this is contained in the previously listed textbooks under "Origin of Life." The term 8-10 means book 8 and addendum page 10.

The sugars in DNA and RNA molecules are all right-handed and the amino acids in proteins are all left handed molecules even though equal numbers of right and left-handed sugar molecules and amino acids exist naturally. This handedness is very important in molecular structure because it affects the shape of the molecule. In the DNA a single left-handed sugar will not allow the DNA to coil so nicely as shown in Figure 28-3, page 589 of the textbook. The ultimate result will be tangling of the DNA molecule strands as it is uncoiled and recoiled in the reproductive and gene making stages. In the case of proteins a right-handed amino acid changes the shape of the molecule and may make the molecule completely non-functional. 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."* [1] This textbook's authors indicate the same idea when they say on page 591, "*A change in just one pair of DNA bases can change a living thing's traits."*

1.. Mader, S.S., *Biology*. McGraw Hill, Seventh Edition, 2001, p. 37 and 47.

28:2 How the Genetic Message Changes Page 595
Mutations

In the first paragraph the authors state *"Sometimes errors happen when chromosomes are copied"* and *"A mutation is any change in copying the DNA message."* These statements are misleading in that they imply 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 and that these changes must be meaningful coherent information 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 radio of today to the computer require additional coherent information or is the computer simply a rearrangement of the information required to build a radio? In other words, if you had the detail plans to build a radio could changing individual letters, swapping paragraphs or pages around one step at a time in a purely random manner result in plans to make a computer? Remember that the plans must always be those of an operating circuit. If not, then this would be similar to a fatal mistake in the evolutionary process and the whole process must start over. As an Electrical Engineering Professor let me assure you that it is impossible since new coherent information is needed to produce the needed new circuits.

The rest of section 28.2 mentions different mutation mechanisms and forces that cause changes in genes and therefore changes in organisms at the species level. It must be recognized 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 than that of the H-39 Mycoplasma (one of the smallest bacteria now called a mollicute [5]) - one of the smallest bacteria. To put this in perspective the mollicute DNA (768,000 base pairs [6]) has the amount of information contained in the first 148 pages (p. 124 plus the first 24 pages of introduction) of this text if every page were covered by nothing but print with **no** spaces, columns, pictures, graphs or headings similar to this page. The size of the pages would be the same as in the appendices without the red stripe across the top. The information content in the DNA of man (3.2 billion base pairs [1]) is the same as 802.2 books like this text with **nothing but text** on the pages as just described. Some might argue that the above numbers are highly exaggerated because of what some call "junk DNA" but it is now known that the so called "junk DNA" is not junk. It is made up of introns, promoters, terminators and telomeres [2] which are functional parts of the DNA. A major question is where did all of this additional information come from by random chance happenings to fill the 802 additional books?

To understand the problem consider the following. There is no known mutational mechanism that will increase the information content of DNA in a **meaningful manner**. In other words, transposons, point and frameshift mutations, duplication errors, jumping genes, extra chromosomes do not add **meaningful** information to the DNA. Viral or bacterial invasion may add information but the chances of it being **meaningfu**l is zero if it is added **in a purely random manner**. Think about this problem with respect to this textbook. Does mixing sentences, letters, paragraphs, errors in copying, mixing up chapters or adding two or more identical chapters add information? No! The textbook may contain more pages but does it contain more information? A chapter or sentences from another book may be added so that there is more information but is it meaningful information? Is it likely to contribute to the sense of the original book? It is inconceivable that meaningful information can be added to accomplish the bacteria to man requirement of macro-evolution by random chance happenings particularly when the number of times it must happen and the fact that it must occur in the cell that takes place in reproduction is considered. It should be recognized that natural selection may decrease the information in DNA but it cannot increase it.

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.[10] Does this confirm the need for added DNA to be meaningful?

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 (see Tables 3-2 and 3, page 56 of the text) . 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 impossible. When duplication errors, favorable mutations rates (which are essentially zero) and the time necessary to establish a trait are considered this becomes apparent.

The following is not considered lecture material and may be beyond the level of the text. It is included for a better understanding of this material.

It is known that duplication (replication) errors are extremely rare as the authors state. 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 frame-shift 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. [3] Generally it takes about 5 mutations to make a significant physical change in an organism. [3] 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. [4] **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 "amoeba to man" 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 one in 1295. 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 (far less than a majority) 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 amoeba to man 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.*" [9] 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 [5]) the odds of this happening are unbelievably small. Consider the following: the mollicute 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 [6.] Since there must also be DNA if the mycoplasma is to replicate there must be 1,536,000 bases in the DNA (human has 6,400,000,000 bases). 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 9 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 an apelike ancestor.

Each one of the arguments discussed in the previous paragraphs indicates the amoeba to man evolution of man is not likely to have taken place. When all three are considered at the same time it should be apparent that molecules to man evolution (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,[7] 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 [8] that revealed mutations can cause only a limited variation in a species (micro-evolution). 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 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. Starr and Taggart, *Biology, The Unity and Diversity of Life*. Wadsworth Group, 2004, p. 254.
2. Campbell, N. A. and Reece, J. B., *Biology*. Benjamin Cummings, 2002 (Sixth Edition), pp. 300-309.
3. Ambrose,E., *The Nature and Origin of the Biological World*, (1982), p. 120-121.
4. Dodson,E., *Evolution: Process and Product*, (1960), p. 225.
5. Smith and Wood, *Cell Biology*. Chapman and Hall, 1996, p. 121.
6. Smith, *Cell Biology*,. Academic Press (1971), p. 86.
7,8. Rifkin, Jeremy, *Algeny*. (1983), p. 134.
9. Johnson & Raven, *Biology, Principles & Explorations*. Holt, Rinehart and Winston, 2001, p. 197.
10. Randerson, J., *Record Breaker*. New Scientist, Vol. 174, 8 June 2002, p. 14

Chapter 29 - Evolution Page 605

Because of the low level of this textbook the authors are able to present figures and statements that are very misleading and lead the reader to false and incorrect conclusions. This is an example of a little bit of information being dangerous in that the reader will believe that they understand the subject of evolution wherein in actuality they do not. This addendum will add relative information that will allow the reader to grasp enough additional information to understand that not only is the term evolution misleading but also many of the facts presented in this chapter.

Strangely, the authors do not attempt to define the term evolution until page 616 which is well into section 29:2. The term evolution has already been used several times before this page. In order to properly understand the material in Section 29:1 the term must be clearly defined.

The Definition of Evolution - A Problem

A major problem with the term evolution is that it has more than one meaning. These authors do not mention this fundamental fact and are therefore misleading the student. This leads to many misunderstandings and unsupported conclusions. Evolution is discussed in many instances as both fact and theory. Whether this is true or not depends upon what is meant by the term evolution. The authors state on the bottom of page 616 "*Evolution is a change in the heredity features of a group of organisms over time. When a species changes through time, it is said to have evolved.*" Darwin proposed that all life forms descended from a simple cell. The above textbook definition is so broad that it causes confusion between the various aspects of this chapter 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 misleading. What Charles Darwin observed is that species change and adapt to their surroundings as the authors point out in the heading entitled "Darwin's Work" on page 615. He observed that natural selection (see heading on next page) was a very strong driving force that can and does cause these kinds of changes as the authors point out. 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. To correct this problem the term evolution has to be 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 56, 57) 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 since it has not been proven. The following diagrams should help you to understand the differences.

Man

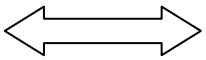
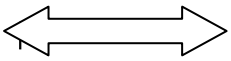
⇧

MACRO-EVOLUTION can be considered to be VERTICAL

(Has no proven examples.)

⇧

Amoeba

 **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.

Adaptations - An Example of Survival Page 606
Natural Selection Page 608

These three headings are true as stated and bring out what micro-evolution is - adaptation to the environment. The dark-colored and light-colored mice are still easily recognized as mice. It should be noted that natural selection does not encourage change. It is a stabilizing force on an organism.

As the textbook explains on page 616 Darwin observed what he called natural selection. It has taken place over the centuries and is an observable fact so that micro-evolution is a proven fact. Living organisms do adapt to their environment. Natural selection 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 to that that already exists, a very necessary happening if macro-evolution is to take place. **It only affects micro-evolution**. Actually, natural selection restricts or removes information from the gene pool. It acts to stabilize a species and provide for its survival.

Mutations Page 609

The authors point out that "*a mutation is a change in the DNA code*." This is true but it must be remembered that unless new coherent information has been added to the DNA macro-evolution will not take place. This is brought out in the discussion of mutations on pages 3 through 6 of this addendum.

Species Formation Page 610

This discussion of species formation describes micro-evolution. It must be recognized that the rabbits are still rabbits and Darwin's finches are still recognizable as finches even though the beaks are different.

Primate and Human Evolution Page 613

The textbook authors make it very plain in the first sentence of this section that they assume humans evolved when they say, "*Fossils are very important when it comes to tracing the evolution of humans*." This assumption is supposed to follow from the previous "Species Formation" section.

Think Critically: Have the authors provided any proof that the small changes in the rabbits and finches can account for a member of the ape family (chimpanzee) changing into a human?

If you have trouble answering this question consider the following in deciding whether or not man and chimpanzee evolved from the same apelike ancestor. A 2002 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 substitutions, insertions and deletions. As more of the genome is considered the difference has risen to 7.7% [2] and 13.3%.[3.] It has even been estimated to be as high as 20%.[4]

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 than the human and 10% more DNA) the 7.7% amounts to 246,400,000 base pairs different. This is the amount of information contained in a book whose thickness is equivalent to about 61.7 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 the chimp has more than the human.[5] Remember that all of these mutations had to occur in the zygote (one cell) that actually takes place in reproduction.

Think Critically: 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 supposed ancestor and man must be approximately the same. Where and how did this vast amount of additional information come about when, as stated earlier, it is recognized by the SETI project that additional coherent information does not come about by accident? It is completely inconceivable that this much coherent information could have been accidently 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?

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. Nelson, C. W., *Human/Chimp DNA Similarity Continues to Decrease: Counting Indels*. Technical Journal, Vol.18 #2, 2004, pp. 37-40.
4. Weissenbach, Jane, *Differences With Relatives*. Nature, Vol, 429, 27 May 2004, pp. 353-354.
5. Hacia, J. G., *Genome of the Apes*. Trends in Genetics, Vol.17 #11, 2001, pp. 637-645.

Section 29:2 Explanations of Evolution Page 615

Darwin's Work

For a more accurate definition of evolution refer back to the addendum write up dealing with the "Definition of Evolution" on page 7.

Figure 29-12 - Fossils in the Rock Layers Page 619

Many facts from the geological record tend to challenge macro-evolution. One 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]."* 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*."

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.

Other Evidence Page 619
Figure 29-13 - Embryos Page 620

This material is to be inserted at the end of the second paragraph under this heading.

The textbook authors are misleading in their treatment of this figure. What they have presented are drawings proposed in 1891 by Ernst Haeckel. He produced a series of drawings of vertebrate embryos proposing that they represent a kind of tree of life.[1] The drawings supposedly showed that all vertebrates pass through all of their evolutionary history in arriving at its final state. He used the drawings to illustrate what he called the Biogenetic Law. Haeckel was such an enthusiastic evolutionist that he altered his drawings in order to make his 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. [2]

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."* [3]

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 facts were. Michael Pitman in 1984 reported [4], "*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 facts. He found that Pitman was right and that there was little resemblance between Hackel's drawings and what he found. 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 shown in Figure 29-13)" [5] as reported by Pitman. It is important to recognize that this one appearance of similarity is **true for this case only** and therefore indicates nothing since the embryos are very different for earlier and later development stages.

1. Wells, Ionathan, *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, p120.
3. K. S. Thomson, *Ontogeny and Phylogeny recapitulated.* American Scientist, May/June 1988, pp. 273-275
4. Pitman, Michael, *Adam and Evolution.* London, Rider, 1984, p. 120.
5. E Beck, DB. Moffat and D.P. Davies, *Human Embryology*, 1985, p.345

Insert this material after the third paragraph.

Think Critically: 1. The authors state that early and later life forms all have cells, DNA and alphabet. Does this sound like something that would happen by chance?

2. Is it logical to assume that all organisms must have a number of similarities in their chemical and physical structure since they all have to live in the same environment?

Insert this material after the fourth paragraph.

The textbook authors define a vestigial structure as "*a body part that no longer has a function."*

Originally, there were thought to be approximately 180 vestigial structures or 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. Just because an organ appears to have no use at this time does not mean its use will not be discovered later. A good example of this is the appendix which the authors claim has no function. This is no longer a true statement. The medical profession now knows that it plays a functional role in the immune system. [1]

The authors state that "*the pink lump in your eye is all that is left of a third eyelid."* This is an assumption based upon macro-evolutionary thinking. Since macro-evolution has not been observed but only assumed, the existence of a third eyelid on man cannot be verified since man's ancestors are not available for detail analysis. It should also be recognized that just because the pink lump in a person's eye is unknown at this time does not mean that its use will not be discovered later just as the function of the appendix has been now determined.

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

A Fossil Hunt Page 622

This section is misleading because it gives the wrong impression about the age of rock layers and fossils. The authors state, "*Fossils may also be used by scientists to judge the age of the rock layers in which they are found."*

Think critically: The above statement says that the age of a rock layer can be determined by the fossils in it. How is the age of a fossil determined?

Assume that as you walk across a field you discover a fossilized bone. How do you determine its age? If it is truly fossilized the bone has turned to rock. How can the age of the rock be determined when it is the rocks age that is to be determined? There is no way to determine the age of a rock **without making assumptions**. The authors maintain that you can determine the age of the rock by the fossil in it but that fossil is also rock just like the rock that surrounds it. The fact is that the fossil represents a former living organism whose age has been assumed based upon evolutionary thinking. The concept of evolution originated many years before Darwin so that the ages and order of the various fossils was assumed long before Darwin proposed his theory of what caused evolution to take place. What this means is that the index fossils are based upon the assumption that macro-evolution is true.

It should be recognized that the petroleum geologist does not need to know the ages of the rocks to determine whether or not oil is present. The indicator of oil is the presence of certain types of fossil organisms regardless of the age or order in the strata.

Skill Review Question 2 Page 625

The number of toes on the horses changed but the horses are still horses. Just because a person is born without a finger or toe or is extra tall does not mean that they are no longer human and have become a new genus. This is an example of micro-evolution and has nothing to do with macro-evolution. In this instance evolution means "adaptation or possibly change."

Breeding Guppies Page 627

Recognize that if the suggested project to raise guppies is attempted the results will not in any way confirm evolution because intelligence was used to breed the guppies and do the experiment.

Delicious, Nutritious Bananas Page 627

The fungus that is attacking the bananas may be the result of the gene pool of the fungus or possibly a mutation. It has thrived through the process of natural selection. The fungus is still recognizable as the same as it has always been and is an example of adaptation or micro-evolution. This is the same situation

as the person being born extra tall. They may make a better basketball player but they are still human.

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 to make unsubstantiated statements addressing the origin of different organisms. The reader should always keep in mind that macro-evolution cannot happen unless a change increases the information content of the DNA in a meaningful manner. This will help a person to determine whether or not a change is reasonable and/or possible.

Several conclusions should be obvious at this time:

1. It is misleading to use the term evolution without specifying whetheat this time r 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.

    The fossilization process demands catastrophic happenings more violent than what we see today.

    Similar genes do not necessarily produce similar structures.

    How can new meaningful information be added to the DNA by random chance happenings.
4. Other explanations for what is observed on earth should be examined..