

EVOLUTION ADDENDUM
For Chapters 1, 2, 12,15,16,17, 32
In the Textbook

BIOLOGY

by
K.R. Miller and J. Levine

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Prepared by Charles H. Voss, Jr.
Ph.D.

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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 (see page 15 and the page 369 comments by Dr. Levine). It should be remembered that biology is the study of living things. It is not necessary to know about an organism's origin or past to determine: (1) how it functions internally and externally, (2) how it relates to other organisms and (3) 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 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. Evolution is discussed in many instances as both fact and theory. Read the next section below of this addendum for an understanding of the problem.

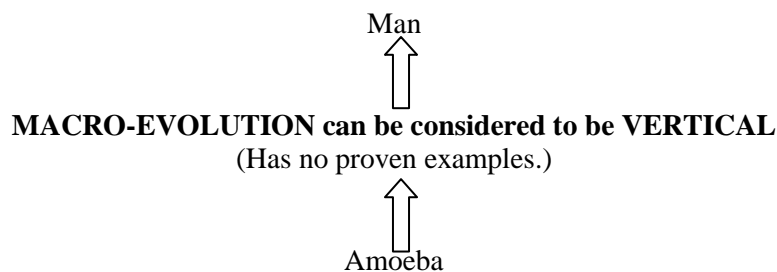
This presentation will provide additional facts concerning evolution so that the student can clearly see problems not answered by the theory of evolution. This addendum presents facts that the student should consider when judging the soundness of the theory of evolution.

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 Evolution Page 20

The textbook authors make the following statement, "*As a group, however, any given kind of organism can evolve, or change over time.*" Wherein this statement is true it defines evolution to be simply "*change over time.*" By so doing, the authors set up a situation where the reader is and can be misled because it ignores the fact that there are varying degrees of change which are unrelated to each other and which are often spoken of as micro and macro-evolution. Micro-evolution is more properly called a change or adaptation at the species level and is what Darwin observed. He observed that natural selection was a very strong driving force that could and does cause changes at the species level. On the basis that micro evolution was true he hypothesized that "macro" evolution or "molecules to man" evolution was also true. The textbook defines macro-evolution as "*large scale evolutionary patterns and processes that occur over long periods time.*" (Page 435) 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 text page 450) and implies that all life on Earth descended from a few types of cells that somehow came into being in the past. The diagram below should help you understand the differences in the two terms



← 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 since it has not been observed directly. Using the term "evolution" without specifying which type is being discussed is misleading and unfortunate and has caused much misunderstanding among scientists and the public. The term "macro" (molecules to man) evolution should be used in order to clarify the problem.

Chapter 2

Nucleic Acids and Proteins Page 47

This material is needed to clearly understand the material in chapter 17 dealing with the origin of life. Wherein its content logically fits in this part of the textbook it can be put off until considering the material in Section 17-2, page 423. Insert it after the last paragraph of this section on nucleic acids.

In order to clearly understand some of the problems inherent in the origin of life (Chapter 17) and mutations (Chapter 12) it is important to recognize that the sugars that are part of DNA and RNA and the amino acids that make up proteins are optical isomers called chiral molecules. An isomer is a molecule that has more than one three-dimensional form even though the chemical formula is the same. It is important that this fact be clearly understood when discussing both sugars and proteins. The protein is used for illustration purposes because it is easier to understand. The basic facts that must be recognized and kept in mind are:

(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 1¹ - a Hydrogen atom, a Carboxyl Group (COOH), an Amino Group (NH₂) and an R Group which is a carboxyl/hydrogen based unit (see Figure 2-16, page 47 of the text). 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 1 shows this. The number of compounds that can join to the carbon atom at this spot is much larger than the twenty present in living organisms. 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

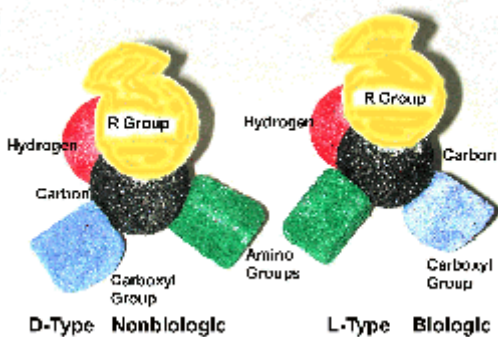


Figure 1. Amino Acid Types

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 or chiral molecules 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

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 (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 are no preferential connections of biologic verses non-biologic amino acids in forming poly-peptides (chains of amino acids). 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 unless the R group is symmetrical. This is most easily understood by looking at Figure 1 and connecting the Carboxyl and Amino Groups together. This makes the R Groups point in the opposite directions with respect to the polypeptide chain so that the shapes 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 changes shape and becomes non-biologic. Note that not only is the R Group (yellow color) and 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. It is the shape of the molecule that determines what kind of protein it is. 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

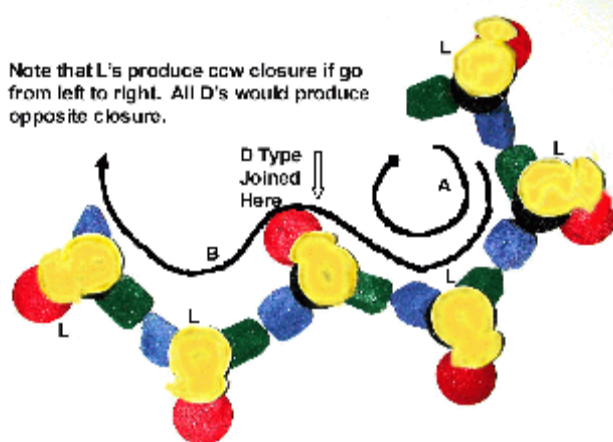


Figure 2. Effect of introducing a D molecule into an L molecule chain..

It is very important to recognize that the shape of a molecule determines how it will interact with other molecules. It is the shape of the molecule that determines what kind of protein it is. 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.

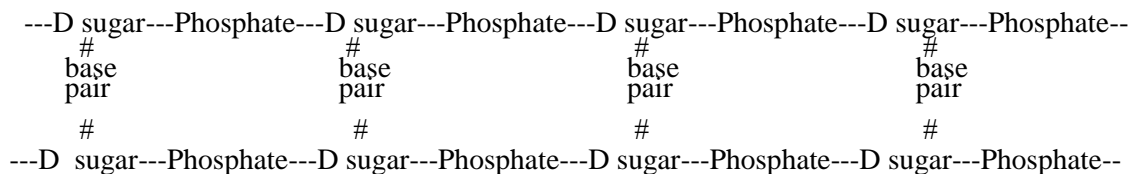


Figure 3. DNA Structure

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 recognized 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 69 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 6,400,000,000 D type sugars.. Logically, half of these should be L type sugars but there are none. How could this have come about?

Think Critically: What do the L and D type molecules and the great number of possible amino acids do to the complexity of life concept?

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.

Chapter 12

Mutations Page 307

It is necessary to understand this material from Chapter 12 in order to properly understand the process by which organisms change and its implication regarding the theory of evolution.

The text says on page 307, "*Mutations are changes in the genetic material.*" Recognize that the definition is an oversimplified statement of a very complex problem. It is self evident that as organisms become more complex there must be **additional information** in the DNA in the same sense that it takes more instructions to put together a non partially assembled bicycle than a velocipede.. "**New information**" must be added 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." 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 rest of chapter 12 discusses different mutation mechanisms and forces that cause changes in the DNA and therefore changes in organisms. It must be remembered that just because mutational changes do occur at the species level this does not prove that all organisms descended from a common ancestor. The textbook does not discuss some of the factors that give the reader an understanding of how difficult speciation is and the fact that it cannot explain the phenomena of molecules to man or even amoeba to man evolution.

First of all it must be remembered that the DNA in a living organism contains the complete information necessary to form an identical organism including the instructions of how to make a reader for its own code system. The amount of information stored in the DNA is staggering. Second, the amount of information stored in the DNA of man is 4166 times more than that of the H-39 Mycoplasma - one of the smallest bacteria which is now called a mollicute.¹ To put this in perspective the mollicute (H-39 mycoplasma) DNA (768,000 base pairs)² has the amount of information contained in the first 4 chapters of this text if the first 44 pages in the front are included and 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 517 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 telomeres⁴ which are functional parts of the DNA. These authors mention introns and exons on p. 302 and promoters on page 358 as having functions. A major question is where did all of this additional information come from to fill the 516 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, gene shuffling, extra chromosomes, and viral or bacterial invasion do not add **meaningful** information to the DNA. Viral or bacterial invasion may add information but the chances of it being **meaningful** is zero if it occurs **in a random manner**. 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 randomly adding chapters or books, magazines or newspapers add **relevant meaningful information**? The textbook may contain more pages but does it contain more information? No! It is inconceivable that **meaningful** information can be added to accomplish the bacteria to man requirement of 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 will be involved 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.⁵ 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. 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.

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 This textbook’s authors do address some of these ideas very superficially on page 308. 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

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 26 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 a reasonable assumption. 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. Rifkin¹¹ 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
 - Williams, A., Copying Confusion. *Creation*, Vol. 25, No. 4, Sept.-Nov. 2003, p. 15.
6. Ambrose, E., *The Nature and Origin of the Biological World*, (1982), p. 120-121.
7. Dodson, E., *Evolution: Process and Product*, (1960), p. 225.
8. Johnson & Raven, *Biology, Principles & Explorations*. Holt, Rinehart and Winston, 2001, p. 197.
9. Smith, *Cell Biology*., Academic Press (1971), p. 86.
- 10,11. Rifkin, Jeremy, *Algeny*. (1983), p. 134.

Development and Differentiation Page 312

The fourth paragraph starts with, "*The striking similarity of genes that control development has a simple scientific explanation. Common patterns of genetic control exist because all these genes have descended from the genes of common ancestors.*" It is possible to make these statements only if the author has assumed that

macro-evolution is true. There is no factual evidence confirming these statements that can meet the rigid requirements of scientific proof. This is like saying that all electronic equipment has RC circuits (a combination of resistors and capacitors) so they all came about through random chance happenings from a common ancestor.

Think Critically: Can you think of another reason why the “genes that control development” might be similar?

Unit 5 Evolution Page 367

Chapter 15

The Puzzle of Life’s Diversity Page 369

The textbook states, “*The answer is a collection of scientific facts, observations, and hypotheses known as evolutionary theory. Evolution, or change over time, is the process by which modern organisms have descended from ancient organisms. A scientific theory is a well-supported testable explanation of phenomena that have occurred in the natural world.*” Just two pages earlier Dr. Levine is quoted as saying, “*Because all parts of the living world - from the DNA in our cells to the air we breathe - are united by evolutionary theory into the story of life on Earth.*”

These two quotes point out clearly why and how the term evolution, as defined by the first quote on page 20 of the textbook, can be and is very misleading and even leads to false statements and ideas. At this point it is recommended that the reader go back to page 1 of this addendum and read the section labeled “evolution.”

The third sentence of the first quote above says that a scientific theory is testable. Macro-evolution is not testable. Why is macro-evolution not testable? How do you go about proving or testing a procedure that happened in the past when no one was present to observe it happening. There is abundant contradictory evidence that raises serious doubts about macro-evolution ever happening? What the authors should have pointed out and said is that micro-evolution is well-supported and testable but macro-evolution is not. Some of the contradictory evidence and reasoning will be presented in the following parts of this addendum.

The second quote also is deceitful in that in order for it to be true macro-evolution must be true. Since macro-evolution has never been observed and is not testable the assumption that it is a fact is not good science.

Voyage of the Beagle Page 369

The authors say, “*During his travels, Darwin made numerous observations and collected evidence that led him to propose a revolutionary hypothesis about the way life changes over time. That hypothesis, now supported by a huge body of evidence, has become the theory of evolution.*”

Place this next paragraph immediately after the last paragraph on page 369 of the text.

Because of the way the authors define evolution the second sentence is not completely true. The “huge body of evidence” supports micro-evolution not macro-evolution. There is little, if any, direct evidence supporting macro-evolution. The authors provide ample evidence in Section 15-2 that the theory of macro-evolution was well established before Darwin was born (1890). Darwin proposed what was thought to be a reasonable explanation for the theory by observing one of the driving forces behind adaptation or micro-evolution. Darwin and others of that time supposed that if micro-evolution was true then macro-evolution must be true even though they had no supporting evidence. Darwin recognized there was a problem as is evidenced by his book on the “origin of Species.” He devoted three of the fifteen chapters (Chapters 6, 7, 10 see page 13 of addendum) of his book to pointing out the problems with his theory and what it would take to

disprove it. Interestingly, the problems he saw with his theory have not been resolved. Some of these will be pointed out later in this addendum.

Evolution by Natural Selection Pages 380-382.

At the bottom of page 381 the statement is made that “*As a result, species today look different from their ancestors. Each living species has descended, with changes, from other species over time.*” The first sentence of this quote is not completely true if it is recognized that there are many fossils that were once thought to be extinct but have been found alive today. The table below shows a small portion of organisms that have gone through so little change over supposedly millions of years that they are still recognizable as the same as the fossils. The above statement therefore is not true as a generalization. Paleontologist Dr. Joachim Scheven claims to have started a museum in Hagen, Germany where he has accumulated almost two hundred examples of fossils that were thought to be extinct but have been found alive. He has a video out on the subject. Some of the more commonly referred to fossils are shown in this table.

ALIVE ORGANISM	YEARS PRESENT IN THE FOSSIL RECORD
Coelacanth	350 to 70 million years ¹
Horseshoe Crab	424 to 50 million years ²
Lingula	510 to 430 million years ³
Neoplina	600 to 385 million years ⁴
Graptolites	570 to 360 million years ⁵

In the second sentence in the above quote one must be careful to notice that species have descended from other species. Since the changes are occurring at the species level this is micro-evolution. Be careful to note that this does not imply the results hypothesized in the next paragraph on the top of page 382 as noted below.

It has already been established that the complete description of an organism is contained in its DNA. In order for a macro-evolutionary step to take place meaningful information has to be added to the DNA. “*Natural selection does not act directly on genes*” (page 397) and can only select organisms from the gene pool that exists for that organism. Natural selection may increase the fitness of a particular species to survive in its particular environment and therefore acts to stabilize a species. It tends to eliminate changes in a species. Niles Eldridge, curator of the Museum of Natural History in New York City puts it this way, “*But natural selection per se does not work to create new species.*”⁶ Natural selection only works at the species level. It cannot add the additional information so necessary for macro-evolution to take place.

On page 382 the authors extrapolate their statement quoted in the first of this section to say that descent with modification and common descent produce, “*A single ‘tree of life’ that links all living things on Earth.*” This conclusion is inconsistent with the facts of natural selection and the fossil record. It ignores the gaps in the fossil record. Michael Thomas says, “*One could argue at this point that such ‘minor’ changes, extrapolated over millions of years, (micro-evolution) could result in macro-evolutionary change. But the observational evidence will not support this argument.*”⁷ The late Steven J. Gould of Harvard concurred when he said, “*The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology. The evolutionary 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.*”⁸

1. Hickman, et al., *Integrated Principles of Zoology*. C. V. Mosby, London, 1979, 6th. Edition, p. 508.
2. *ibid.* p. 333.
3. *ibid.* p. 437.

4. *ibid.* p. 270
5. Rigby, Sue, *Nature*. Vol. 362, 18 March 1993, p.209.
6. Eldridge, Niles, *An Extravagance of Species*. Natural History, Vol. 89, No. 7, (July 1980), p. 46.
- Pitman, Michael. *Adam and evolution*. London: Rider, 1984, p. 76.
7. Thomas, Michael, *Stasis Considered*. Origins Research, Vol. 12, Fall/ Winter 1989, p. 11.
8. Gould, Steven J. *Evolution's Erratic Pace*. Natural History, Vol. 86 (May 1977), p. 14.

The Fossil Record Pages 382-83

The authors cover more on this subject in Section 17-1 on pages 417-422 (page 14 of his addendum). **This material should be inserted after the last sentence of this heading.**

The authors state, "*Researchers have discovered many hundreds of transitional fossils that document various intermediate stages in the evolution of modern **species** from organisms that are now extinct. Gaps remain, of course, in the fossil records of many **species**, These gaps do not indicate weakness in the theory of evolution itself. Rather, they point out uncertainties in our understanding of exactly how some **species** evolve.*" This is very misleading in view of the statement at the end of the sub-topic "Descent with Modification" on the previous page. It implies that this paragraph refers to macro-evolution but it does not. Notice the number of times that the word species (in bold print) is used in this quote. It is very important to recognize that the authors are talking about gaps that exist in the fossil record at the species level. Gaps that appear in the fossil record at the species level are dealing with micro-evolution - **not** macro-evolution. In other words, a transitional fossil may have been discovered between the timber wolf and the coyote which are both different species under the wolf genus (Canis - see page 450).

Darwin was somewhat concerned by these gaps in the fossil record at the species level but saw the gaps between the various groups of organisms as lethal to his theory. 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 One hundred forty five years after this was written these gaps still exist. Professor Stephen J. Gould of Harvard University confirmed that 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, Vol.86, No.6, June-July 1977, p.24.

Geographic Distribution of Living Species - Figure 15-14 Page 383

Think Critically: The authors state, "*Species now living on different continents, as shown in Figure 15-14, had each descended from different ancestors.*" What is this statement saying? Would you expect anything else?

Homologous Body Structures Page 384

The textbook makes the statement, "*Homologous structures provide strong evidence that all four limbed vertebrates have descended, with modifications, from common ancestors.*" Homology is one of the proofs proposed for macro-evolution. The real question is whether things that look similar **necessarily** have the same origin. Carefully examine the bones of the same color in Figure 15-15 (page 384). If you were given all the bones of one of these colors in a bag with no labeling would you consider them to be similar?

Upon close examination of the structures presented in the figure the major similarity is that they are located in the same relative location on the limbs. Do they have the same bony heads and size? Examination reveals they are not similar after all. The bone lengths, diameters and knobby protrusion locations, shape and size are all different. The information in the DNA must be very different to direct the formation of each of these different bone structures.

The textbook also states, “Structures that have different mature forms but develop from the same embryonic tissues are called homologous structures.” The question arises as to exactly what is meant by the term “same embryonic tissues.” These words imply an identicalness that cannot be justified as noted in the next paragraph. The many differences noted earlier must require many differences in the DNA.

Think Critically: If the mutational problems presented earlier are considered is it reasonable that the many differences in DNA could have occurred by random chance happenings? Why isn't this supposed common ancestor from which all of this evolved named? Does it really exist?

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 (emphasis added) 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 (see figure on page 12 of this addendum) 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.

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?

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 384

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

The three skinks pictured in Figure 15-16 are said to indicate that the legs have become vestigial. The fact that the legs became so useless that the skink could survive in that particular environment is a clear example of how natural selection works. The loss of useful legs was brought about through mutations that did not harm the skink in the environment it was living in. The total information in the DNA **decreased** so that this is an indication of a micro-evolutionary change. This is true of all so called vestigial organs if they can be said to exist. Vestigial organs do **not** support macro-evolution but are an example of de-evolution or evolution in a negative way..

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

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

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

Similarities in Embryology Page 385 and Figure 15.17

Insert these paragraphs at the end of the material on this subject.

The authors correctly point out that in 1891, Ernst Haeckel 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 its macro-evolutionary history in arriving at its final state and therefore is a proof of macro- evolution. 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 by his fellow professors at the University of Jena in Germany and found guilty of fraud.² The authors are to be commended for reporting this fraud.

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 are. Michael Pitman in 1984 reported³, "*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 Haeckel'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)*"⁴ as reported by Pitman and shown in Figure 15.17. 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. It certainly does not indicate macro-evolution. Based upon this fact the similarity between the chicken, turtle and rat embryo shown in the figure is a gross misrepresentation of the facts.

The textbook authors are misleading in Figure 15-17 as shown by the adjacent figure and discussed above when they say, "*In their early stages of development, chickens, turtles, and rats look similar, providing evidence that they shared a common ancestry.*" The figure to the right shows that the stages preceding that shown in the Figure 15-17 do not look anything like each other for fish, amphibian, bird and mammal. A turtle egg (amphibian) is about one-fifth of the volume of a chicken egg and is hundreds of time larger than the rat egg (mammal). As these organisms go through their stages up to that shown they do not look similar at all until they get to the stage pictured. Even then the similarity is not that striking.

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 It is interesting that this statement was made 17 years ago but the biogenetic law still appears in modern textbooks.

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.

Strengths and Weakness of Evolutionary Theory Page 386

Insert these paragraphs at the end of the material on this subject.

These paragraphs leave the impression that there are virtually no weaknesses in the theory of “evolution.” The comments about how species arise and become extinct actually refer to micro-evolution. No reference is made to any weaknesses in macro-evolution which is where the major problems exist. This addendum has already and will continue to make it clear that there are many weaknesses in macro-evolution. Even Darwin recognized many weaknesses in his theory. These weakness still exist. As stated earlier he devoted three of the fifteen chapters of his book ”On the Origin of Species” to this subject. The three chapters are:

Chapter 6 - “Difficulties of the Theory”

Chapter 7 - “Miscellaneous Objections to the Theory of Natural Selection”

Chapter 10 - “On the Imperfection of the Geological Record”

Darwin believed that both sides of the issue should be presented. He closed his book with this statement: “For I am well aware, that scarcely a single point is discussed in this volume on which facts cannot be adduced, often apparently leading to conclusions directly opposite to those at which I have arrived. A fair result can be obtained only by fully stating and balancing the facts and arguments on both sides of each question.” The authors have let him down by presenting only a portion of the truth.

Chapter 16

It must be noted that this entire chapter deals with the different explanations of how speciation takes place. This means that it deals with the subject of micro-evolution. It produces no evidence for macro-evolution.

Section 16-1 Sources of Genetic Variation Pages 394-395

The reader is referred back to the material on mutations on page 4 of this addendum. On page 307 of the textbook mutation is defined as “*changes in genetic material*” and in this section is defined as “*any change in a sequence of DNA*.” The authors discuss gene shuffling and sexual reproduction as additional Sources of Genetic Variation.

To get a better understanding of gene shuffling consider the following exercise. If this textbook (Biology by Miller and Levine) were considered to contain the information in the DNA of an organism then this section could be likened to a gene. To illustrate gene “shuffling” consider the following. Keeping your eyes closed, open the textbook to some page and put your finger somewhere down on the page. At this spot

put in section 16-1 in. What would be the effect? The total information in the textbook has not changed although the information has been rearranged. The shuffling would make the textbook appear different but it would not be as useful.

- Critical Thinking:**
1. Does the term mutation as defined above by the authors include the terms gene shuffling and sexual reproduction?
 2. How likely is it that section 16-1 could be moved in a purely random chance manner somewhere else in this textbook to make it a better textbook? Does the answer to this question have any relationship to the DNA of an organism?

Testing Natural Selection in Nature Page 406

The presentation in this section is misleading in that it is not labeled as an example of micro-evolution. It should be recognized that all of the birds pictured in Figure 16-13 are recognizable as finches in spite of their different beaks. The variations in beaks is an example of micro-evolution or adaptation and does not in any way indicate the possibility of macro-evolution.. The capability for different types and sizes of beaks was in the gene pool and was selected by the environmental conditions. Darwin called this natural selection as the authors point out. They observed adaptation just as Darwin did.

The report on the observations of the Grants on the changes of the finches in the Galapagos Islands actually verifies the fact that the changes are an example of micro-evolution. What is not reported is that the finches beaks returned to their original, sizes and shapes once the food supply became the same as when they first started their observations. Note that the authors say on page 410 that the Grants, “*did not observe the formation of a new species.*”

Studying Evolution Since Darwin Page 410

Add this to the last one in the first paragraph.

The authors state, “*Scientific evidence supports the theory that living species descended with modification from common ancestors that lived in the ancient past.*”

Think Critically: The above statement says that “*Scientific evidence supports the theory...*” What is this theory? Did you descend from your parents, grandparents, great grandparent, etc.? Are you an exact copy of your parents or are you different? If you are different does this agree with the theory proposed? How far back do you have to go to maintain that you descended from people who lived in the “*ancient past?*” What kind of evolution are you the result of?

The following statement occurs at about the middle of the page. “*Remember that a scientific theory is defined as a well tested explanation that accounts for a broad range of observations. Evolution theory fits this definition.*” Based upon everything you have learned about the term evolution and the evidence that has been presented up to now do you believe that the second statement above is true? The above statement should it be modified to state “*Micro-evolution fits this definition?*”

Chapter 17 Fossils and Ancient Life Page 417

The authors state, “*They group similar organisms together and arrange them in the order in which they lived - from oldest to most recent. Together, all this information about past life is called the fossil*”

record. The fossil record provides evidence about the history of life on earth. It also shows how different groups of organisms, including species, have changed over time.....Fossils occur in a particular order."

The material below belongs after the above quote from the second paragraph.

These statements refer to the geologic column which is given in Figure 17-5 on page 421 of the text and are supposed to be proof of macro-evolution.. What must be recognized is that the fossil order and geologic column are based upon macro-evolutionary thinking and **exist only in textbooks** and therefore do not prove macro- evolution..

The Geologic Time Scale was essentially in its present form by 1840 with only some minor adjustments to the dates attributed to the various strata. What this means is that the authors statement in bold print above is speculation based upon the assumption that macro-evolution is true. The Geologic Time Scale existed before Darwin and long before much was known about world geology. If macro-evolution is accurate then the order presented by geology and many biology books, such as this one, is what would be expected in the fossil record. However, there are facts that tend to nullify this assumption. One of these 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].*"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

Thinking Critically: In view of the facts just quoted is the statement, "The fossil record tells a Story of Evolution" a reasonable one? Explain.

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

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

17-2 Earth's Early History (The Origin of Life) Page 423

The reader of this section should consider what is actually known versus what is proposed, hypothesized, speculated or suspected to have happened to explain a given fact. This is particularly important in this section because the authors present many unproven ideas as fact and oversimplify the origin of life concept. By their very nature the facts presented cannot be proven or demonstrated scientifically. The authors present none of the weaknesses and contradicting information and logic concerning the origin of life. Unfortunately, because of this, the information presented in this addendum concerning section 17-2 does not easily integrate into the textbook information and is therefore presented as additional "food for thought." In order to bring this discussion of the origin of life into correct perspective several facts must be recognized and kept in mind. The material presented on pages 2-4 of this addendum and entitled Nucleic Acids and Proteins (page 47 of the textbook) is very important and indicative that life could not have originated by random chance chemical reactions.

Formation of the Earth Page 423

Think Critically: This section presents a dialogue of the formation of the earth as established fact. How can the truth of these statements be proven? Have they been proven?

In the third paragraph the authors give a list of compounds that supposedly made up the earth's atmosphere. Why isn't oxygen listed? Should it have been listed? Why or why not? The answer appears in the next paragraphs.

A partial answer to the oxygen question is given in the second sentence of the next topic and in the topic entitled “Free Oxygen” on page 426. It should be noted that the authors use the term organic molecule in their discussion. The definition of an organic molecule is one that contains carbon as stated on page 44 of the text and developed further on page 2 of this addendum.

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 Alexander Oparin in 1924 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.

Think Critically: What effect does the L and D molecule problem have on Oparin’s hypothesis or the atmosphere proposed by the authors or any other proposed atmosphere? Is the formation of a biologic compound more or less probable?

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 discussed in the next textbook heading. 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). However, most of the amino acids formed were not biologic even though they can be classified as organic. This makes the formation of a biologic compound impossible for reasons given in #3 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 atmosphere¹ 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 water vapor, 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 two 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:

3. 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 acids⁴ 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 or RNA will make it biologically useless from a functional viewpoint as pointed out earlier (pages 2-4 of this addendum). The proteins of living organisms are made up of L type amino acids and the DNA and RNA 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 in the natural environment.

DNA produces tRNA which promotes the synthesis of L type proteins. There is no evidence that such a separating mechanism was ever present. Replicating life forms are the only known L and D separating mechanisms that occur naturally.

4. 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 when the reaction itself produces more water. The evaporating pool hypothesis, that evaporation will concentrate the amino acids, has the problem that some of the compounds necessary for protein synthesis evaporate⁵ 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.

5. Natural selection only takes place in living organisms.

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

7. 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."*

8. 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, et al., *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 First Organic Molecules (Miller Experiment) Page 424

The famous Miller-Urey experiment supposedly proved that life could have evolved. The apparatus is shown in Figure 17-8 on p. 424. 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 scientists² 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 that appear 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 **non biologic** and therefore not indicative of life.

A further difficulty of the Miller-Urey experiment is that in the atmosphere ultraviolet light breaks down the 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.

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.

“Primitive” Life Forms

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, a mollicute or 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. If man could finally create a living organism in a laboratory that would not prove that it could happen by random chance happenings.

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 has added additional problems for the evolutionist.

Recent experiments concerning the formation of polypeptides do not enhance the chances of macro evolution taking place unless the polypeptide is one that can be used in the particular organism. If it cannot be used then it is only making macro evolution less likely since it introduces an additional non-usable

compound. If it is usable then it must be included in exactly the right place in the protein being formed - a very unlikely scenario.

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

The Unbreakable Cycle

There is an unbreakable cycle in all cells and bacteria that makes any possibility of macro evolution 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. The complexity and interdependence indicates design and not random chance happenings. 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 the origin of life theories to account for 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.

Formation of Microspheres Page 425

The steps from microsphere to actual cell is beyond comprehension. It should be recognized that the differences between the cell membrane and the microsphere membrane is unbelievably large. The membrane enclosing a cell is much more complex than a shell like structure in that it has openings which allow certain chemicals, not just water as the microsphere does, to pass in and out and reject others. If a cell were placed inside a microsphere instead of its own membrane it would not live because there would not be any way to get nutrients into and waste out of the cell. Furthermore, Fox, et al. point out that microspheres are readily dissolved with changes in PH, heat and dilution and are easily broken up by agitation.¹ What this means is that microspheres occur under laboratory conditions and are rarely, if ever, found in nature. Miller and Orgel comment, "*the microsphere's membranes ... are not biological-like membranes since they do not contain lipids or carry out any of the functions of biological membranes. ... It seems unlikely ... that the division of microspheres is related to the origin of cell division.*"² The other factor is that the contents within the cell membrane is much more complex than that of the microsphere.³ It should be recognized that the microsphere experiments are carried out in laboratories under carefully controlled circumstances rather than the random chance environment found in nature and so are not the ancestors of any kind of life forms. The authors acknowledge this in the first sentence of the next section.

Thinking critically: If a person puts together ten pieces of a 1,000 piece jig-saw puzzle is it reasonable to assume that the rest of the puzzle will eventually assemble itself if not touched? Is there a similarity between the jig-saw puzzle example and the first living cell from the microsphere example cited in the textbook?

1. Fox, Harada, Krampitz, Mueller, *Chemical Engineering News*. June 22, 1970, p.80.
2. Miller, Stanley L. and Orgewl, Leslie E., *The Origins of Life on the Earth*. Prentice Hall, 1974, p.144.
3. Thaxton, Charles, Bradley, Walter, Olsen, Roger, *The Mystery of Life's Origin*. Philosophical Library, 1984, pp172-176.

Evolution of RNA and DNA Page 425

As discussed earlier RNA and DNA nucleotides consist of a base, a phosphate and a ribose sugar. The sugar can be in either the “L” or “D” form which considerably complicates the problem because only “D” or right handed sugars are present in living organisms. If a left handed ribose sugar appears in the chain then the RNA or DNA chain that might be formed is non-biologic. RNA chains have been observed to form as reported in the text but the real question is whether the initial conditions of the experiment truly represent conditions that would actually occur in a real life situation. It should also be recognized that chains of RNA that may be able to make copies of themselves are of no use unless they are able to make a biologic protein. The formation of a biologic polypeptide is of no consequence compared to the complexity of the first living organism. It should also be recognized that even if a protein is made nothing will be accomplished by repeatedly copying this protein. It takes many different types of proteins to make a living organism.

Free Oxygen Page 426

The authors state, “*Those first life forms must have evolved in the absence of oxygen, because Earth’s first atmosphere contained very little of that highly reactive gas.*”

Think Critically:

How many facts are presented in the statement above? How many assumptions are presented?

The following statements occur in the discussion of the “Free Oxygen” heading. What assumption had to be made in order to make the statement?

1. Over time, as indicated by fossil evidence,...
2. By 2.2 billion years ago at the latest...
3. One of the first things oxygen did...
4. As atmospheric oxygen concentrations rose, concentrations of methane and hydrogen sulfide began to decrease.
5. The rise of oxygen in the atmosphere drove some life forms to extinction, while other life forms evolved new more efficient metabolic pathways that used oxygen for respiration.
- 6.. Organisms that had evolved in an oxygen free atmosphere were forced into a few airless habitans,...
7. Some organisms, however, evolved ways of using oxygen for respiration and protecting themselves from oxygen’s powerful reactive abilities.
- 8.The stage was set for the evolution of modern life.

Sexual Reproduction and Multicellularity Page 428

The last paragraph of this Heading states, “*A few hundred million years after the evolution of sexual reproduction, evolving life forms crossed another great threshold: the development of multicellar*”

organisms from single-celled organisms.”

The last part of the above statement is not backed up by the fossil record and is therefore an assumption. There is a wide diversity of single celled life forms but no known 2, 3, 4, or 5 celled life forms although parasites are known to exist containing 6 to 20 cells. Doesn't logic dictate that there should be non-parasitic life forms having 2 to 5 cells if multicellular organisms came about through evolution? Based upon what you have already learned would you expect to find these intermediates?

17-3 Evolution of Multicellular Life Page 429-434

The authors continue their dialogue from a dogmatic evolutionary viewpoint and make many statements as fact, not theory. Rather than address each one of these instances individually it is hoped that the information brought out in this addendum has convinced the reader that the case for macro-evolution is basically nonexistent or very weak at best. With this in mind it is believed that the reader can determine the assumption in the third sentence of this opening section that says, “*In this section, you will get an overview of how multicellular life evolved from its earliest forms to its present day diversity.*” The assumption is that multicellular life evolved. As brought out earlier the fossil record does not support this assumption. It is arrived at by assuming that macro-evolution is a fact.

There are at least four statements besides the one concerning Cambrian fossils on page 430, at least two on page 431, one on page 432, three on page 433 and one on page 434 that are assumptions based upon the assumption that macro-evolution is true. Can you name them?

Cambrian Fossils Page 430 and 746

The Cambrian Explosion is one of the mysteries of geology in that, as the authors state, “*most animal phyla evolved.*” More phyla have been discovered in these strata than exist now. 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

Think Critically: Is this what you would expect if macro-evolution were true? Darwin recognized the Cambrian Explosion as a major problem back in his time. Since that problem still has not been resolved what should be our response? Should we agree with Darwin?

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, Vol. 105, (2 February, 1974), p. 72.

3. Darwin, Charles, *On the Origin of Species*. Harvard University Press, 1964, p. 308.

Jurassic Period - Dinosaur to Bird Evolution Page 432 and 807

The authors say on page 432, “*Many paleontologists now think that birds are close relatives of dinosaurs. Since the 1990's, scientists working in China have found evidence for this hypothesis in other fossils that have the skulls and teeth of dinosaurs but the body structure and feathers of birds.*” The

evidence found was named Protarchaeopteryx and Caudipteryx. The two strata that they were found in are reported dated at 120 and 136 million years and the fossil “birds” were reported to be “*more primitive than Archaeopteryx.*”¹ The difficulty is that Archaeopteryx, which is recognized as a true bird in biology textbooks,^{2,3} is dated at 150 million years old. These so called ancestors of the bird are about than 20 million years younger than the parent. How can they be called intermediates? Can a parent be younger than the children?

1. Ji Qiang, Currie,P.J., Norell, M.A., and Ji Shu-An, “*Two Feathered Dinosaurs from Northeastern China.*” Nature 393 (6687):pp.753-761, 25 June, 1998.
2. *Modern Biology.* Holt, Rinehart and Winston, 2002, p.862.
3. Miller, K.R. and Levine, J., “*Biology.*” Prentice Hall, 2002, p.807.

Quaternary Period Page 434

The authors state, “*The fossil record suggests that the early ancestors of our species appeared about 4.5 million years ago but they did not look entirely human.*” Please note the use of the word “suggests” in this statement. There is a very good reason why this is an incorrect statement. Look at the addendum material concerning human evolution in the discussion concerning Chapter 32 and addressed on addendum page 26.

17-4 Macroevolution Page 435

The authors state, “*Six important patterns of macroevolution are mass extinctions, adaptative radiation, convergent evolution, co-evolution, punctuated equilibrium, and changes in developmental genes.*” There is no doubt that these factors cause changes in the populations of the different organisms alive at the time but there is no evidence that this happened on anything except the species level which is micro- evolution. All of the examples cited are examples of micro-evolution. No proofs of macro-evolution are presented.

The same comments can be made regarding false statements at the beginning of Section 17-3. The number of questionable statements made on page 435 is at least one, three on page 436, two on page 437, three on page 438, three on page 439 and three on page 440. Can you locate them?

Punctuated Equilibrium Page 439

The student should notice that gradualism and punctuated equilibrium are both presented as explanations. 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.

Figure 17-25 uses the supposed horse evolution as an example of gradualism and punctuated equilibrium. It should be recognized that the familiar pictures of the supposed evolution of the horse are found only in

museums and textbooks. They are not substantiated by the fossil record. David Raup, Curator of the Museum of Natural History, where approximately 20% of the world's fossils are housed, comments,² ".....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. Gould, S. J., *Evolution's Erratic Pace*. Natural History, Vol. 86 (May 1977), p. 14.

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

Developmental Genes and Body Plans Page 440

Refer back to section 5 of Chapter 12 of this text (p.312) and the section on mutations on page 1 of this addendum. It is significant that all of the mutational efforts and studies on the fruit fly have never produced anything but a fruit fly. There is absolutely no evidence for macro-evolution in these experiments. Remember that mutations do not add additional coherent information to the DNA. The conclusion is that wherein the "hox" genes have the capability to change organisms this occurs at the species level and does not provide any evidence for macro-evolution.

Chapters 18-40

As pointed out in Section 17-3 the authors continue their dialogue from a dogmatic evolutionary viewpoint and make many statements as fact, not theory. Rather than stretch this addendum out to address each one of these instances individually it is hoped that the information brought out in this addendum has convinced the reader that the case for macro-evolution is basically nonexistent or very weak at best. A friend has counted at least 130 such instances in Chapters 18-40. This should make it clear that the authors are heavily biased regarding evolution so that the presentation in this textbook is not a well balanced presentation of the strengths and weaknesses of macro-evolution. Darwin's last sentence in his "Origin of Species" encourages everyone to carefully consider the facts and weaknesses of his theory. His statement is given in the second to last sentence in this addendum. You are encouraged to follow his approach.

Chapter 32

Human Evolution Pages 834 - 841

The textbook author states on page 834 that "*Humans and other primates evolved from a common ancestor that lived more than 65 million years ago.*" The entire section 32-3 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 substitutions, insertions and deletions. As more of the genome is considered the difference has risen to 7.7%² and 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.

Even the 5% difference amounts to a staggering amount of information in the DNA. If the human and chimpanzee genomes are considered to have the same number of base pairs, (3,200,000,000) in spite of the chimp having 2 more chromosomes than the human and 10% more DNA,⁴ the 5% amounts to 150,000,000 bases. This is the amount of information contained in a book whose thickness is equivalent to about 30 books such as this textbook if it contained nothing but full pages of print from cover to cover. 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?

Think Critically: If the chimp has 10% more DNA than a human how can it be said that there is only a 5% difference? Which of the differences given above is the most reasonable?

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

Conclusions

What has been covered in this addendum should be kept in mind as one reads through this 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.

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

1. It is 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.

At the end of Darwin's book he wrote, "For I am well aware that scarcely a single point is discussed in this volume on which facts cannot be adduced, often apparently leading to conclusions directly opposite to those at which I have arrived. A fair result can be obtained only by fully stating and balancing the facts and arguments on both sides of each question." I encourage you to follow his advice.