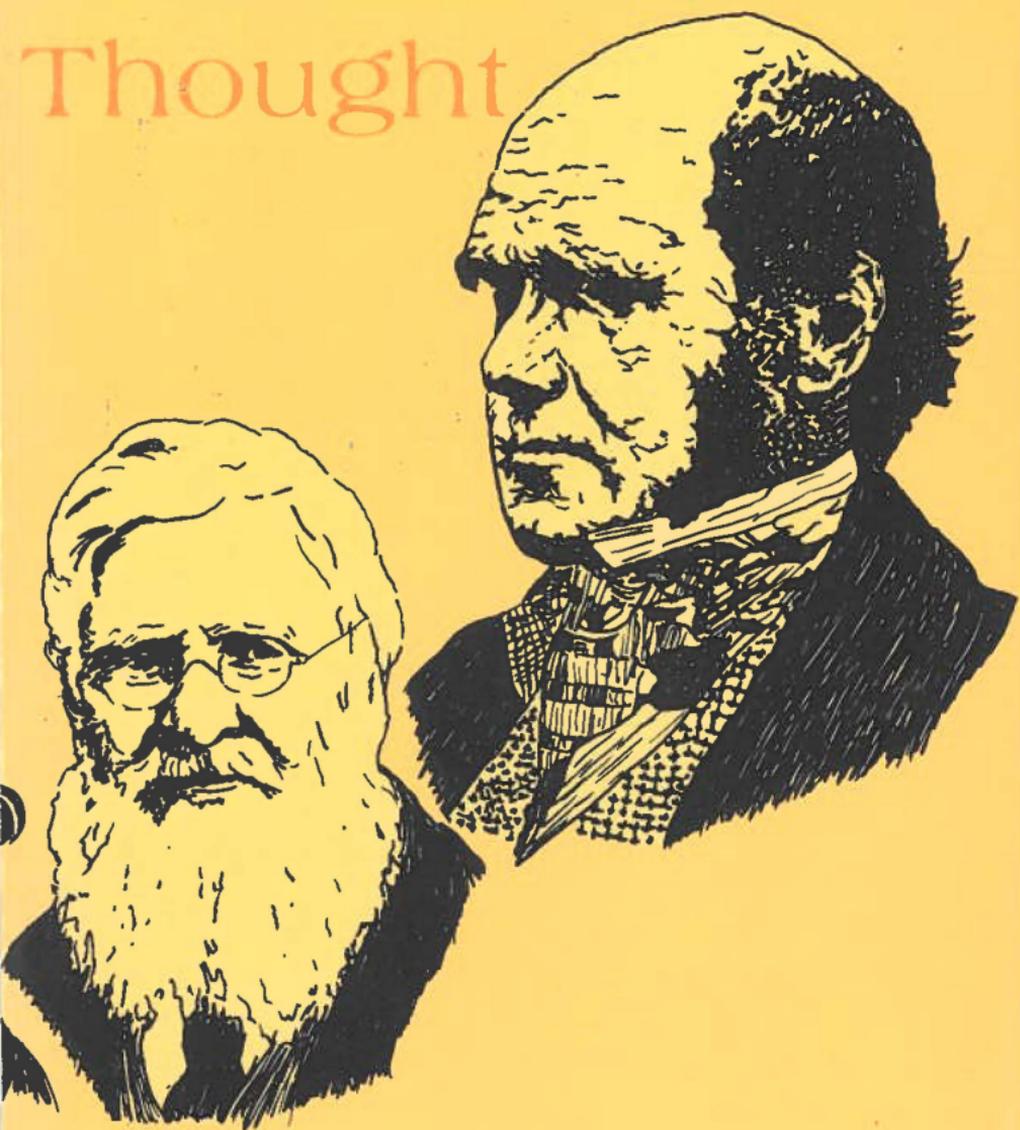


The History of Evolutionary Thought



by Bert Thompson, Ph.D.

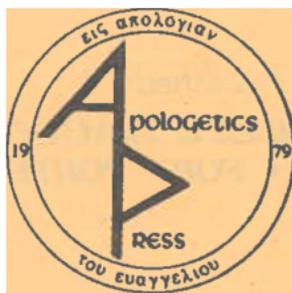
THE HISTORY OF EVOLUTIONARY THOUGHT

Bert Thompson, Ph.D.

Published By

STAR BIBLE & TRACT CORP.

P.O. BOX 181220 • FORT WORTH, TEXAS 76118



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DEDICATION

This book is dedicated, with warmth and fondness, to Dr. Russell Charles Artist, Professor Emeritus of biology and former Chairman of the Department of Biology, David Lipscomb College, Nashville, Tennessee. Dr. Artist, who holds the Ph.D. degree in biology from the University of Minnesota, has been a constant source of encouragement and happiness to the author. Long before I ever had the opportunity to personally meet this fine Christian gentleman, his stand for scholarship in science, and faithfulness to God, were well-known in my house. Over the past years we have become not only the best of friends, but working companions as well, enjoying a relationship which few could match. We have traveled here and yon, far and wide, often at each other's side, in defense of the historic Christian faith and God's inspired revelation of His creation. Dr. Artist's love for God, love for his fellow man, and love for Truth have inspired me beyond comparison. My debt to him I will never be able to repay. He, and his lovely wife, Dora, have been a constant help to my family, reminding us always of the work to be done and the price to be paid. It is with humility (learned from him) and gratitude (due to him) that this book is dedicated to Dr. Russell C. Artist.

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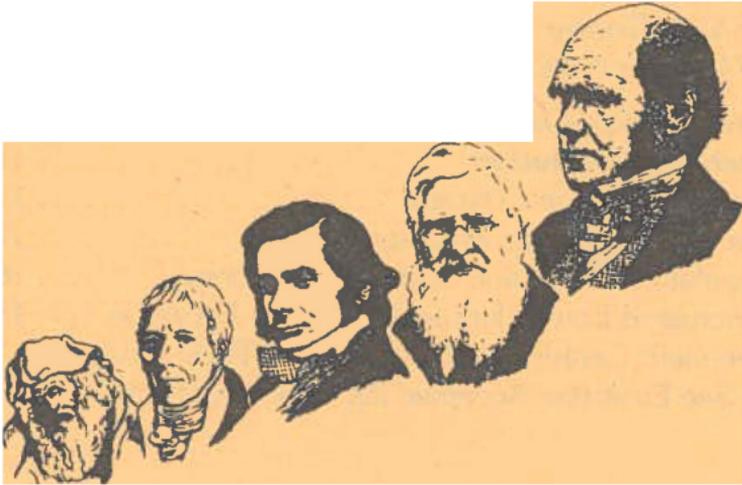
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— ABOUT THE COVER

The artwork on the cover reminds the reader of the progression of evolutionary thought from ancient times to Charles Darwin and beyond. Each of the men portrayed on the cover was an ardent advocate of evolution. They were (beginning from lower back cover): (1) Thales (640-546 B.C.), one of the seven wise men of ancient Greece; (2) Jean Baptiste de Lamarck (1744-1829), popularizer of the false concept of “acquired characteristics”; (3) Sir Thomas Henry Huxley, M.D. (1825-1894), the man who called himself “Darwin’s Bulldog”; (4) Alfred Russell Wallace (1823-1913), the co-founder of the concept of “natural selection”; (5) Charles Robert Darwin (1809-1882), the author of *The Origin of Species* which popularized evolution and gave it an alleged mechanism.

FOREWORD

From the dust-laden relic heaps of antique Greek philosophy, to the Chicago convention of evolutionary confusion (October, 1980), the history of evolutionary thought has been characterized by an “evolutionary” process all its own. As Dr. Thompson quaintly described it in an early chapter of this work, it has been “a long trail a’ winding,” and, like the trails that furrowed the terrain of America in its pioneer days, the evolutionary trail is strewn with the “bones” of theories that have not survived the journey.

Man is a wonderfully unique being. He is the only creature upon the earth interested in his past. Neither the amoeba nor the ape has the slightest curiosity about its ancestry. But not so with that insatiably inquisitive creature who has dubbed himself *Homo sapiens* (the species that is “full of knowledge”). So preoccupied is man with his history that he has become highly specialized — the biologist is concerned with roots of physical “life”, the anthropologist studies human social and cultural development, and the archaeologist looks at the material elements of the past (buildings, coins, documents, etc.) to get a glimpse of our heritage. In short, we want to know as much as we possibly can of our history. This intellectual curiosity is but one of the many traits that sets humanity *apart* from the animal world and thus helps to negate the concept of man’s alleged evolutionary development.

The Bible is the only reliable source of knowledge concerning mankind’s ultimate origin. This statement is made without a blush, with no apology, with absolute confidence! Man was created miraculously as a direct act of God; he was made in the image of his Maker (Gen. 1:26; 2:7). He was created for the purpose of glorifying

God (Isa. 43:7), and the sum of his duty is to reverence Jehovah and to observe His commandments (Eccl. 12:12). Ultimately, *there is no purpose for human existence other than serving and honoring the God of the Universe!*

But man, generally speaking, has become the rebel. Far too frequently he has simply “refused to have God in [his] knowledge” (Rom. 1:28), and thus, *Naturalism* and *Rationalism* and *Materialism* have become his unholy trinity. If unbelieving man *will not* find God in his past [and if not in the past, then not in the present], he *must* concoct some historical scheme which will both allow him to satisfy his philosophical urges and yet cut the tie to a Creator to whom he is responsible. The result has been the fabrication of the evolutionary mythology.

No one is really prepared to fully understand the theory of evolution, hence, to effectively deal with its many errors, who does not understand something of its checkered past. The evolutionary concept [and we simplistically speak as though it were a unified doctrine — it is not!] is a mongrel whose background is intensely interesting.

In this scholarly volume, *The History of Evolutionary Thought*, Bert Thompson has provided an encyclopedia of information on the development of this atheistic philosophy. From Thales in the ancient world, to Stephen Gould, the fiery apostle of modern evolutionism, the tragic, sometimes-sad, sometimes-humorous scene has been surveyed. This book is a reference tool that those who are on the firing line in defending the faith will use again and again. It is with the greatest gratitude to the author, and an abiding joy, that I recommend this superb contribution in the field of biblical apologetics.

Wayne Jackson
Stockton, California

PREFACE

I wonder how many books have been written as much out of sheer frustration as any other motive?! I wonder how many men and women, who now have taken their place among that number of individuals who can wear the name “author,” never started out to end up there? Instead, they intended to be on the other end of the spectrum. They intended to be reading the works, not writing them. They made their pilgrimage one day to the library. The next day it was another library. The next day it was yet another library. And so on, and so on. Finally, after much searching and re-searching, it became clear that there were either no books on the topic they needed, or the ones that did exist weren’t complete enough to help them much. And so, out of what could be called nothing less than sheer frustration, that “author-to-be” decided to simply write what he could not find. I wonder, as I write these words, how many books have come into being because this scenario has been played over and over again?

The book you now hold in your hand, and whose preface you are reading, is a case in point. It would be difficult to find, I’m convinced, a book written *more* out of a sense of frustration than this one. Day after day, week after week, month after month I searched for answers to important questions, information on timely topics, biographical data on eminent people, solutions to time-worn problems — only to find that the more diligent I became in my search, the more lacking I became in regard to in-hand data. What information I was able to glean came from a chapter here, a footnote there, an indirect statement attributed to “old so-and-so” who got it second hand, or . . . well, you get the point. The more I searched, the more frustrated I became. Finally, one day, I “cracked.” There was no way out — except to write the book myself. And so I did.

If there is a single volume which already contains the material this book contains within its two covers, I have yet to find it. I *wanted* to find it. I *searched* for it. I *asked* about it. I *hoped* for it. But I never found it. And that, to me, was sad. Perhaps I overlooked it. Perhaps my search was not broad enough, or long enough. Perhaps when someone reads these words, they will sit down, pen me a letter, and with that letter forward me a copy of the book I looked for, but never could find. I hope that *does* happen. I would enjoy reading it, to see how another author would handle this timely topic. But, in the meantime, I have written this book.

This work, *THE HISTORY OF EVOLUTIONARY THOUGHT*, is meant to fill a gap. It seemed to me that a book documenting the checkered history of evolutionary thought was sorely needed. It seemed to me that something *more* was needed than just an introductory chapter in some book dealing with evolution or creation. It seemed to me that something *more* was needed than just an appendix to yet another book on concepts of origins. It seemed to me that something *more* was needed than just another footnote in just another chapter in just another book. It seemed to me that if *any* topic ever demanded its own full-length, well-documented book, surely the history of evolutionary thought was *that* topic.

Whether we realize it or not (or whether we realize it, but don't much care to admit it), the topic of evolution has touched the lives of all of us. It has been with us, in one form or another, for a long, long time. It has waxed *and* waned. It has had what might seem to be more than its share of the limelight during certain times in history, our own time notwithstanding. And it is, of course, by the very nature of the concept of origins it attempts to explain, a *controversial* topic. That has ensured its *controversial* history. And indeed, it is a *controversial* history. The men and women who have championed — or opposed — it, the debates it has stirred, the books it has inspired, the intellects it has disturbed, all attest to the fact that it is not only a *controversial*, but an *important* sub-

ject. Surely if there were ever a topic which deserves better than it has received from the literary world, this is it!

Likely, at this point, you are wondering about two things: (1) First, you would like to know about my credentials as an historian; (2) Second, you would like to know where I stand in regard to the sensitive matter I am discussing — evolution. The answer to the first question, of course, is of interest because it likely will affect the quality of the book itself; the answer to the second question is of interest because it will explain any bias that might creep through and thereby affect the matters being discussed. Let us, then, turn our attention for just a moment to these two items.

I am, quite admittedly, *not* an historian. I am a scientist. I do not claim any special academic training in history. Nor do I claim any life-long interest in it which might better-qualify me to write such a book as this. On the other hand, I *do* confess a *deep interest* in the topic of *evolutionary* history, for this has been a favorite topic of mine for many years. I am keenly interested in the evolution/creation controversy, and have spent years researching both sides of the issue, for a variety of reasons. I know the importance of dealing with concepts of origins. I know the emotions involved, and the intellectual battles surrounding such concepts. And, I have a deep, abiding desire to see an accurate historical record preserved which will serve posterity well, so that when people in the future want answers to questions, or biographical data, or solutions to problems, they will not have to first write the book!

I am also, quite admittedly, a creationist. I do not believe in organic evolution in any form or fashion. I believe, as a Christian, that God did exactly what He said He did in the Bible. I believe God meant what He said, and said what He meant. I hold to what some would call the “naive literal view.” Furthermore, I am quite committed to creation, having lectured and written on this important topic for many years, defending creation as

the logical conclusion regarding the matter of origins. This conclusion has been reached because of my investigation into the scientific facts, as well as an examination of biblical revelation.

Now, with these things stated, I would like to make the following comments. I would be the first to admit that history is a difficult thing to write without at least *some* bias. And I certainly do not confess to having somehow been the one to produce a completely “unbiased” history of evolutionary thought. I feel certain that my views as a creationist will “leak through” my historical reporting. I cannot help but wonder however, if the same would not have been true had an evolutionist written this book? How *would* a man give such a lengthy, and delicate history without introducing at least *some* bias into it? I, for one, do not think I could have done it, though I have at least *tried*. Perhaps others could succeed where I may have failed. If so, I urge them to do exactly that, for we need such material. In any case, I want the reader to know that I have done my very best to try to be as objective as possible in reporting this material. I have worked on sections of the book, only to later discard them completely and re-work them in order to eliminate what I saw as my own bias. I *do* realize that bias should not (ideally) enter into historical reporting. How successful I have been will be a matter for you to judge. But I do ask that you at least examine the material with an open mind, laying aside for the moment the fact that the material was written by a creationist, to let the material speak for itself first. Then, if in your estimation I have failed in my task to report these historical events, so be it.

I know also that even professional historians are not in agreement on *what* history is, and *how* it is written. And so, for a scientist to “barge in” on the historian’s privileged territory may be seen by some as utter sacrilege, if not something worse. I want the reader to know, however, that I am at least *aware* of the various views held in regard to history, and the reporting thereof. I know, for example, that to some history is totally use-

less, and no doubt some will say the same of this book. Henry Ford, for example, said that "history is bunk!" Goethe once stated that "History is really only a complexus of nonsense for the higher thinker." And, some view history, if not in exactly such derogatory terms as these, at least in a bad light. It reminds them of "bad" days gone by, when they were forced to remember how many wives Henry VIII possessed (or dispossessed as the case may be), when the Nina, the Pinta and the Santa Maria sailed, or when the Magna Carta was signed. For them history is not the problem; remembering history is the problem. History has been called by some a "bag of tricks we play on dead men." By others it is deemed "a lie agreed upon."

I do not hold to such debasing views of history. I, though I am not a professional historian, hold to a grander view of history. I agree wholeheartedly with Jacques Barzun, who must surely rank as one of the greatest of the historians of our day, if not of all time, when he stated: "Large parts of man's history are thoroughly well known and beyond dispute . . . Taken all in all, history is genuine knowledge, and we should be lost without it." I agree with Jakob Jocz when he states in his book, *The Covenant: A Theology of Human Destiny*:

"While there is no perceptible pattern to history on the large scale of time, there is a pattern to the personal story of every human being. Man as an individual cannot be integrated into the faceless mass of humanity. He has his own beginning and end; he belongs to a family, a people, a country, a culture. His life is intertwined with the lives of other human beings, for better or for worse. He carries responsibility for others, and others are responsible for him. To live as an individual means to exercise one's freedom and to make responsible decisions. History, in the first place, is the result of decisions, choices, responses on the part of individuals. Even on the larger scale, the individual plays a decisive role. No group can manage to act unitedly without a leader. It is frequently the leader's motivation that ultimately decides about the turn of events. History is forged in the clash of wills. The hidden motives behind man's decisions and deeds carry

moral significance and transcend the purely biological rules. History never ‘happens’; it is the result of a complex of choices, struggles, and cross-purposes.”

Elton Trueblood, in his book, *Philosophy of Religion*, states that “History is a theater of moral judgment.” These two men have accurately described, in their own way, the history of evolutionary thought. The story told is not always a pretty one; but it is profoundly realistic, including (in the graphic account), unhappy and tragic as well as fortunate events. It abounds with the records of the lives of both good and bad, kind and unkind, likable and unlikable characters. The story is a long one, but the “whole story” is actually only one story with many scenes, many characters, and many sets.

The story, besides being realistic, is also unbelievably exciting. It has mystery, intrigue, crime, and almost every other element so essential to a best-selling novel. In its own way — to those who are interested in the creation/evolution controversy — it is the kind of material you can hardly stop reading once you have begun. Some may disagree, of course, but I think many will find this to be true. The characters range from the eminent (such as Thomas Huxley, Charles Darwin, or Stephen J. Gould) to those few of us would even recognize (Francisco Suarez, William Brooks, Edward Cope). The scenery ranges from the halls of Harvard to the seashores of the Galapagos Islands, and everything in between. And of course, the story is filled with the conflict which continues to rage between the two basic theories of origins: creation and evolution. Opponents as well as advocates of evolution are discussed. Their contributions, their failures, their successes all become a part of the story. And so it should be. Isaiah Berlin, the famous historian, said it well when he remarked: “The purpose of the historian . . . is to paint a portrait of a situation or a process, which, like all portraits, seeks to capture the unique pattern and peculiar characteristics of its particular subject; not to be an X-ray which eliminates all but what a great many subjects have in common.” Professor C.A. Coulson, in his work, *Science And Christian Belief*, remarked con-

cerning the interpretation of history, that “He who stops at the facts misses the glory.” How well put. It is not merely the *facts* that make history; it is the understanding of the facts, and what they mean in overall context.

How many of us have wondered what *really* happened “back there” in history? How often have we wished we could just have been “back there”? Well, that “back there” history can be, and must be, reconstructed by the “right now” historian. Certainly, historical events are in many ways *removed*, but they are not *totally removed*. The lessons are there, if we will but study, observe, and listen.

It is the purpose of this book to bring the “back there” to the “right now,” and to do it with as much accuracy as humanly possible. No perfection is claimed — not even the smallest amount — for surely there will be mistakes made, items overlooked, important people or events omitted. But these mistakes were not intentional. Every attempt has been made to document, fully and accurately, material used in the preparation of this book, so that others, too, might have access to the mountains of material used in the preparation of this work. In the end, it is the hope of this author that the book will provide something which hithertofore has been lacking — a complete, all-in-one-place, heavily documented history of evolutionary thought.

Bert Thompson, Ph.D.

September, 1981

*The History Of
Evolutionary Thought:
An Introduction*

1

The History Of Evolutionary¹ Thought: An Introduction

The great Roman statesman, orator, and man of letters, Marcus Tullius Cicero (106-43 B.C.), sagely said: "History is the witness of the times, the torch of truth, the life of memory, the teacher of life, the messenger of antiquity." Cornelius Tacitus, (55?-117 A.D.), Roman historian, Governor of Asia, and son-in-law of Julius Agricola, cogently commented: "The principle office of history I take to be this: to prevent virtuous actions from being forgotten, and that evil words and deeds should fear an infamous reputation with posterity."

¹ The reader is advised that in this book the word "evolution" is used to refer to the "General Theory of Evolution" which says that "... all the living forms in the world have arisen from a single source which itself came from an inorganic form" (Cf: *Implications Of Evolution*, G.A. Kerkut. Pergamon Press. New York. 1960. p. 157). This is "molecule to man" type evolution, as it is often called. While it is true that evolution is a word with many meanings, it is the purpose of this book to discuss only "organic evolution" as such. For an excellent summary of the various types of evolution, the reader is referred to *Evolution And The Scientific Method* by Dr. James D. Bales (privately published at 707 E. Race St., Searcy, Arkansas, 1976), pages 21-29.

History, in general, is somewhat enticing, somewhat intriguing. As history rolls past our minds and parades before our thoughts we are reminded of the words of Augustine Birrell when he said, "History is a pageant . . ." And so it is. History is a pageant of all that has gone before — the men, the women, the children, the activities. History is our "looking glass" into times gone by — what we reminiscingly call "the past." History is our "time machine," whereby we may venture not into the future, but into the past. History is our means of becoming cognizant of the successful achievements of bygone generations. History is our benefactor, not simply in that it tells us of success, but in that it brings to our attention mistakes of bygone generations as well. From those stories of success we benefit; from those of failure we learn. As Carlyle so aptly adduced: "Histories are as perfect as the historian is wise . . ." Truly, history has the capabilities of preventing virtuous actions from being forgotten, while at the same time causing evil words and deeds to fear an infamous reputation with posterity.

The history of evolutionary thought is a case in point. It is a history filled with both word and deed. It is a history that has spanned over 2700 years and all seven continents. It is a history that has seen lives changed — sometimes for good, sometimes for bad. It is a history that has refused to remain static. From its earliest beginnings to its most recent times the history of evolutionary thought has been a history of controversy. By its very nature it must be so. That is the nature of its initial impact, the nature of its final outcome.

Ralph Waldo Emerson, in his famous *Essays*, remarked: "There is properly no history, only biography." In regard to the history of evolutionary thought, a truer statement would be difficult to imagine. Of a truth, the history of evolution is totally immersed in the history of its friends and its foes. There is no separating the history of evolution from the human elements involved in it. To discuss one is to discuss the other. To try to discuss the history of evolutionary thought apart from its pervading

personalities would inflict great damage on a topic of immense importance.

This book on the history of evolutionary thought has as its goal the investigation of the theory of evolution and the men and women who have either befriended or belittled it. No attempt whatsoever will be made to separate the human element from the theoretical element. To attempt such would be sheer folly, and would serve no useful purpose. We invite the reader to travel back into the annals of history on a most interesting and educating journey as we carefully examine the history of evolutionary thought, in hopes that when the last sentence of this book is completed the history of evolutionary thought will be abundantly clear.

*A Long Trail
A'Winding*

2

A Long Trail A'Winding

When Dr. Henry M. Morris comments in his book, *Education For The Real World*, that “people of all other beliefs in all ages have been evolutionists of one sort or another,”² he does us a great favor in bringing to our attention something which many of us often forget — that is, that the theory of organic evolution is by no means new. Though the popular acceptance of the theory of evolution dates from the publication in November 1859 of *The Origin Of Species By Means Of Natural Selection* by Charles Darwin, Darwin did not originate the theory of evolution as many have supposed. Far from it, in fact.

As far as we can determine, the concept of evolution had its beginnings about 700-650 B.C. in the province of Ionia in Greece.^{3 4} Defining evolution as the development of the more complex forms from the simpler, we

² Morris, Henry M. *Education For The Real World*. Creation-Life Publishers. San Diego, California. 1977. p. 55.

³ Actually Ionia was not a part of mainland Greece, but was instead a name given to a part of the coast of Asia Minor and the nearby islands. The earliest Greek scientists did not live on the mainland of Greece, but in Ionia.

⁴ Actually the ideas behind Thales' theory of evolution were not exactly original with him either. Somewhat similar constructs can be found in the writings of even more ancient Chinese and Hindu philosophies, as well as those of Egypt, Assyria, and other ancient na-

begin our history with Thales of Miletus (640-546 B.C.), who first advanced the idea of a cycle of development. The oldest name mentioned in Greek science is Thales (pronounced Thay-leez). He was born in Miletus in Ionia, but he traveled much into Greece proper, Crete, and Egypt. One of the seven "wise men" of ancient Greece, he was the first to realize that the stars were more than mere signs in the sky to be translated into fantastic meanings. He founded the earliest school of Greek philosophers. He also developed geometry, and put it to such practical uses as measuring the height of trees or buildings, and determining the distance of ships at sea. He drew maps of the most noticeable stars in the heavens — a task that no man before him had attempted. In 585 B.C. he foretold an eclipse of the sun, and when the eclipse actually occurred (proving the accuracy of his prediction) he rose to a fame that has lived through the ages. His greatest claim to fame was through his astronomy, and as the father of geometry. Dr. J. B. Birdsell, in his book, *Human Evolution*, has stated that Thales

“. . . was the first ancient to leave a record of an orderly approach to the interpretation of natural phenomena.

4 *Continued* —

tions. The Egyptians had long believed in spontaneous generation. As they looked out over the banks of the Nile River they saw nothing. After the Nile had flooded the land and receded, frogs, toads, snails, and worms appeared. This appearance the Egyptians assumed to be due to spontaneous generation. The Chinese, in examining plants where silk worms were bred, would one day see nothing on the leaves, and the next day would notice aphids (tiny plant lice) covering those same leaves. This appearance "from nothing" the Chinese assumed to be spontaneous generation. These, and other numerous examples which could be given, establish the fact that even before Thales' time people were moving toward a theory of evolution. We credit Thales with the first pronouncement of the theory of evolution because, so far as can be ascertained, he was the first to elucidate the theory in a clear, coherent style which demanded evolution from the simple to the complex. More will be mentioned later concerning the ancients' beliefs in spontaneous generation, as we deal with that subject in regard to van Helmont, Redi, Spallanzani, Pasteur, and others.

He broke away from mythological explanations, and expressed his belief that all life had originated in and rose out of the waters of the seas . . .”⁵

Thales began with the single material cause — water, which in turn developed into the other elements. He held that these first developed into the bodies of plants, then into simpler animals, and finally into more complex forms such as man. Thales felt that all unsuccessful forms supposedly reverted back to those elements from which they sprang.

Thales’ ideas survived through the students he taught, and were propagated by these students. One such student was Anaximander (611-547 B.C.), also of Ionia, who produced a complete but “childishly clumsy”⁶ hypothesis of evolution. Anaximander was a Greek philosopher who was born in Miletus, where he also lived and studied. He is perhaps best known as the man who made the first map of the world.

Anaximander believed in the existence of a “primordial mass.” He felt that the earth had come about through a kind of condensation of water. Originally the earth consisted of mud which floated on the surface of an earth centered under a circular vault of sky. The “primordial mass” perpetually gave off a series of shapes of matter, which in turn resolved themselves into plant forms. These in turn resolved themselves into animal forms of ever-increasing complexity. It is interesting to note that Anaximander taught that men were derived from fishes (or fishlike forms). Man’s helplessness at birth was supposedly “proof” of his inadequacy for terrestrial existence. Later, these men-fish cast off their scaly skin and came out upon dry land, where they lived thereafter. Anaximander felt that all derived forms were held to return ultimately to the primordial mass from

⁵ Birdsell, J.B. *Human Evolution*. Rand McNally. Chicago. 1972. p. 22.

⁶ *Ibid.*

which they sprang. The primordial mass, Anaximander said, was eternal.

Like Thales, Anaximander's ideas (with some modification) were carried forward by his students. One such pupil and friend was Anaximenes (exact dates of birth and death not available). Anaximenes held the same belief as his teacher Anaximander, with one difference. He assumed the "primordial mass" to be the all-generating air. It is quite remarkable that Anaximenes noticed that air contracts and expands. Because of this, he considered it to be animate.

Yet another pupil of Anaximander, Xenophanes (530?-?? B.C.), held that land animals were derived from aquatic forms. Xenophanes made reference to fossil shells and seaweeds that were found on mountains and in quarries as proof that portions of the land had been once covered with water. Thus, even at this early date we find an appeal being made to paleontological evidence to support a theory of change in form and environment.

Heracletus of Ephesus, Ionia (540-475 B.C.), often called the "weeping philosopher," held that the only reality is change, that everything is always becoming something else. He is noted for his concept of a continual, universal process of flux, having two sides — generation and decay. He made change, or transition, the dominant theme of his philosophy. (He also thought that fire was the principle of life — the single element of all matter.) Reminiscent of Darwin's "struggle for existence" is the concept of Heracletus that individual things endeavor to maintain themselves in permanence against the universal process of destruction and renovation.⁷

Empedocles (490-435 B.C.) was born in Agrigentum,

⁷ We cannot help but remember here the statement of the famous historian, Jacques Barzun, in his work, *Darwin, Marx, Wagner*: "Darwin was not a thinker, and he did not originate the ideas he used" (second edition, Doubleday, Garden City, New York, 1959, p. 84).

Sicily. He postulated four fundamental elements — earth, fire, water, and air. These supposedly formed underground masses which were then cast out on the surface in shapeless lumps — only to be drawn together to become parts of bodies. Empedocles hypothesized that some of this “drawing together” would be unworkable and would therefore perish as failures. Others survived, the most successful of which became capable of reproduction. First the simplest forms were said to achieve this perfection, then the more complex, and finally man. Empedocles held that chance alone was responsible for this entire process, and that in essence man “evolved” from prior plant life.

Democritus (460-370? B.C.) lived in the Greek city of Abdera. The story is told that his father was very wealthy, and that upon inheriting his father’s wealth, Democritus sold the property and used the money to travel to the East in search of knowledge. Like Thales and Pythagoras, he studied in Egypt. The story is also told that the people of his native town, Abdera, once thought him insane and called in the famous physician, Hippocrates, to cure him. Hippocrates is reported to have had a very pleasant conversation with Democritus and then to have announced that if there was any madness in that town, it was in the people who had called him there, not in the mind of Democritus. Whether the people of Abdera finally decided Democritus mad or genius, or both, they gave him the striking nickname of the “laughing philosopher.”

Democritus was a member of the Greek school known as the atomists.⁸ In fact, Democritus was the first to use the word “atom” in science. He seems to have held views similar to those found in the atomic theory of Dalton. He taught that all things were made of atoms, with empty space in between. In fact, he believed that “there is a

⁸ Another member of this school of thought was Leucippus. He shared the ideas of Democritus in regard to atoms but he called them “seeds” instead.

bitter and a sweet, a hot and a cold, and according to convention there is color. In truth, there are atoms and a void.”⁹ These atoms, he felt, were uncaused, eternal entities that varied in size and shape but not in substance.

Democritus was also the first one to advocate the doctrine of pangenes, which was an attempt to explain the inheritance of “acquired characteristics” by means of “pangenes.” These pangenes were considered to be representative particles that came from all over the body and entered into the semen of the male. Aristotle flatly rejected the Democritean theory of pangenes, pointing out that if hereditary material consisted of pangenes derived from all over the body, a man who has lost an arm should not have a child with the usual complement of two. yet he does! Where did the missing pangenes come from? Actually, this pangenes is nothing but a form of evolution similar to what Lamarck propounded later in his theory of evolution based on acquired characteristics.^{10 11}

Plato (427-347 B.C.) seems to have reversed the idea of improvement by change from one life form to another. Rather, he assumed that the human male represented the zenith of perfection, and that all other forms of life represented varying degrees of degeneracy from the ultimate. For example, in his *Timaeus*, he represents woman as the first stage of transmigration from the form

⁹ Dampier, William C. *A History of Science*. Cambridge University Press. New York. 1944. p. 26.

¹⁰ Lamarck's theory of evolution based on acquired characteristics will be fully examined later in the text.

¹¹ It is also interesting to note that Charles Darwin, in his later years, resorted to a theory of the inheritance of acquired characteristics and thus to a revived form of Democritus' pangenes. Darwin even went so far as to speak of “gemmules” instead of pangenes as the representative particles, which he held also entered the germinal material. Once again we are reminded of Barzun's statement: “Darwin was not a thinker, and he did not originate the ideas he used” (see footnote #7).

of man.¹² Fish were supposed to be men who had departed so far from the ideal that they could no longer breathe pure air.¹³

“Of course,” says Dr. Wilbert H. Rusch in *Darwin, Evolution and Creation*, “all these concepts of origins were the product of pure reasoning and speculation rather than direct study and observation. It should be remembered that Plato’s main concern was not biology. These views were just incidental to his main philosophy which had to do with ideas.”¹⁴

It was probably Plato’s student and successor, Aristotle (384-322 B.C.) who left the greatest mark on evolutionary thought through the ages. He has been called “the greatest of all the Greek scientists.”¹⁵ He was born in the little town of Stagira in the northern part of Greece. His father was physician to the King of Macedonia. Plato, a pupil of Socrates, had followed his master as the greatest of the Athenian philosophers. At the age of eighteen, Aristotle made the long trip from Stagira to Athens to study at the feet of Plato. Soon Aristotle became prominent at the Academy, devoting himself to science in all of its branches. He became a popular lecturer, and was the private tutor of Alexander the Great while he was but a small child. Later he established his own school in Athens, the Lyceum. The school became famous as a place where scientists gathered to work out problems and extend the boundaries of knowledge.

Although Aristotle wrote books on astronomy, physics, politics, poetry, and almost everything else, the work for which scientists best remember him is his work with

¹² Plato. *Timaeus*. The Humanities Press. New York. 1952. p. 29.

¹³ *Ibid.* p 48.

¹⁴ Rusch, Wilbert H. “Darwinism, Science, and the Bible.” *IN: Darwin, Evolution and Creation*. Paul Zimmerman, Editor. Concordia. St. Louis, Missouri. 1959. p 8.

¹⁵ McLoughlin, E.V. (Editor). “Men of Science.” *IN: The Book of Knowledge*. Grolier Society. New York. 1957. p 591.

animals. He founded the science of living things — biology. Aristotle was a great collector of living forms, mentioning in his books (ten of which are still in existence, dealing only with biology) some 500 different animals with an accuracy and detail that indicate acute personal observation from his own firsthand dissections. He was the first to dissect fishes, snakes, insects, and octopuses scientifically. Many of his diagrams are so accurate that it is said they could be placed into modern biology texts without significant alteration. Aristotle was the first to study embryology, and the first to classify animals.

Aristotle was a teleologist, holding that everything in nature is the result of intelligent design and direction. He believed that a purposive force created a primordial mass of living matter from which all the forms of life (from the simplest plants to the most complex animals) evolved. He held that nature fashioned organs in the order of their necessity, the first being those essential to life. Dr. J. B. Birdsell has observed:

“His primary contribution consisted of a system of thought based upon an evolution which was subject to rigid laws and which reflected a guiding intelligence. His evolutionary changes appropriately proceeded from lower to higher forms. In the Aristotelian system of logic the realities of nature became incorporated in the type (*eidōs*). This abstract type was unchanging, fixed, and real. Observable variations within populations he considered to be an illusion or to represent accidental or pathological deviation from the true type.”¹⁶

Aristotle and Empedocles both operated by the study of actual living things, in contrast to Plato who considered experimentation almost immoral. However, Empedocles differed from Aristotle by holding that pure chance was the sole force, whereas Aristotle believed a purposive force was the directing factor in all natural phenomena.

Epicurus (342-270 B.C.) followed Aristotle in many of his ideas so far as the development of living things was

¹⁶ Birdsell, J.B. (see footnote #5) pp 22-23.

concerned, but he departed from Aristotle's concept of the purposive force, holding that natural laws due to mechanical causes inherent in nature itself were responsible for any and all natural phenomena.

With the rise of the Romans to power, intellectual pursuits became much less common and of much less importance. As far as the history of evolutionary thought is concerned, Titus Lucretius Carus (or Lucretius as he is more commonly known; 98-55 B.C.) is the only name actually worth mentioning in this regard.¹⁷ Lucretius was a Roman poet who wrote a six-volume work, *De Rerum Natura*. The problems of origins were dealt with in the fifth volume. Lucretius felt that the earth was created by the chance collision of atoms. He traced the progressive development of plant and animal forms from the mother earth. According to him, many forms of life existed and died out, while some survived by the protection of craft, courage, or speed. Man supposedly developed out of a primitive, hardy, beast-like condition into the civilized form of Lucretius' day.

After the decline and fall of Rome's power, theologians became the dominant thinkers of the day. As a result, evolutionary thought was evidently not as pronounced as it had previously been. Some would even go so far as to say that it was stifled. Whatever may be the case, one thing is for certain: this was by no means the end of the matter.

Some have accused Augustine (354-430 A.D.) of being an evolutionist. It is true that he did not believe in a literal six-day creation as taught in Genesis 1 (Cf: Exodus 20:11 and 31:17). He felt that it was simply beyond the power of man to know or to say.¹⁸ Yet it is probably somewhat

¹⁷ Galen (130-200 A.D.) was probably the only other figure of note in the biological sciences, but his operations were restricted to the field of medicine. Also, he held that God had created man for an intelligible end.

¹⁸ *City of God*. Modern Library. Random House. New York. 1950. p 350.

of an overstatement to say he was a true evolutionist. Probably the truth lies somewhere in between. It is likely that Augustine was a theistic evolutionist.¹⁹ Davidheiser²⁰ feels this is the case. According to Henry Fairfield Osborne, former head of the American Museum of Natural History in New York, if the ideas of Augustine had been accepted by the early church to the present time, evolution would not be a problem, for many people would just naturally accept it.²¹ This tends to support the hypothesis that Augustine was a theistic evolutionist. It seems evident that Augustine at least partially accepted Aristotle's views and in some ways tried to correlate them with Genesis.

Thomas Aquinas (1225-1274 A.D.) is also sometimes listed as contributing to evolutionary thought. There are varying views on this. Rusch²² feels Aquinas was probably just reporting the views of others, although Rusch does go on to say that Aquinas' views are not at all clear and that he probably followed Augustine. McGuiggan²³ states categorically that Aquinas accepted at least some evolution, and tried to harmonize it with Genesis. Again, it seems to be the case that Aquinas was, like Augustine, a theistic evolutionist.

An interesting side note is that near the close of the 16th century, a Spanish theologian and Jesuit monk by the name of Francisco Suarez (1548-1617) took strong

¹⁹ For a complete examination and refutation of theistic evolution, see: *Theistic Evolution*. Bert Thompson. Lambert Book House. Box 4007. Shreveport, Louisiana. 1977.

²⁰ Davidheiser, Bolton. "History of Evolution: I" *IN: And God Created, Volume I*. Kelly L. Seagraves, Editor. Creation-Science Research Center. San Diego, California. 1973. pp 84-85.

²¹ *Ibid.* p 84.

²² Rusch, Wilbert H. (see footnote #14) pp 11-12.

²³ McGuiggan, Jim. "Class Notes On Evolution." Privately published by Sunset School of Preaching. 34th & Memphis. Lubbock, Texas. No date. pp 9-10.

exception to the views of Augustine in a tract entitled *Tractatus de Opere Sex Dierum*. Suarez pointed out that the natural interpretation of Genesis indicated that the creation of the world did take place in six 24-hour days. As Davidheiser remarks: "A great deal of credit belongs to Suarez for opposing the idea of theistic evolution which was accepted by Augustine."²⁴ It is true that after Suarez's tract Augustine's view fell into general disrepute.

As the years went on, various naturalistic and mechanistic philosophies were constructed to account for the things man saw around him. Little did Thales realize what he had "started" about 650 B.C. As Dr. Milton K. Munitz, Professor of Philosophy of Science at New York University has observed:

"The type of thinking initiated by the Milesian school of pre-Socratic thinkers — Thales, Anaximander and Anaximenes — in the sixth century B.C. was carried forward in many directions. One of the most remarkable of such speculations, representing a culmination of their materialistic thought, was to be found in the Atomist school. Originally worked out in its main features by Leucippus and Democritus in the fifth century B.C., the teachings of atomism were later adopted as a basis for the primarily ethical philosophy of Epicureanism . . . It elaborates the conception of a universe whose order arises out of a blind interplay of atoms rather than as a product of deliberate design; of a universe boundless in spatial extent, infinite in its duration and containing innumerable worlds in various stages of development or decay . . . It was the same conception, however, which once more came into the foreground of attention at the dawn of modern thought and has remained up to the present time an inspiration for those modes of scientific thinking that renounce any appeal to teleology in the interpretation of physical phenomena."²⁵

²⁴ Davidheiser, Bolton. (see footnote #20) p 85.

²⁵ Munitz, Milton K. *Theories of the Universe*. The Free Press. Glencoe, Illinois. 1957. pp 63-64.

*Evolution Comes
Of Age*

3

Evolution Begins To “Come Of Age”

Jon Gary Williams, in his excellent work, *The Other Side Of Evolution*, paints a word picture which helps the reader understand what was about to happen in the history of evolutionary thought as the 18th century opened. We quote from him here:

“The dark ages which for so long had kept people in religious and scientific error were swiftly passing. There was a ‘spirit of extensive and free inquiry as opposed to the authoritative methods of the Catholic church.’ One of the evil effects of this darkened period was that the ironclad hand of Catholicism had become synonymous with religion and the Bible, and it was this distorted view of religion against which many had been rebelling. Men were thinking for themselves, reaching out for something to which they could hold. Study and research was (sic) expanding in every direction and by the late 18th century a great many changes had taken place. The so-called ‘Age of Reason’ had dawned! During this time some became carried away with intellectualism and natural philosophy. Such men were prone to be skeptical of almost anything religiously oriented, seeking to satisfy their minds elsewhere. It was in the midst of this atmos-

phere of thought that the modern concept of evolution emerged.”²⁶

Immediately upon hearing the phrase “the modern theory of evolution” the average person conjures up thoughts of Charles Darwin, Alfred Russell Wallace, Thomas Henry Huxley, and a host of other men normally associated with the theory of evolution in recent times. Yet there is much ground to cover, many stories to tell, many personalities and ideas to explore before we reach those famous men. Our journey will eventually lead us to Darwin’s doorstep, where we will find men like Wallace and Huxley waiting. But first we must do justice to the precursors of these men. No history of evolutionary thought would be complete without such an examination.

One of the prominent men in the history of evolutionary thought during the 18th century was Maupertuis. Maupertuis, who lived at the same time as Voltaire (1694-1778), was a scientific genius in the eyes of many historians. A physical scientist rather than a biologist, he is the man who proved that the earth flattened toward the poles. In so doing, he obtained evidence for Newton’s law of gravitation. Maupertuis at one time ventured into the field of biology to investigate evolution, thus anticipating Darwin by a century. He formulated a theory of natural selection by survival of the fittest, and also anticipated DeVries regarding mutations, saying that the mutations were the means by which evolutionary creation came about. (He even recognized the fact that most mutations are harmful to the host.)

Maupertuis anticipated Gregor Mendel in the understanding of heredity. He was very famous in his day, yet he is hardly remembered at all today. It would probably

²⁶ Williams, Jon Gary. *The Other Side of Evolution*. Gospel Advocate Company. Nashville, Tennessee. 1970. p 2. [NOTE: The second sentence in Williams’ quote is taken from: *Evolution And Revelation* by Dr. W.O. Davis. Firm Foundation Publishing House. Austin, Texas. No date. p 86].

be safe to state that most people who believe in or study the theory of evolution today have never even heard the name of Maupertuis, much less heard of his contributions to evolutionary thinking. He is not remembered in the annals of history primarily because his former friend, Voltaire, took a sudden and drastic disliking to him, and ruined his reputation by writing nasty things about him. Who among us would doubt Voltaire's caustic wit? It is sad that Maupertuis fell victim to it. It is, however, instructive to note that Maupertuis developed his theory of evolution out of an extreme desire to refute the idea that there is evidence in nature of God. He was not the first to do so; neither has he been the last.

Many who chart the course of evolutionary thought also include the Swedish biologist, Linnaeus (or, as he was born, Carl Linne [1707-1778]). He is primarily known, of course, as the father of taxonomy, being the originator of the binomial system of nomenclature in biology, as well as the compiler of a vast amount of information on plants and animals of his day. His great work was *Systema Naturae*. Yet while we commend Linnaeus out of one side of our mouth for his great work in taxonomy, we must at the same time criticize him out of the other side of our mouth. It is a sad yet true fact of history that it was Linnaeus who identified the Scriptural "kind" with "species," holding that the species of animals and plants were created as a single adult pair. He thus saddled creationism with the false concept of "fixity of species." From 1650 to the present many creationists have mistakenly held that the creation of plants and animals refers to the creation of Linnaean "species." Oddly enough, although Linnaeus originated the aforementioned concept, he himself seems to have abandoned it later and considered that genera, not species, represented the created level. The controversy he started still continues to this very day, and has been a source of contention since its inception in the time of Linnaeus.

Among the first who can be considered the *immediate* precursors of Darwin was Georges Louis de Buffon

(1707-1788), a distinguished French natural philosopher. Evolutionist Ernst Mayr is correct when he says: "The idea of evolution had been widespread for more than 100 years before 1859. Evolutionary interpretations were advanced increasingly often in the second half of the 18th and the first half of the 19 centuries" ²⁷ Buffon was among the number of men who were postulating evolution in one form or another.

Buffon, who held a law degree, became interested in forestry, particularly the properties of timbers, and their improvement on his family estates. He organized the known phenomena of nature into a rigid system governed by physical laws. He translated Newton's *Fluxions* into French before writing his own contribution which was entitled *Histoire Naturelle* and consisted of 15 volumes. Included in this great work were essays on the theory of the origin of the earth, and its development into an environment fit for living creatures. Buffon flatly rejected the biblical account of creation and postulated a very old age of the earth. He divided earth history into seven periods, beginning with its creation and ending with the advent of man.

It seems somewhat more than mere coincidence, at least to some historians, that in his great work *Histoire Naturelle* we find the salient points of Darwin's *Origin Of Species* (remember that Buffon's work preceded Darwin's by about 100 years). The points are, briefly: (1) the tendency of living things to outstrip their food supply; (2) variations with species; (3) similarity of structure among living forms; (4) the need for a longer period of time than is allowed for in the Bible. Buffon, of course, firmly believed in a change in form from one animal type to another.

Leopold Christian Frederick Dagobert Cuvier was, it has been said, one of the most brilliant scientists who glittered with stars and metal braid at the court of the

²⁷ Mayr, Ernst. "The Nature of the Darwinian Revolution." *IN: Science*. Vol. 176, June 2, 1972. p 981.

great Napoleon. He was, in fact, a favorite of Napoleon, and seems to have been as accustomed to having his own way in science as Napoleon was to having his own way on the battlefield. But to science, this man from the court of Napoleon is best known as Georges Cuvier (1769-1832). He was born of French parents in a town then belonging to the German state of Wurttemberg. As a boy he was sent to a German school where officials and army officers were trained. His only language was French, but he quickly learned German as well. He was a young man when the French Revolution broke out.

Cuvier carried on the great work of Linnaeus and greatly improved the classification of animals. But even more important was the fact that he was the first to make systematic studies comparing the remains of extinct animals (fossils) with the structure of existing species. Although fossils had been known since the time of the ancient Greeks, and were known to be the remains of extinct animals, there were still some people who considered them mere "freaks of nature." Cuvier showed that some of the fossils were very similar to living types, and that others were very different. Perhaps more than anyone else he deserves credit as the founder of paleontology.

Cuvier thought that several times in the past there had been great catastrophes, wiping out vast populations of living things at one time. He thought of these catastrophes as something more terrible and awesome than anything that was currently being observed on the earth. He not only believed in a succession of local destruction of organisms, but he believed that those organisms destroyed were then replaced by those migrating in from other regions. He was quite skilled in diplomacy, and was an eloquent speaker. He was also an accomplished writer. In 1812 he published his famous *Ossemens Fossiles*. He was a creationist (of sorts) and devoted a great deal of time and effort to the refutation of evolutionary theories. In spite of his many great scientific achievements, Cuvier made some serious errors, yet due to his great

fame these errors went unnoticed until later generations. His firm stand against evolution, however, can hardly be overlooked.

One of the most distinguished of Cuvier's pupils was the English paleontologist, Sir Richard Owen (1804-1892). Owen's early ambition was to go to sea as a ship's doctor, but while he was waiting for an opening in the navy he was placed in charge of the natural history collections of the Royal College of Surgeons. That assignment was to change his life. He dissected hundreds of animals and spent years on an investigation of the teeth of mammals. In 1856 Owen became the Director of the Natural History Department of the British Museum.

Following Cuvier's example, Owen was able to predict the general structure of an extinct animal from a comparatively small fossilized portion. Once Owen was sent a fossilized leg bone of a bird from New Zealand. Nothing else was sent but this queer bone, some thirty-four inches long. Using his own knowledge and the bone, he was able to describe the great wingless bird, *Dinornis*. Since his reconstruction, many remains have been found in New Zealand and it is clear that Owen was substantially correct.

Owen, like so many scientists after Linnaeus and Cuvier, believed in the fixity of the species as well. He was violently opposed to organic evolution, even though in his day and time many were beginning to believe in it. The scientific world still believed, for the most part, that species do not change, and that *each* individual species had been separately created. Owen and Cuvier stand out as two who opposed evolution vehemently in a time when so many others were both accepting and promulgating it.

During the latter part of the 18th century, the name of James Hutton (1726-1797) became quite familiar in the halls of science. Hutton was a Scottish medical doctor who had studied in universities in both Edinburgh and Paris. For reasons not completely understood, Dr. Hutton turned from human medicine and dabbled in agri-

culture. Then, at the “ripe old age” of 42 he “retired,” only to devote the remaining years of his life to scientific pursuits. Geology was at first a hobby to him, but later became his life’s pursuit. In fact, it has been said that he may also “fairly be called one of the founders of modern geology.”²⁸

Hutton is generally regarded as the father of uniformitarianism. This is extremely important since “the doctrine of uniformity is the foundation of the modern acceptance of the various hypotheses of evolution.”²⁹ Professor C. R. Longwell claims that Hutton’s greatest contribution in his geological pursuits and papers was the “formulation of the uniformitarian principle, which states that natural agents now at work on and within the earth operated with general uniformity through immensely long periods of time.”³⁰ Stated another way uniformitarianism is the view that present processes are sufficient to account for the geologic phenomena in the earth today.

Hutton himself stated the doctrine of uniformity as follows:

“Not only are no powers to be employed that are not natural to the globe, no action to be admitted of except those of which we know the principle, and no extraordinary events to be alleged in order to explain a common appearance, the powers of nature are not to be employed in order to destroy the very object of those powers; we are not to make nature act in violation to that order which we actually observe, and in subversion of that end which is to be perceived in the system of created things. In whatever manner, therefore, we are to employ the great agents, fire and water, for producing those things which appear, it ought to be in such a way as is consistent with the propagation of plants and the life of animals upon the surface of the earth. Chaos and con-

²⁸ Adams, Frank Dawson. *The Birth And Development of the Geological Sciences*. Williams and Wilkins. Baltimore. 1938. p. 239.

²⁹ Clark, Robert T. and J.D. Bales. *Why Scientists Accept Evolution*. Baker Book House. Grand Rapids, Michigan. 1966. p 11.

³⁰ Longwell, C.R. *IN: Encyclopedia Britannica*. Vol. 10. 1962. p 170.

fusion are not to be introduced into the order of nature, because certain things appear to our partial views as being in some disorder. Nor are we to proceed in feigning causes, when those seem insufficient which occur in our experience.”³¹

Since Hutton’s hypothesis involved ‘the exclusion of all causes not supposed to belong to the present order of nature,’³² he had to explain all past events in terms of present day causes. As Drs. Clark and Bales point out in their work, *Why Scientists Accept Evolution*: “If present-day causes do not seem to be sufficient to explain all things, one must postulate vast periods of time in the past in order to give these causes time to produce these physical changes.”³³ This, in fact, is exactly what Hutton did when he said: “In order to produce the present continents, the destruction of a former vegetable world was necessary; consequently, the production of our present continents must have required a time which is indefinite.”³⁴ In fact, Hutton’s conclusion concerning time was that “we find no vestige of a beginning — no prospect of an end.”³⁵

Hutton’s views were radically opposed to the then universally-accepted “catastrophe geology” which claimed that the strata of rocks were laid down in a series of catastrophes of great magnitude. He fully realized this. In an attempt to avoid completely ruling out the idea of God, Hutton limited his hypothesis of uniformity to the world of physical things, and he realized that his theory

³¹ Quoted in: “Theory of the Earth.” *IN: A Source Book in Geology*. Kirtley F. Mather and S.L. Mason. McGraw-Hill. New York. 1939. p 95.

³² Lyell, Charles. Quoted in: *More Letters of Charles Darwin*. D. Appleton & Co. New York. 1903. Vol. II. p 149, footnote.

³³ Clark, Robert T. and J.D. Bales. (see footnote #29) p 12.

³⁴ Hutton, James. “Theory of the Earth.” *IN: Transactions of the Royal Society*. Edinburgh. 1785. Vol. I, p 301. Quoted by Harold W. Clark. *The New Diluvianism*. Science Publications. Angwin, California. 1946. p 5.

³⁵ *Ibid*. p 304.

dealt only with the present order of things. Thus he wrote, concerning the system of rivers on the earth, that it “is then to be considered as an object of design; and, in this design, we may perceive either wisdom, so far as the ends and means are properly adapted, or benevolence, so far as that system is contrived for the benefit of beings who are capable of suffering pain and pleasure or of judging good and evil.”³⁶³⁷ Nevertheless, he set the stage for what was to come in regard to the acceptance of evolutionary thinking. His “present is the key to the past” dogma was to usher in much more than he realized (or probably intended).

Two men — a German and an Englishman — carried forward the work done by Hutton. The German, A.G. Werner (1749-1817) became famous for his “onion coat” theory, which stated that the various strata of the earth appear in concentric shells. The Englishman, William Smith (1769-1839), taught that fossils occurred in definite strata or layers in a definite order. (He even picked up the nickname of “Strata” Smith.) Smith came across strata during his studies (by the way, Smith was a canal engineer; geology was merely his hobby) which had certain kinds of fossil shells in them. He discovered that these same kinds of fossils could be found in similar deposits elsewhere in England. He then claimed one could look at the shells found and know which strata they were found in. Conversely, one could approach the strata and predict the nature of the fossil finds. We would credit Smith, then, with introducing for the first time the concept of “index fossils.” This, of course, was to become a major element in evolutionary doctrine.

Erasmus Darwin (1731-1802), the grandfather of the now famous Charles Darwin, was a medical doctor (as was his son, Robert, Charles’ father), a scientist, and a poet. He was a fairly prolific writer, and often wrote long

³⁶ *Ibid.* p 566.

³⁷ For further statement which indicates Hutton’s belief in God, see footnote #31, p 95.

poems with such strange titles as "The Loves Of The Plants" and "The Origin Of Scoiety." He was an ardent evolutionist, and paved the way for much of Charles Darwin's work which was to follow later. He produced a two-volume work entitled *Zoonamia*, the first volume of which appeared in 1794. This work was translated into French, German, and Italian. In the preface he stated that there was "a certain similtude on the features of nature . . . that the whole is one family of one parent."³⁸ He even used the term "evolution" and considered that it was brought about by the "power of acquiring new parts, attended with new propensities, directed by irritations, sensations, volitions, and associations, and thus possessing the faculty of continuing to improve by its own inherent activity and of delivering those improvements by generation down to its posterity, world without end."³⁹ In his *Temple Of Nature* he manifestly taught the upward trend in evolution and the prime importance of natural selection and the survival of the fittest.

Jacques Barzun, in his classical work, *Darwin, Marx, Wagner*, devotes considerable space to writings of Samuel Butler, a contemporary of Charles Darwin. Barzun mentions that "after comparing Darwin's theory in all its vaccillating forms . . . Butler came to the conclusion that the grandfather, and not the grandson, had met most nearly the difficulties involved in any evolutionary hypothesis."⁴⁰ Professor C.D. Darlington, writing in *Scientific American*, has echoed exactly the same sentiments: ". . . Erasmus Darwin originated almost every important idea that has since appeared in evolutionary theory."^{41 42}

³⁸ Darwin, Erasumus. *Zoonamia*. Thomas & Andrews. Boston. 1803. Vol. I. Preface.

³⁹ *Ibid.* p. 572.

⁴⁰ Barzun, Jacques. *Darwin, Marx, Wagner*. Doubleday. Garden City. New York. 1958. p 108.

⁴¹ Darlington, C.D. "The Origin of Darwinism." *IN: Scientific American*. Vol. 201. May, 1959. p 62.

⁴² See next page please.

Darlington goes on to tell of the accomplishments of Erasmus Darwin:

“He supposed that competition and selection were means of change: that overpopulation was a continual agent in enhancing competition; that this was true in plants as well as in animals; that in animals another important kind of selection arose from competition between males in pursuit of the female; that fertility and susceptibility to disease, being hereditary, were fields of selection. He took Comte de Buffon’s notion of the inheritance of acquired characteristics and suggested that this inheritance might be not only direct but also indirect: that the effects of use and disuse might be inherited.”⁴³

Erasmus Darwin’s works included all the major aspects which were to be employed by men who were to follow him. Yet seldom is he given credit for his ideas and beliefs. Four years after *Zoonamia* appeared, Thomas Malthus developed one of its ideas into his *Essays On Population*. Nine years after *Zoonamia*’s appearance, Lamarck expounded a theory of evolution based on Erasmus Darwin’s “use and disuse” comments. Seventy years later Charles Darwin was to write a book on sexual selection, borrowing ideas originally found in his grandfather’s work.⁴⁴

What were Erasmus Darwin’s thoughts on God and religion? He had a great disdain for Christians, it is clear. His attitude can perhaps best be summed up in his statement: “As for the being of a God, the existence of a soul, or a world to come, who can know anything about them?

⁴² Once again we are reminded of Barzun’s statement: “Darwin was not a thinker, and he did not originate the ideas he used.” (see footnote #7)

⁴³ Darlington, C.D. (see footnote #41) p 62.

⁴⁴ The fact that Charles Darwin did not even mention his various predecessors in his works is worthy of mention, and will be dealt with later in the section on Charles Darwin.

Depend on it, my dear madam, these are only the bugbears by which men of sense govern fools.”⁴⁵

Another pre-Darwinian who supported a belief in evolution was E. Geoffroy St. Hilaire (1772-1844). St. Hilaire was a disciple of Buffon (though he was a contemporary of Lamarck). St. Hilaire believed in the inherited direct action of the environment, but he also advocated a theory that there were certain changes of saltations in organisms which could produce new species. This, of course, was a radical departure from the other thinkers of St. Hilaire's time, yet was an idea that foreshadowed DeVrie's mutation theory. Little did St. Hilaire know that over 200 years later 20th century evolutionists would be reverting back to his "saltation" argument.⁴⁶

No history of evolutionary thought would be complete without a discussion of the English geologist/biologist Sir Charles Lyell (1797-1875). Lyell was born, the first of ten children, to well-to-do parents in Scotland. His father possessed a keen interest in natural history, which may have sparked Lyell's interest in the subject later in his

⁴⁵ Darwin, Erasmus. Quoted in: "Psychological Considerations." *IN: A Critical Look At Evolution*. Robert Camp, Editor. Religion, Science and Communication Research and Development Corporation. Atlanta, Georgia. 1972. p 176.

⁴⁶ The reference made here to 20th century evolutionists is in regard mainly to three men who have tried in recent years to interject into evolutionary thought saltatory mechanisms. The first was the late Dr. Richard Goldschmidt of the University of California. Dr. Goldschmidt suggested that evolution occurred through systemic mutations to produce "hopeful monsters" (Cf: Goldschmidt, Richard. *Theoretical Genetics*. University of California Press. 1955. pp 485-486). The second was the late Dr. George Gaylord Simpson, Harvard's eminent paleontologist. Dr. Simpson felt that "quantum evolution" had occurred (Cf: Simpson, G.G. *The Major Features of Evolution*. Yale University Press. 1966). Only recently (June/July, 1977) Dr. Stephen J. Gould, Professor of Geology and Paleontology at Harvard, has "resurrected" Goldschmidt's "hopeful monster" theory as the mechanism of evolution (Cf: *Natural History*. June/July, 1977. p. 24). Each of these men, and their theories, will be discussed in detail later in this book.

life. Anthropologist Loren C. Eiseley gives this interesting account of Lyell's early life:

"... As Charles Darwin and Alfred Russell Wallace were later to do, the young Lyell collected insects in his boyhood. Absent-minded but versatile, tree-climber and chess player, he matriculated at Exeter College, Oxford, in 1816. Having early stumbled upon a copy of Robert Bakewell's *Introduction To Geology* in his father's library, he sought out Dean Buckland's geological lectures at Oxford, and from then on was a haunter of chalk pits, rock quarries, caves and river terraces.

"In 1818 he made the usual continental tour with his parents and sisters. The slow carriage travel of that day promoted leisurely observation, and Charles made the most of it. He saw the red snow and glaciers of the high Alps as well as the treasures that lie open to the observant in the flints of the common road. Lyell had not as yet settled upon a career in geology. He was destined for the law, and shortly after his graduation from Oxford he came to London to prepare himself for the bar.

"Even in London, however, Lyell was soon elected a Fellow of the Geological Society and joined the Linnaean Society. Two handicaps tended to retard his legal career. His eyes were weak and troublesome, and he suffered from a slight speech difficulty, with which he was to contend bravely in his years as a lecturer on the natural sciences. When he was called to the bar in 1825 he was already contributing articles on scientific subjects to the *Quarterly Review*.

"It has sometimes been intimated that Charles Lyell was 'only an armchair geologist,' that he was scientifically timid, a rich man's son who happened to dabble his way to success in a new science. But in those days there was little in the way of public support for science. Even the great schools were still largely concentrated upon the classical education of gentlemen. Only the man of independent means, like Lyell or Darwin, could afford to indulge his interest in science. With occasional struggling exceptions such as Wallace, it was the amateur who laid the foundations of the science of today. The whole philosophy of modern biology was established by such a 'dabbler' as Charles Darwin, who never at any time held

a professional position in the field. Charles Lyell and his great precursor, the Scotsman James Hutton, similarly laid the foundations of modern geology without claiming much in the way of formal institutional connections.”⁴⁷

If James Hutton originated the idea of uniformitarianism, it was Sir Charles Lyell who made it popular. Lyell is today known as the father of historical geology, and the man who took the unpopular idea of uniformitarianism and made it acceptable to the world. As Eiseley has observed:

“Lyell’s principal precursor, James Hutton, died in intellectual eclipse in 1797, the very year that saw the birth of the man who was to revive his views — so tenuous and yet so persistent is the slow growth of scientific ideas. In the 1780’s Hutton made the first organized and comprehensive attempt to demonstrate that the forces that had shaped the planet — its mountains, boulders and continents — are the same forces that can be observed in action around us today. Hutton had an ear for the work of raindrops, an eye for frost crystals splitting stones, a feel for the leaf fall of innumerable autumns. Wind and frost and running water, given time enough, can erode continents, ran his argument. Peering into the depths of the past, he could see ‘no vestige of a beginning, no prospect of an end.’

“Hutton, though not the first to suspect the earth’s antiquity, nor the work that perfectly natural forces can perform, was the first to write learnedly and extensively upon the subject. His work fell, however, into undeserved neglect. He was criticized as irreligious. In England, particularly in the conservative reaction following the French Revolution, the catastrophism theory, with its grander scenery and stage effects, had a more popular appeal. The world of Hutton by contrast was an unfinished world still unrolling into an indeterminate future. Its time depths were immeasurable, and the public had recoiled from its first glimpses into that abyss.

“Yet this was the domain, and this the philosophy,

⁴⁷ Eiseley, Loren C. “Charles Lyell.” *IN: Scientific American*. Vol. 201. August, 1959. pp 98-99.

upon which Sir Charles Lyell was to force his colleagues to take a long second look. He was a more eloquent and able writer than Hutton. But beyond this he had the advantage of almost 50 years of additional data, including his own personal study of the continental deposits. 'Lyell,' remarks one of his contemporaries, 'was deficient of power in oral discourse, and was opposed by men who were his equals in knowledge, his superiors in the free delivery of their opinions. But in resolute combats, yielding not an inch to his adversaries, he slowly advanced upon the ground they abandoned, and became a conqueror without ever being acknowledged as a leader.'"⁴⁸

It must be remembered that geology at the beginning of the 19th century was known to many in England as a dangerous science. It both attracted and repelled the public. Theological influence was very strong. In fact, many geologists were also theologians, or vice versa. Pressure was strong to avoid conflict with religion. Catastrophism and progressionism were very popular and were formidable opponents.

It was in this atmosphere that Sir Charles published, in 1830, the first volume of his *Principles Of Geology*. "Like most great ideas it was not totally original with its author."⁴⁹ Although Lyell had once accepted Buckland's "catastrophical" theory, he had abandoned it for uniformity before he wrote *Principles Of Geology*.⁵⁰ At the age of 17 he matriculated at Exeter College, Oxford, where he attended the lectures of Dr. Buckland. He had already cultivated an interest in geology and the age of the earth.

"Blakewell's *Geology*, which he found in his father's library, was the first book which gave him an idea of the existence of such a science as geology, and something said in it about antiquity of the earth excited his imagina-

⁴⁸ *Ibid.* p 101.

⁴⁹ *Ibid.*

⁵⁰ *Life, Letters and Journals of Sir Charles Lyell.* John Murray, Inc. London. 1881. Vol. II. pp 6-7.

tion so much that he was well-prepared to take interest in the lectures of Dr. Buckland, Professor of Geology at Oxford.”⁵¹

It was not long until he could speak of “my bias towards a leading doctrine of the Huttonian hypothesis.”⁵²

He viewed uniformity to be of extreme importance to geology. In a letter of January 15, 1829 he wrote of his *Principles*:

“It will not pretend to give even an abstract of all that is known in geology, but it will endeavour to establish the *principle of reasoning* in the science; and all my geology will come in as illustration of my views of those principles, and as evidence strengthening the system necessarily arising out of the admission of such principles, which, as you know, are neither more nor less than that *no causes whatever* have from the earliest time to which we can look back, to the present, ever acted but those *now acting*; and that they never acted with different degrees of energy from that which they now exert.”⁵³

The doctrine of uniformity, however, did not mean to him the same things happened over and over again. He wrote, “My notion of uniformity in the existing causes of change always implied that they must forever produce an endless variety of effects, both in the animate and inanimate world.”⁵⁴ The doctrine of uniformity he advocated so long and so vigorously caused one of his admirers to state this in regard to his work shortly after his death:

“His leading lesson was a belief in the uniformity of the laws of nature: a belief which led him to argue that by studying the changes which are being wrought upon the surface of the earth by the silent action of forces now in operation, we put ourselves in possession of a key to the interpretation of those ancient records which it is the

⁵¹ *Ibid.* Vol. I. p 32.

⁵² *Ibid.* Vol. II. p 4.

⁵³ *Ibid.* Vol. I. p 234.

⁵⁴ *Ibid.* Vol. II. pp 2-3. March 7, 1837.

special business of the geologist to decipher. Sir Charles, indeed, developed with singular success the great truths which were first enunciated by Dr. Hutton of Edinburgh, and eloquently illustrated by his friend Professor Playfair. Hutton died in 1797, and it is curious to note that the same year which witnessed his death gave birth to one who was destined to expound his doctrines with such force of argument as to carry them successfully against all opposition, and establish them as fundamental principles of the science.”⁵⁵

Although a firm believer in uniformity, Lyell did not conclude that the universe was self-explained and self-contained. He even believed that God, the Presiding Mind, existed.⁵⁶ To Charles Darwin, May 5, 1869, he wrote:

“I quite agree with you that Wallace’s sketch of natural selection is admirable. I wrote to tell him so . . . I reminded him that as to the origin of man’s intellectual and moral nature I had allowed in my first edition that its introduction was a real innovation, interrupting the uniform course of the causation previously at work on the earth. I was, therefore, not opposed to his idea, that the Supreme Intelligence might possibly direct variation in a way analogous to that in which the limited powers of man might guide it in selection, as in the case of the breeder and horticulturist. In other words, as I feel that progressive development or evolution cannot be entirely explained by natural selection, I rather hail Wallace’s suggestion that there may be a Supreme Will and Power which may not abdicate its function of interference, but may guide the forces and laws of nature.”⁵⁷

Lyell was a theist, and as such felt that evolution did not do away with creation. He told Charles Darwin on March 11, 1863 that, “I think the old ‘creation’ is almost as much required as ever, but of course it takes a new form if Lamarck’s views improved by yours are adopted.”⁵⁸ Lyell’s

⁵⁵ *Ibid.* Vol. II. p 470.

⁵⁶ *Ibid.* Vol. I. p 380.

⁵⁷ *Ibid.* Vol. II. p 442.

⁵⁸ *Ibid.* Vol. II. p 363.

acceptance of God did not, however, mean that he necessarily believed in the Bible. As Drs. Bales and Clark state: "This certainly would have been inconsistent with his dogma of uniformity."⁵⁹ Science, Lyell contended, needed to be freed from Moses. In April, 1829 he spoke of driving certain men "out of the Mosaic record."⁶⁰ On June 14, 1830 he said of some that "they see at last the mischief and scandal brought on them by Mosaic systems."⁶¹ The Noachian deluge, he claimed, was an incubus to the science of geology.⁶²

Was Lyell an evolutionist? In part, the answer to that question depends on what period of his life is under consideration, and how much we require him to accept before labeling him an evolutionist. It is true that early in his career Lyell did not want to accept as much evolution as Lamarck and Darwin were espousing. His *Principles Of Geology* was heavily indoctrinated with natural theology. Ernst Mayr of Harvard has said: "Even such a sober and cautious person as Charles Lyell frequently explained natural phenomena as due to 'creation' and, of course, a carefully thought-out creation."⁶³ Dr. Mayr even labels Lyell as one of the leading opponents of evolution,⁶⁴ though this hardly seems justified in light of his writings — even early in his career. In a letter to his father, dated February 7, 1829, Lyell expressed his antagonism to the idea of a simultaneous creation of various species. He felt that geology would help determine whether or not they arose gradually:

"I am now convinced that geology is destined to throw upon this curious branch of inquiry, and to receive from

⁵⁹ Clark, Robert T. and J.D. Bales. (see footnote #29) p 19.

⁶⁰ *Life, Letters and Journals of Sir Charles Lyell.* (see footnote #50). Vol. I. pp 253, 256.

⁶¹ *Ibid.* Vol. I. pp 268, 240.

⁶² *Ibid.* Vol. I. p 328.

⁶³ Mayr, Ernst. "The Nature of the Darwinian Revolution." (see footnote #27). p 983.

⁶⁴ *Ibid.* p 982.

it in return, much light, and by their mutual aid we shall very soon solve the grand problem, whether the various living organic species came into being gradually and singly in isolated spots, or centres of creation, or in various places at once, and all at the same time. The latter cannot, I am already persuaded, be maintained.”⁶⁵

Some of Lyell’s ideas may have been the result of Lamarck’s influence. In a letter of March 2, 1827 (two years before the above quote), he mentioned that he had read though not yet fully accepted, Lamarck. Yet even in the letter there are indications that the hypothesis of evolution must have had some influence on him:

“I devoured Lamarck *en voyage*, as you did Sismondi, and with equal pleasure. His theories delighted me more than any novel I ever read, and much in the same way, for they address themselves to the imagination, at least of geologists who know the right inferences which would be deducible were they established by observations. But though I admire even his flights, and feel none of the *odium theologicum* which some modern writers in this country have visited him with, I confess I read him rather as I hear an advocate on the wrong side, to know what can be made of the case in good hands. I am glad he has been courageous enough and logical enough to admit that his argument, if pushed as far as it must go, if worth anything, would prove that men may have come from the Ourang-Outang. But after all, what changes species may really undergo! How impossible will it be to distinguish and lay down a line, beyond which some of the so-called extinct species have never passed into recent ones. That the earth is quite as old as he supposes has long been my creed, and I will try before six months are over to convert the readers of the quarterly to that of Heterodox opinion.”⁶⁶

Drs. Bales and Clark make the following observation regarding Lyell:

“Thus Lyell was an evolutionist at heart long before Dar-

⁶⁵ *Life, Letters and Journals of Sir Charles Lyell*. (see footnote #50). Vol. I. pp 245-246.

⁶⁶ *Ibid.* Vol. I. p 168.

win propounded his hypothesis. In fact, it was more or less implied in his *Principles* which Darwin read on the *Beagle*. Huxley quoted the above statement from Lyell and maintained that it revealed that evolution was an esoteric doctrine with Lyell, and that he did not plainly commit himself to it because of the fear of offending certain persons and of arousing prejudices against himself.”⁶⁷

On November 23, 1868 Lyell wrote to Professor Ernst Haeckel concerning references Haeckel had made in his *History Of Creation* to Lyell’s work:

“I am therefore obliged to you for pointing out how clearly I advocated a law of continuity even in the organic world, so far as possible without adopting Lamarck’s theory of transmutation. I believe that mine was the first work (published in January 1832) in which any attempt had been made to prove that while the causes now in action continue to produce unceasing variations in the climate and physical geography of the globe, and endless migration of species, there must be a perpetual dying out of animals and plants, not suddenly and by whole groups at once, but one after another. I contended that this succession of species was now going on, and always had been; that there was a constant struggle for existence, as De Candolle had pointed out, and that in the battle for life some were always increasing their numbers at the expense of others, some advancing, others becoming exterminated.

“But while I taught that as often as certain forms of animals and plants disappeared, for reasons quite intelligible to us, others took their place by virtue of a causation which was beyond our comprehension; it remained for Darwin to accumulate proof that there is no break between the incoming and outgoing species, that they are the work of evolution, and not of special creation.”⁶⁸

At what point Lyell became a full-fledged Darwinian

⁶⁷ Clark, Robert T. and J.D. Bales. (see footnote #29) p 20.

⁶⁸ *Life, Letters and Journals of Sir Charles Lyell*. (see footnote #50). Vol. II. p 436.

evolutionist is not entirely clear. The change was somewhat of a gradual one. There can be no doubt, however, that the man who once resisted Darwinian evolution finally accepted it *in toto*. Lyell stated:

“My feelings, however, more than any thought about policy or expediency, prevent me from dogmatizing as to the descent of man from the brutes, which, though I am prepared to accept it, takes away much of the charm from my speculations on the past relating to such matters.”⁶⁹

Lyell wrote the following to Charles Darwin on January 16, 1865:

“I have some notes of it, and hope one day to run over it with you, especially as it was somewhat of a confession of faith as to the ‘Origin.’ I said I had been forced to give up my old faith without thoroughly seeing my way to a new one. But I think you would have been satisfied with the length I went.”⁷⁰

But perhaps the clearest statement of his “conversion” to evolution comes from his letter to professor Haeckel on November 23, 1868 (from which we quoted earlier):

“But while I taught that as often certain forms of animals and plants disappeared, for reasons quite intelligible to us, others took their place by virtue of a causation which was beyond our comprehensions; it remained for Darwin to accumulate proof that there is no break between the incoming and the outgoing species, that they are the work of evolution, and not of special creation.”⁷¹

Lyell was an evolutionist! One writer, after Lyell’s death, maintained that after advocating ideas of special creation in nine editions of his *Principles Of Geology*, he “put forth a tenth edition, in which the old theory was formally renounced and the new one taken up.”⁷² He spoke

⁶⁹ *Ibid.* Vol. II. p 363. March 1, 1863.

⁷⁰ *Ibid.* Vol. II. p 384.

⁷¹ *Ibid.* Vol. II. p 436.

⁷² *Ibid.* Vol. II. p 473.

of "his late conversion to Mr. Darwin's doctrine of Natural Selection."⁷³

Why the confusion on Lyell's position? It seems Lyell himself wanted it that way. Lyell thought that new species were taking the place of old ones that had been destroyed, but he was not always definite about it.

"He kept it almost invisible, because he could not refer to any particle of a fact which would give any indication of how a species could be 'created' by natural law. He wanted his readers to gather such an idea, but wanted to avoid the scientific odium of proposing it as a part of science."⁷⁴

"It is therefore probable that Lyell believed his 'creation' of species was brought about by some quite unknown operation of natural law. It is certain that Lyell chose, as a matter of policy, to conceal his belief and to let readers infer that a 'creation' was a miraculous interposition of the hand of God" ⁷⁵

This is characteristic of Lyell's writings for many years. It irritated Charles Darwin, in fact, who wrote to Lyell:

"I will first get out what I hate saying, viz., that I have been greatly disappointed that you have not given judgment and spoken fairly out what you think about the derivation of species . . . I think the *Parthenon* is right, that you will leave the public in a fog."⁷⁶

Yet this seems to have been Lyell's *modus operandi*.

What effect did Lyell have on the people of his day? Needless to say, he prepared the way for many to accept Darwinism. As Dr. Loren Eiseley observes: "To Darwin, . . . Lyell gave the gift of time. Without that gift there

⁷³ *Ibid.* Vol. II. p 472.

⁷⁴ *Charles Darwin and the Theory of Evolution.* New Home Library. New York. 1943. p 436.

⁷⁵ *Ibid.* pp 436-437.

⁷⁶ *Life and Letters of Charles Darwin.* D. Appleton & Co. New York. 1898. Vol. II. p 196.

would have been no *Origin of Species*.”⁷⁷ Sir Thomas Huxley said, “I cannot but believe that Lyell, for others, as myself, was the chief agent for smoothing the road for Darwin.”⁷⁸

Even Lyell himself recognized that he prepared the minds of many for Darwin. He stated on November 23, 1868: “I had certainly prepared the way in this country, in six editions of my work before the ‘*Vestiges of Creation*’ appeared in 1842, for the reception of Darwin’s gradual and insensible evolution of species”⁷⁹ Lyell told Joseph Hooker on March 9, 1863 that he (Lyell) had influenced many to accept Darwin:

“Darwin . . . seems much disappointed that I do not go farther with him, or do not speak out more. I can only say that I have spoken out to the full extent of my present convictions, and even beyond my state of feeling as to man’s unbroken descent from the brutes, and I find I am half converting not a few who were in arms against Darwin, and are even now against Huxley.”⁸⁰

“However, I plead guilty to going farther in my reasoning toward transmutation than in my sentiments and imagination, and perhaps for that very reason I shall lead more people on to Darwin and you, than one who, being born later”⁸¹

To Charles Darwin, March 11, 1863 he expressed it as follows: “But you ought to be satisfied, as I shall bring hundreds toward you, who if I treated the matter more dogmatically would have rebelled.”⁸²

And lastly, what effect did Lyell have on Darwin? That

⁷⁷ Eiseley, Loren. (see footnote #47) p 98.

⁷⁸ *Life and Letters of Charles Darwin*. (see footnote #76) Vol. I. pp 543-544.

⁷⁹ *Life, Letters and Journals of Sir Charles Lyell*. (see footnote #50) pp 436-437.

⁸⁰ *Ibid.* Vol. II. p 361.

⁸¹ *Ibid.* Vol. II. pp 361-362.

⁸² *Ibid.* Vol. II. pp 363-364.

question shall be answered in much greater detail in the section dealing with Darwin. However, two quotes from the pen of Charles Darwin himself are appropriate here. In *Origin Of Species* Darwin wrote: "He who can read Sir Charles Lyell's grand work on *Principles Of Geology* . . . and yet does not admit how vast have been the periods of time, may at once close this volume."⁸³ Darwin even said, "I feel as if my books come half out of Sir Charles Lyell's brain."⁸⁴

"And so he who prepared the way for Darwin finally followed Darwin."⁸⁵ Sir Charles Lyell died in 1875, two years after the passing of his wife. He was gaunt and almost blind. By a curious twist of history, Darwin replaced Lyell as a popular idol. A few years before, he had written to his friend Ernst Haeckel: "Most of the zoologists forget that anything was written between the time of Lamarck and the publication of our friend's *Origin Of Species*."⁸⁶ How true a statement in light of modern history!

The road leading to Charles Darwin and the modern day acceptance of the theory of evolution is a long, winding one. As one traces the road of evolutionary thought through the annals of history, some of the men who have traveled that road stand out more conspicuously than others. It becomes abundantly clear that some men have effected a profound influence, in regard to evolution, not only on the men of their day, but even on those of us who live in the 20th century.

Such a man was Herbert Spencer (1820-1903), the Englishman. Spencer, and the geologist Charles Lyell, probably influenced Charles Darwin more than any

⁸³ Darwin, Charles. *Origin Of Species*. p 314.

⁸⁴ Darwin, Charles. Quoted in: "Charles Lyell." Loren Eiseley, author. *IN: Scientific American*. Vol. 201. August, 1959. p 98.

⁸⁵ Clark, Robert T. and J.D. Bales. (see footnote #29) p 28.

⁸⁶ *Life, Letters and Journals of Sir Charles Lyell*. (see footnote #50) Vol. II. p 436.

other two men of the Darwinian era,⁸⁷ and may ultimately be responsible for more of the acceptance of the theory of evolution than they are given credit for. Lyell has already been discussed. It is now Herbert Spencer who deserves our attention.

Herbert Spencer, perhaps oddly it might seem, was not a scientist as such, but a philosopher. He, too, had been grappling with the “problem of the origin of species.” Like Darwin, upon whom he was to have the most profound influence in later years, Spencer lived in ill-health most of his life. Yet, whereas Darwin had inherited enough money from his parents to live comfortably, Spencer was very poor. He worked for ten years as a railroad engineer and then as a journalist. When he was forty years old, he set out to write a great work of philosophy in ten volumes, to gather together and explain the principles of all the fields of knowledge. Spencer gave himself 20 years to accomplish this task. It actually took him 36 years!

“The writings of Herbert Spencer, formerly so influential, now line the back shelves of second-hand bookstores. Yet the chief books of Darwin are forever being republished and are so much read that their author’s name is virtually a synonym among ordinary folk for ‘evolution,’ and among sophisticates for ‘natural selection.’ . . . In his own day, which was that of Darwin too, Spencer was regarded as a giant, and his *Principles Of Biology* was adduced as one of the chief evidences for this high estimation.”⁸⁸ It cannot be doubted that Spencer had a profound influence on his generation — a fact indicated by, among other things, the tremendous number of books which were circulated by his publisher in the United States alone:

⁸⁷ To the names of Spencer and Lyell, as profound influences on Charles Darwin, some would add the names of Wallace, Malthus, and Lamarck. With that we would have no quarrel.

⁸⁸ Plochman, G.K. “Darwin Or Spencer?” *IN: Science*. Vol. 130. November 27, 1959. p 1452.

“It may be added here that from the beginning until December 31st, 1903, the Messrs. Appleton had sold 368,755 volumes of Mr. Spencer’s writings, but these figures, of course, take no account of the sale of unauthorized editions during the years previous to the adoption of International Copyright.”⁸⁹

As Drs. Bales and Clark point out: “Publishers cannot continue to publish an author’s books in such quantities unless there is a big demand for them. And when people buy books it is quite likely that they read at least some of them. This gives one an idea of how tremendous was the influence of Spencer in the latter part of the nineteenth century.”⁹⁰

Herbert Spencer was a confirmed naturalist — and that may be stating the matter too simply. Even from his younger years he leaned heavily toward totally naturalistic explanations for everything he saw.⁹¹ In fact, the conviction that everything must be explained naturally became so strong with Spencer that his own father claimed that his son regarded natural laws in the same way others regarded revealed religion.

“From what I see of my son’s mind, it appears to me that the laws of nature are to him what revealed religion is to us, and that any wilful infraction of those laws is to him as much a sin as to us disbelief in what is revealed.”⁹²

Spencer’s bias against the supernatural was so compelling that he could not even think about supernatural manifestations being possible. He wrote:

“And simple induction would I think almost have led me to believe in supernatural agency were it not that with me

⁸⁹ Spencer, Herbert. *An Autobiography*. D. Appleton & Co. New York. 1904. Vol. II. p 113. (see footnote)

⁹⁰ Clark, Robert T. and J.D. Bales. (see footnote #29) pp 52-53.

⁹¹ For substantiation of this statement, see: Duncan, David, *Life and Letters of Herbert Spencer*. D. Appleton & Co. New York. 1908. Vol. I, p vii. and Vol. II, pp 305-306.

⁹² Spencer, Herbert. (see footnote #89). Vol. I. p 655.

the conviction of natural causation is so strong that it is impossible to think away from it.”⁹³

“If I find myself obliged to hold that there are supernatural manifestations and a supernatural interference with the order of things, then my personal experience would force me to the conclusion that the power underlying things is diabolical.”⁹⁴

Because of his naturalistic attitude, he was led (as Darwin and Huxley were) to accept evolution. He (and they) had rejected special creation and was (were) looking for something to take its place. In speaking of his paper, “The Development Hypothesis,” Spencer said:

“It shows that in 1852 the belief in organic evolution had taken deep root, and had drawn to itself a large amount of evidence — evidence not derived from numerous special instances but derived from the general aspects of organic nature, and from the necessity of accepting the hypothesis of Evolution when the hypothesis of Special Creation has been rejected. The Special Creation belief had dropped out of my mind many years before, and I could not remain in a suspended state: acceptance of the only conceivable alternative was peremptory.”⁹⁵

“From this time onwards the evolutionary interpretation of things in general became habitual, and manifested itself in curious ways.”⁹⁶

Drs. Clark and Bales, in their chapter on Spencer, make the following comments under the heading “Spencer’s Admission Of His Strong Bias”:

“After admitting that the earlier part of the evidence for evolution was missing and that the remainder was fragmentary and obscure, after saying that it was but a hypothesis and that it probably would never be anything more, Spencer still accepted it. And in the same paragraph his real reason for accepting it was shown to be an

⁹³ Duncan, David. (see footnote #91) Vol. II. p 85.

⁹⁴ *Ibid.* Vol. II. p 85 (letter of January 21, 1896).

⁹⁵ *Ibid.* Vol. II. p 319.

⁹⁶ *Ibid.*

anti-supernatural bias that made creation intolerable to him and left him without any position unless he accepted evolution. He accepted evolution not because of evidence, but because it was the only thing that he could accept after rejecting creation.”⁹⁷

A statement from Spencer’s own pen proves the above statement to be correct. Four years before Darwin’s *Origin Of Species* was published, Spencer made this comment:

“Save for those who still adhere to the Hebrew myth, or to the doctrine of special creations derived from it, there is no alternative but this hypothesis or no hypothesis. The neutral state of having no hypothesis, can be completely preserved only so long as the conflicting evidences appear exactly balanced: such a state is one of unstable equilibrium, which can hardly be permanent. For myself, finding that there is no positive evidence of evolution — alike in the history of the human race, in the modifications undergone by all organisms under changed conditions, in the development of every living creature — I adopt the hypothesis until better instructed: and I see the more reason for doing this, in the facts, that it appears to be the unavoidable conclusion pointed to by the foregoing investigations, and that it furnishes a solution of the controversy between the disciples of Locke and those of Kant.”⁹⁸

“This anti-supernatural bias was built up before Spencer accepted a theory of evolution. In fact, this bias prepared the soil for the seed of evolution.”⁹⁹

Spencer, in speaking of his years between the ages of 18-20, and in commenting on his religious tendencies and feelings at that time, has stated:

“Memory does not tell me the extent of my divergence from current beliefs. There had not taken place any pronounced rejection of them, but they were slowly losing

⁹⁷ Clark, Robert T. and J.D. Bales. (see footnote #29) p 56.

⁹⁸ Spencer, Herbert. *The Principles of Psychology*. D. Appleton & Co. New York. 1897. Vol. 1. p 466 (see footnote).

⁹⁹ Clark, Robert T. and J.D. Bales. (see footnote #29) p 57.

their hold. Their hold had, indeed, never been very decided: 'the creed of Christendom' being evidently alien to my nature, both emotional and intellectual. To many, and apparently to most, religious worship yields a species of pleasure. To me it never did so; unless, indeed, I could as such the emotion produced by sacred music . . . But the expressions of adoration of a personal being, the utterance of laudations, and the humble professions of obedience, never found in me any echoes." ¹⁰⁰

"Thus during the period between eighteen and twenty years of age Spencer was building up a frame of mind that made ridiculous the idea of creation, and which necessitated some sort of hypothesis of evolution to explain the origin and development of life without a break in the chain of physical causation — thus without supernatural intervention." ¹⁰¹

Spencer on occasion referred to a "First Cause," ¹⁰² yet he was agnostic by his own admission. Not only was he agnostic, but he even tried (like Darwin was later to try) to avoid thinking about God:

"It seems to me that our best course is to submit to the limitations imposed by the nature of our minds, and to live as contentedly as we may in ignorance of that which lies behind things as we know them. My own feeling respecting the ultimate mystery is such that of late years I cannot even try to think of infinite space without some feeling of terror, so that I habitually shun the thought." ¹⁰³

Spencer was, as has already been mentioned, a prolific writer. His works, *Social Statics* (1850), "*The Development Hypothesis*" (1852), "*The Theory of Population*" (1855), *First Principles* (1862), and *The Principles Of Biology* (1864), were well-received. *First Principles* had gone through six editions by 1900. Spencer's "writings

¹⁰⁰ Spencer, Herbert. (see footnote #89) Vol. I. p 171.

¹⁰¹ Clark, Robert T. and J.D. Bales. (see footnote #29) pp 58-59.

¹⁰² Spencer, Herbert. *First Principles*. Fourth Edition. D. Appleton & Co. New York. 1897. p 38.

¹⁰³ Duncan, David. (see footnote #91) Vol. II. p 83.

just prior to the appearance of *Origin* indicated a full-grown, concrete evolutionist theory . . .”¹⁰⁴

It is to Herbert Spencer that credit is usually given for the phrase “survival of the fittest.” It seems that Darwin likewise “borrowed” this term from Spencer, and popularized it.¹⁰⁵ Spencer had suggested many pre-Darwinian ideas concerning evolution, but naturalists of his day would have little to do with them. When Darwin published *Origin Of Species* in 1859, Spencer immediately became an enthusiastic supporter of Darwin and his new book. For Spencer, as for Darwin, survival of the fittest was the best explanation for natural selection, and natural selection was the best explanation for evolution.

The question arises as to why Darwin became so popular and Spencer so forgotten — at least in regard to 20th century thinking. There are probably many reasons, none of them simple.¹⁰⁶ The net result was, however, Spencer’s almost complete anonymity and Darwin’s almost complete reverence in the history of evolutionary thought. Many today do not even recognize the name of Herbert Spencer, or realize the great stage he helped set not only for Charles Darwin, but eventually for modern Neo-Darwinism as well (through his post-*Origin* writings). One cannot help but recall the statement of John the Baptist in regard to his relationship to Christ (John 3:30), “He must increase and I must decrease” as it applies to the Spencer-Darwin scenario. Truly, Spencer “decreased” and Darwin “increased.”

Twenty-five years before Georges Cuvier was born, another French boy was born whose ideas about the classification of animals and about how new species arise were destined to change the history of evolutionary

¹⁰⁴ Rusch, Wilbert H. (see footnote #14) p 17.

¹⁰⁵ See our footnote #7.

¹⁰⁶ For a treatise dealing with some of the reasons for Darwin’s increasing popularity and Spencer’s declining popularity, the reader may wish to read, “Darwin Or Spencer?” by G.K. Plochman in *Science*, Vol. 130. November 27, 1959. pp 1452-1456.

thought. He was Jean Baptiste de Lamarck (1744-1829). He came from a family of soldiers, and was the eleventh child of his parents. His father sent him to a Jesuit college to study for the ministry, but when his father died Lamarck bought a broken-down horse and trotted this melancholy animal toward the German frontier (the Seven Years' War was going on), joined the French army, and in his first battle distinguished himself for bravery. When all the officers in his company had been killed, Lamarck took command and refused to fall back, though the rest of the army was retreating.

His military career was ruined when a comrade injured his neck in a practical joke. Now unfit for military service, he went to Paris to study medicine. Studying drug-producing plants he became fascinated by the beauty and variety of vegetable life. After about nine years' work he wrote a scientific description of many of the plants of France. This work won him wide acclaim as a botanist. Later he was invited to help reorganize a famous natural history institution, now known all over the world as the *Jardin des Plantes*; he then became a member of the staff.

When Lamarck was 50, the institution shifted him from work in botany to work in zoology. He soon became one of the world's authorities on classification of invertebrates. Studying the anatomy of hundreds of animals, he came to the conclusion that new species resulted from the gradual change of previous species, as a result of the use and disuse of parts and the influence of surroundings.

Lamarck was a brilliant scholar, and a committed evolutionist. As Dr. Theodosius Dobzhansky observed:

"The first complete theory of evolution was that of Lamarck (1809). It contained two elements. The first and more familiar . . . is that organisms are capable of changing their form, proportions, color, agility, and industry in response to specific changes in the environment. This capability was regarded as an essential property of living organisms, and altered conditions were therefore be-

lieved to be hereditary. The other element of Lamarckian evolution, upon which he based a significant revision of the classifications of invertebrate animals, was his belief in a discontinuous progression from simpler to more complex kinds of organisms . . . Apparently he believed that a tendency toward greater complexity is an inherent property of life itself.

“Lamarck was the first modern naturalist to discard the concept of fixed species, and instead view species as variable populations. He was also the first to state explicitly that complex organisms have evolved from simpler ones . . . Nevertheless Lamarck is only in a limited sense the founder of evolutionary theory.”¹⁰⁷

Dr. J. B. Birdsell, in his book, *Human Evolution*, remarks concerning Lamarck:

“He stressed that the most fundamental aspect of life is change, and he held that evolution involved change through some sort of striving upward. He arranged living forms in an evolutionary scale in which the mammals naturally occupied the top level.”¹⁰⁸

Dr. W.H. Rusch has commented that Lamarck “. . . concluded that evolution is a general process embracing every form of life in a single historical process. To this end he proposed a tree of life, or phylogeny.”¹⁰⁹ As evolutionist Dr. Ernst Mayr has pointed out: “Stirrings of evolutionary thinking preceded the *Origin* by more than 100 years, reaching an earlier peak in Lamarck’s *Philosophie Zoologique* in 1809.”¹¹⁰ It was in Lamarck’s *Philosophie Zoologique* that he suggested the doctrine for which he is now so famous — the doctrine of acquired characteristics.

¹⁰⁷ Dobzhansky, Theodosius, F.J. Ayala, G.L. Stebbins and J.W. Valentine. *Evolution*. W. H. Freeman & Co. San Francisco, California. 1977. p 10.

¹⁰⁸ Birdsell, J.B. (see footnote #5) p 23.

¹⁰⁹ Rusch, Wilbert H. (see footnote #14) p 16.

¹¹⁰ Mayr, Ernst. (see footnote #27) p 988.

Dr. Byron Nelson, in his classic work, *After Its Kind*, explains Lamarck's doctrine:

"Observing the everyday fact that if a man uses his arm vigorously for a time, as a blacksmith does, the arm becomes larger, and if he does not use his arm, but sits physically idle in an office as does a clerk, his arm becomes smaller, Lamarck thought he had found a solution of the problem. He said, 'The remote ancestors of present day forms were always being induced by the conditions in which they lived to use certain parts of their bodies more than others. Those parts that were used became larger. Those parts not used became smaller. The effects of the use or disuse of these parts were passed on to the offspring. They were slightly different from their parents. In turn, the offspring themselves were caused by conditions in their environment to use one part more and another part less. The results in them of this use or disuse of parts were still further passed on. Thus, changes in the offspring imparted to them by the varied use or disuse of parts by the parents were steadily accumulated through the centuries, and by their accumulation living forms were continually undergoing a process of transformation.'

"To make this explanation of a difficult problem clear, a few concrete examples had best be taken out of Lamarck's book. Taking the case of the giraffe with its long neck, Lamarck explains it in the following manner: 'The remote ancestors of the giraffe had short necks as does the horse or cow. Along came a drought and dried up all the vegetation on the ground. Leaves remained on the trees, however. For these leaves the short-necked ancestors reached and in doing so stretched their necks. Then they had offspring and the offspring showed in themselves the effects of their parents' stretching. The necks of the offspring were imperceptibly longer than their parents'. The offspring grew up. Along came another drought which dried up the grass on the ground but left the leaves on the trees. For these leaves the ancestors stretched their necks: When their young were born they showed the effects of their parents' stretching. Their necks were still longer. And so on. By the steady accumulation through thousands of years of the effects

upon the neck of stretching for leaves the present long neck of the giraffe came into being.' ”¹¹¹

Dr. W.H. Rusch gives a similar explanation of Lamarck's doctrine:

Lamarck held that frequent and constant use of any organ gradually strengthens, develops, and enlarges that organ and gives it a strength proportional to the length of time of such use. On the other hand, lack of use of such an organ gradually weakens it, causes it to become reduced in size and function and ultimately to disappear. This became known as the law of use and disuse. The advantages and disadvantages gained by any individual organism as the result of these structural changes were supposed to be handed down to the new generation, which carried on the process. Thus the development or disappearance of any organ progressed. This is the hypothesis of inheritance of acquired characteristics. Later he added the concept that new organs have their inception in a physiological need” ¹¹²

How popular was Lamarck's doctrine of acquired characteristics? That is a difficult question to answer. From its inception there were both people who thrived on it, and people who flatly condemned it. When Rusch says, “In the days of Lamarck his theory was not generally accepted,”¹¹³ that is probably an accurate statement. For example, Charles Darwin said, “Heaven forbid me from Lamarck's nonsense.”¹¹⁴ Alfred Russell Wallace pro-

¹¹¹ Nelson Byron. *After Its Kind*, Baker Book House. Grand Rapids, Michigan. 1967. pp 86-87. [NOTE: The quotes from Lamarck have been paraphrased by Dr. Nelson. They are *not* exact word-for-word quotes from Lamarck.]

¹¹² Rusch, Wilbert H. (see footnote #14) p 16.

¹¹³ *Ibid.* p 17.

¹¹⁴ Darwin, Charles. Quoted in: *Variation, Heredity, and Evolution* by Lock. p 115. [NOTE: Although Darwin criticized Lamarck, he incorporated much of Lamarck's doctrine of acquired characteristics into his own evolutionary dogma. As C.D. Darlington has so well pointed out: “Darwin was slippery . . . (using) a flexible strategy which is not to be reconciled with even average intellectual integ-

claimed, "The hypothesis of Lamarck has been repeatedly and easily refuted."¹¹⁵ Yet on the other side of the coin, there were people like Herbert Spencer who said, "Either there has been inheritance of acquired characteristics or there has been no evolution."¹¹⁶ It is therefore difficult to state categorically that Lamarck's theory was either totally accepted or totally rejected. As Dr. Henry M. Morris records:

"For a while it seemed that Lamarck's theory of evolution by the inheritance of acquired characteristics would serve the purpose. The theory had a superficial appearance of plausibility and did seem to provide an alternative explanation for the evidences of creative design in nature. Lamarck, with his own bitter hatred of the Bible and Christianity, argued his theory very forcefully and persuaded many people of its value."¹¹⁷

What is the status of Lamarck's theory now? That is not a difficult question to answer. Dr. J.B. Birdsall says, "We remember Lamarck today chiefly for his false doctrine of acquired characteristics."¹¹⁸ Dr. W.H. Rusch mentions, "From what we know of genetics today, it can be said that no mechanism exists by which some factor acting on the organism in its lifetime can bring about the necessary gene change to perpetuate results of use and disuse to succeeding generations."¹¹⁹

Speaking of acquired characteristics, Professor Kel-

¹¹⁴ *Continued* —

rity . . . He began more and more to grudge praise to those who had in fact paved the way for him . . . Darwin damned Lamarck and also his grandfather for being very ill-dressed fellows at the same moment he was engaged in stealing their clothes." (Cf: *Darwin's Place in History*. London. 1959. pp 60, 62))

¹¹⁵ Wallace, Alfred Russell. Quoted in: *Variation, Heredity and Evolution* by Lock. p 115.

¹¹⁶ Spencer, Herbert. *The Contemporary Review*. March, 1893.

¹¹⁷ Morris, Henry M. *The Troubled Waters of Evolution*. Creation-Life Publishers. San Diego, California. 1974. p 61.

¹¹⁸ Birdsall, J. B. (see footnote #5) pp 23-24.

¹¹⁹ Rusch, Wilbert H. (see footnote #14) p 16.

logg of Stanford University said it "unfortunately does not seem to happen."¹²⁰ Professor Conklin of Princeton University went so far as to say, "The inheritance of acquired characteristics is inconceivable."¹²¹ Professor Kellogg has also said:

"The plausible and fascinating explanation of Lamarck, based on the assumed inheritance by offspring of changes acquired by the parents during the development and lifetime is found to be insecurely based. Acquired characters, in the Lamarckian sense, are not inherited. Hence, new species do not come that way."¹²²

There has been, however, and still is a movement to bring back Lamarckianism. Going under the heading of Neo-Lamarckianism, it is trying to resurrect the false doctrine of acquired characteristics. Professor Morgan of Columbia University has said, "Today the theory has few followers among trained investigators, though it still has a popular vogue that is wide and vociferous."¹²³ Dr. Henry M. Morris has commented, "Karl Marx and his colleagues followed Lamarck to some extent and their successors continue to impose it on communist biology"¹²⁴ Dr. W.H. Rusch corroborates Dr. Morris' statement when he says, "A revival of interest in Neo-Lamarckianism has existed since 1948 when the Communist Party in Moscow declared that all good Communists must support the theory that acquired characteristics can be inherited. Following the party line of thought, a previously obscure biologist, Lysenko, became leader of the movement."¹²⁵

¹²⁰ Kellogg. *Evolution and the Way of Man*. p 97. Quoted in our footnote #111.

¹²¹ Conklin. *Heredity and Environment*. p 240. Quoted in our footnote #111.

¹²² Kellogg. *World's Work*. March, 1926. Quoted in our footnote #111.

¹²³ Morgan. *Critique of the Theory of Evolution*. Quoted in our footnote #111.

¹²⁴ Morris, Henry M. (see footnote #117) p 61.

¹²⁵ Rusch, Wilbert H. (see footnote #14) pp 24-25.

Perhaps Dr. Dobzhansky concludes this study of Lamarck in the best possible words when he states simply: "Neither his concept of the inheritance of acquired characteristics nor that of an inherent tendency toward complexity can now be regarded as valid."¹²⁶

What (or who?) was responsible for the decreasing popularity of Lamarckianism? Had it not been for one man's poor eyesight, Lamarck's doctrine might have enjoyed longer credibility than it did. The man was the German medical doctor and zoologist August Weismann (1834-1914). Born in Frankfort on the Main, Germany, he received his degree in medicine at Gottingen; then he practiced in Frankfort. But he was so much interested in pure science that at the age of thirty he went to Gressen to study zoology and a few years later was appointed a professor of zoology at Freiburg, a position he held for more than 45 years. For some time he devoted himself to the study of flies, but as his eyesight became impaired, it grew impossible for him to work extensively with the microscope. Consequently, he turned his attention to wider biological matters, and the problem of heredity became his greatest interest.

Weismann was himself a Darwinian evolutionist. He gave the death blow to Lamarck's doctrine. As Dr. Byron Nelson explains:

"Weismann appealed to his fellow evolutionists' common sense. He pointed out how for many generations the tails of certain breeds of sheep and the combs of fighting cocks have been cut off with no effect upon the tails and combs of the sheep and cocks which descended from them. He himself cut off the tails of mice for nineteen generations and then gave it up. The tails of the last were as long as the first.

"Weismann, however, performed a greater service to

¹²⁶ Dobzhansky, Theodosius, *et al.* (see footnote #107) p 10. [NOTE: For the reader who would like further information on both historical and modern Lamarckianism, we suggest *Genes, Genesis, and Evolution* by J.W. Klotz (Concordia. 1970), pp 26-32. This is an excellent summary.]

true science . . . than merely cutting off the tails of mice. Convinced by experiment that acquired characters are not inherited, he began a study of living organisms which resulted in an important and vital discovery. He learned that there are two kinds of cells that go to make up the mass of any individual (1) body cells, and (2) germ cells. He noticed further that very early in the development of the embryo, even as early as the eight- and sixteen-cell stages in some animals, when the creature is the size of a pin-head, the germ cells are set aside. Set aside, they never change. They retain all through life the original character of the egg-cell, and they go to make up the reproductive cells of the adult. Out of these germ cells come all future generations. Weismann observed, however, that the body cells, which go to make up the eyes, hands, feet, change their character. He also observed that the germ cells are totally independent of the body cells and are not affected by changes in the body. The cutting off of a finger has no effect whatever on the germ cells out of which the next generation comes. As a result of Weismann's work, men have learned that the direct line of descent from generation to generation is not a descent from adult to adult but from germ cell to germ cell . . .

“The physiological explanation by Weismann of the fact of the non-inheritance of acquired characters is today universally accepted. It explains why a crooked nose or a shaved head, or a cut-off leg does not and cannot result in crooked-nosed and bald-headed and one-legged children. It shows why evolution could not have come about in the fashion Lamarck imagined.”¹²⁷

We owe Weismann a great debt. His work was quite conclusive. As Klotz observes: “No one has ever been able to demonstrate conclusively the inheritance of a single acquired characteristic, and for that reason, the theory has been discarded.”¹²⁸ As Stebbins has pointed out, there is no valid experimental evidence in either

¹²⁷ Nelson, Byron. (see footnote #111) pp 90-91.

¹²⁸ Klotz, John W. *Genes, Genesis, and Evolution*. Concordia. St. Louis, Missouri. 1970. p 28

plants or animals to indicate that acquired characteristics are inherited, and there are some experiments to show that they are not. ¹²⁹ ¹³⁰

In 1843-46 a two-volume work entitled *Vestiges Of The Natural History Of Creation* appeared anonymously. It wasn't until 1884, after the author's death, that his name became known. He was Robert Chambers (1802-1871), a noted Scottish author and publisher. Chambers held that life increased in complexity as one traced through the layers of sedimentary rock. He was convinced that a succession of living forms increasing in complexity was the element of creation. Chambers even seems to have anticipated Haeckel's theory that the development of the individual repeats the development of the race, for he held that there was a strong analogy between the succession of forms and the development of the individual organism. To him, organic as well as cosmic evolution was a reality.

It is little wonder that *Vestiges* was published anonymously, for it had a wide circulation and caused a stir that did not subside for years. Oddly enough, one of its most violent opponents was Sir Thomas Huxley. Mayr says:

"When Chambers in his *Vestiges* dared to replace direct intervention of the Creator by the action of secondary causes (natural laws), he was roundly condemned. Although the attacks were ostensibly directed against errors of fact, virtually all reviewers were horrified that Chambers had 'annulled all distinction between physical and moral,' and that he had degraded man by ranking

¹²⁹ Stebbins, G.L. *Variation and Evolution in Plants*. Columbia University Press. New York. 1950. p 75.

¹³⁰ Three physicians, Drs. W.C. Wells, J.C. Prichard, and W. Lawrence attacked Lamarckianism vehemently. Their views were expressed at the same time, in 1813. As Prichard said: "All acquired conditions of the body end with the life of the individual in whom they are produced. But for this salutary law the universe would be filled with monstrous shapes." For an excellent discussion of these three men and their plight, see: "The Origin of Darwinism" by C.D. Darlington in *Scientific American*. Vol. 201. May, 1959.

him as a descendant of the apes and by interpreting the universe as 'the progression and development of a rank, unbending and degrading materialism.' " 131

Chambers said in his work that when there is a choice between two theories, either special creation or the operation of general laws instituted by the Creator, "I would say that the latter [theory] is greatly preferable, as it implies a far grander view of the Divine power and dignity than the other."¹³² It is not at all surprising, then, to hear Dr. Henry M. Morris speak of Chambers, "who had written a very influential work advocating theistic evolution called *Vestiges Of The Natural History Of Creation*."¹³³

Chambers' work was lambasted because it espoused evolution yet tried to "mix and match" it with a Creator. Again we say, as does Mayr, that "It is not surprising that in this intellectual climate Chambers had taken the precaution of publishing anonymously."¹³⁴

Why, then, is Chambers' work so important? Where, in this great puzzle of evolutionary history, does it fit? Perhaps its greatest claim to fame is that, according to Charles Darwin himself, it was Chambers' *Vestiges* that absorbed the brunt of the attack that would have otherwise fallen on *Origin Of Species*!¹³⁵ Were it not for Chambers' work, *Origin* most likely would have been violently attacked. As it happens, *Origin* escaped most of that attack because *Vestiges* took it. That represents a valuable contribution by Chambers any way you look at it!

In 1959, 100 years after the publication of Darwin's *Origin Of Species*, a centennial celebration was held at the University of Chicago in honor of the man who some

¹³¹ Mayr, Ernst. (see footnote #27) p 983.

¹³² Chambers, Robert. Quoted in footnote #27.

¹³³ Morris, Henry M. (see footnote #117) p 55.

¹³⁴ Mayr, Ernst. (see footnote #27) p 983.

¹³⁵ Darwin, Charles. *Origin Of Species*. A. L. Burt & Co. New York. No date. p x.

say introduced the concept that made man timeless. All the heavyweight evolutionists were present to pay their tribute and homage to Charles Darwin. Few people realized that, but for a few fateful occurrences approximately 100 years backward in time, things could have been different — much different! As Loren Eiseley observed at the centennial celebration in 1959:

“In this centennial year of 1959, 100 years since the publication of Darwin’s *Origin Of Species*, innumerable addresses will extol the scientific achievements of Darwin. [Alfred Russell] Wallace, on the other hand, will be present in many of these historical accounts only as an attenuated shadow — a foil to the great Darwin. Many will not know his name, or, if they recognize it, will do so only with vague expression that Wallace found out something which Darwin had already perceived more clearly.”¹³⁶

Who is Alfred Russell Wallace? What was his contribution to evolutionary history? What is the meaning of Eiseley’s above-mentioned statement?

Alfred Russell Wallace was born on January 8, 1823 in the Welsh village of Usk in Monmouthshire. His father seems to have been a middle-class gentleman who had, through a series of misfortunes, lost all of a small but comfortable inheritance. As a result, the Wallace family had sought refuge in the remote district of Monmouthshire where low rent and country food were available. Wallace’s father appears to have had a good education, and was fond of books, which he read to the family on many occasions. Alfred Russell Wallace left home before he was 14, and saw little of his family after that. His schooling, what little there was of it, was from a small grammar school in the old town of Hertford.

Wallace traveled to London, where he lived with his older brother, John. He was waiting for another brother, William, from whom he was to learn surveying. While

¹³⁶ Eiseley, Loren C. “Alfred Russell Wallace.” *IN: Scientific American*. Vol. 199. p 70.

learning surveying, he also learned much geology. He once remarked, "We obtain an excellent illustration of how nature works in moulding the earth's surface by a process so slow as to be almost imperceptible."¹³⁷

In 1843 Wallace's father passed away, and his brother, William, because work was scarce, had to tell Alfred Russell that he would have to move out on his own. So, once again Wallace moved to London. In 1844 he secured a teaching position at a school in Leicester; he remained at that post somewhat over a year. It was while he was at Leicester that Wallace read Alexander von Humboldt's *Personal Travels in South America* and Thomas Malthus' *An Essay On The Principle Of Population*. Both of these writings were to profoundly influence young Wallace.

Loren Eiseley summarizes well the situation when he says:

"It can already be seen that, although they were separated by a vast social distance, Darwin and Wallace had pretty much the same reading background, except that Wallace had a greater concern for social movements and perhaps a deeper and more intense interest in the study of man. Both had been stimulated by their predecessors, Lyell and Humbolt. Darwin had already made his voyage and was working secretly at Down while Wallace, 14 years younger, was still teaching children to read. No one could possibly have imagined that this unpromising, unlettered young school-teacher would catch up to, and share honors with, the greatest biologist of the age, but so it was to be."¹³⁸

Wallace was not only influenced by Lyell and Malthus, but by two other writers as well. Robert Chambers' work, *Vestiges Of The Natural History Of Creation*, and William Henry Edwards' work, *A Voyage Up The River Amazon*, profoundly influenced Wallace.

¹³⁷ *Ibid.* p 74.

¹³⁸ *Ibid.* p 75.

While at Leicester, Wallace met Henry Walter Bates, an entomologist. The two became fast friends, and after reading Edwards' work and after talking personally with Edwards in London, Wallace and Bates decided to make a trip to Brazil. They departed England in April of 1848, onboard the ship *Mischief*. Wallace was to spend the next four years of his life in the Amazon, working there as a naturalist. Because his health failed him, however, he returned home after those four years, while Bates stayed seven more years. As a result of Bates' travels, he produced the English classic, *The Naturalist On The River Amazon* (1863).

Wallace arrived back in England in 1852, but because of a fire onboard the boat he lost almost everything he had worked so hard for during those years in the Amazon. He sought refuge with a married sister, and worked for 18 months on his account of his travels. However, his stay back in England was short-lived. In 1854 he sailed for Malaya, where he was to remain for the next several years. Eiseley says:

“Although Wallace appears to have been a believer in the general principle of evolution since the time of the *Vestiges*, it was here in Malaya, amidst fever and the long indoor rainy season, that Wallace began to marshal the thoughts that would place him beside Darwin. Wallace was tremendously interested in plant and animal distribution. He studied William Swainson and Humboldt. He now had had experience in both the New World and the Old World tropics. The questions of the origin of species, he tells us ‘was rarely absent from my thoughts.’ Traveler though he was, he carried books with him. ‘The great work of Lyell,’ he remarks in his autobiography, ‘had furnished me with the main features of the successions of species in time.’

“While visiting Borneo in 1854 and 1855 he prepared a paper ‘On The Law Which Has Regulated The Introduction Of New Species.’ He sent it to the *Annals and Magazine of Natural History*, where it was published in September of 1855. ‘Every species,’ Wallace wrote as his principal conclusion, ‘has come into existence coinci-

dent both in space and time with a pre-existing closely allied species.'

"... The young naturalist was disappointed when the article passed almost unnoticed . . ." ¹³⁹

Undaunted, Wallace continued to work and write. In the early months of 1858, while he was suffering from intermittent fever, he finally was able to formulate his viewpoint on the problem of the origin of species. Malthus' work, which had influenced Darwin in such a strong way, became the basis for Wallace's ideas as well. Why did some animals live while others died? He felt the answer was clear: the best-fitted live! As Dr. Eiseley observes:

"It was Darwin's unpublished conception down to the last detail, independently duplicated by a man sitting in a hut at the world's end!" ¹⁴⁰

Drs. Bales and Clark corroborate Eiseley's observation: "Alfred Russell Wallace came to the theory of natural selection or survival of the fittest, independently of, but not before, Darwin." ¹⁴¹

Wallace rushed his quickly written paper to Darwin, with these words upon his lips: "I hoped that the idea would be as new to him as it was to me." ¹⁴² Darwin received the paper in June of 1858, and was in great despair as to its contents. He even remarked to Lyell, "All my originality, whatever it may amount to, will be smashed. I never saw a more striking coincidence." ¹⁴³

Darwin was at a loss as to the course of action he should take. He sought his friends' advice, and as Eiseley notes:

"Wiser counsels prevailed. Darwin, fortunately, had a copy of a letter sent to Asa Gray at Harvard College,

¹³⁹ *Ibid.* pp 78-79.

¹⁴⁰ *Ibid.* p 80.

¹⁴¹ Clark, Robert T. and J.D. Bales. (see footnote #29) p 83.

¹⁴² Eiseley, Loren C. (see footnote #136) p 80.

¹⁴³ *Ibid.* p 81.

which validated his priority. After much self-questioning by Darwin and judicious consideration by Lyell and Hooker, it was decided to read Wallace's paper along with Darwin's letter to Gray and an extract from his unpublished sketch of 1844, before a meeting of the Linnaean Society on July 1, 1858. This was the dramatic prelude to the great intellectual storm which would shake the latter half of the 19th century and be reflected in the Scopes trial of the 1920's here in the U.S.

"Yet the beginning was deceptively quiet. Wallace was traveling among the islands, unaware of fame, lost in a dream of rare birds and rarer butterflies. Darwin, who did not attend the meeting, was nursing a sick child. There was no discussion before the Society.

". . . A man pursuing birds of paradise in a remote jungle did not yet know that he had forced the world's most reluctant author to disgorge his hoarded volume, or that the whole of Western thought was about to be swung into a new channel because a man in a fever had felt a moment of strange radiance. The path led on. It always did for Wallace."¹⁴⁴

It was an odd turn of events. Darwin was sitting on "his" theory of evolution based on natural selection when Wallace wrote to him about his theory. It is probably safe to say that the publication of Darwin's *Origin Of Species* was greatly hastened because of that single letter from Wallace. Eiseley comments that, "Wallace independently achieved and set forth the same ideas as Darwin. He was an independent discoverer of natural selection. If it had not been for the mere chance that he chose to dispatch the account of his discovery to Darwin, we might today be acclaiming Wallace, rather than Darwin, as the founder of modern biology."¹⁴⁵

Certainly, the obvious question would be, Why was it not Wallace's theory that gained popularity instead of Darwin's? There are perhaps several reasons. Wallace

¹⁴⁴ *Ibid.* p. 81.

¹⁴⁵ *Ibid.* p. 70.

as a man and his “station in life” may be justly stated as the first reason:

“The fact that Wallace emerged from a social class different from Darwin’s, that he was not a product of the traditional schools, has perhaps militated subtly against the full recognition of his scientific achievements. Moreover, Wallace, by nature modest and retiring, never thrust himself forward and his contributions have in some cases passed into the body of scientific thought without acknowledgement.

“He belonged to no cliques, and avoided participation in virulent scientific and theological disputes . . .”¹⁴⁶

But there is a more pervading reason. Hall and Hall, in their book, *The Truth: God Or Evolution?*, point out:

“Embarrassingly, Darwin found himself at opposite poles on the question of natural selection and struggle for existence with none other than the co-founder of modern evolutionary theory, Alfred Russell Wallace. Wallace parted ways with his more famous colleague over the issue of natural selection.”¹⁴⁷

Eiseley says that this is indeed the case. “In terms of his later life he can be classified . . . as one of the more theistically inclined evolutionists”¹⁴⁸

Wallace, though an evolutionist, retained a spiritualistic view of life and a type of theism.¹⁴⁹ “Finally the man who had not been impressed in his youth by organized religion was led to suggest that a higher intelligence might have played a hand in the development of our kind.”¹⁵⁰ Wallace asked:

¹⁴⁶ *Ibid.* pp. 70, 72.

¹⁴⁷ Hall, Marshall & Sandra. *The Truth: God Or Evolution?*. Baker Book House. Grand Rapids, Michigan, 1974. p. 34.

¹⁴⁸ Eiseley, Loren C. (see footnote #136) p. 72.

¹⁴⁹ Wallace, Alfred Russell. *My Life*. Vol. I. pp 78, 87ff; 266-268. See also: *Alfred Russell Wallace: Letters and Reminiscences*. James Marchant, author. Cassell & Co. London. 1916. Vol. I. pp 66-67; 341-342.

¹⁵⁰ Eiseley, Loren C. (see footnote #136) p. 84.

“How then, was an organ developed so far beyond the needs of its possessor? Natural selection could only have endowed the savage with a brain a little superior to that of an ape, whereas he actually possesses one but little inferior to that of the average member of our learned societies.”¹⁵¹

Yet Wallace went farther.

“Finally, Wallace challenged the whole Darwinian position on man by insisting that artistic, mathematical, and musical abilities could not be explained on the basis of natural selection and the struggle for existence. Something else, he contended, some unknown spiritual element must have been at work in the elaboration of the human brain. Why else would men of simple cultures possess the basic intellectual powers which the Darwinists maintained could be elaborated only by competitive struggle?”¹⁵²

Darwin was stunned. Huxley was severely critical. Darwin wrote to Wallace, “I differ grievously from you, and am very sorry for it.”¹⁵³ The *Chamber's Encyclopedia* says this of Wallace:

“Wallace differed from Darwin on the problem of human evolution. He considered that natural selection was *not* sufficient to explain certain features of man's structure such as the loss of hair and the specialized character of the hands and feet. He was also of the opinion that man's mental faculties could not be regarded as a product of natural selection . . . The operation of natural selection would . . . have been such as to oppose the action of sexual selection and hence it followed that ‘this extremely rigid action of natural selection must render any attempt to select mere ornament (as in the case of color differences found in the two sexes of the same animal species) utterly nugatory unless the most ornaments always coincide with the fittest in every respect; while if they do so

¹⁵¹ Eiseley, Loren C. *The Immense Journey*. Random House. New York. 1957. pp 83-84.

¹⁵² *Ibid.* p 84.

¹⁵³ Eiseley, Loren C. (see footnote #136) p 84.

coincide, then any selection of ornament is altogether superfluous.' ”¹⁵⁴

For these reasons, and others, Wallace became the “unknown” while Darwin rose to fame. Wallace would not compromise his beliefs, however much controversy or adverse comment they caused. He simply could not see in natural selection all that Darwin could. And so today we speak of Darwinism rather than “Wallaceism.” Such is history!

It would hardly be just to tell the history of evolutionary thought without at least brief mention of one of the most powerful writers on the side of special creation. He was William Paley (1743-1805), the man who wrote *Natural Theology* in 1802. In his book, he took his stand on human anatomy. He insisted on the necessity, in each particular case, of an intelligent designing mind for the contriving and determining of the forms which organized bodies bear. Paley, as is well-known to most students, compared the intricate anatomy of the human eye, with its numerous delicate and automatic adjustments, to the telescope. Paley argued that it would be no easier to believe that the eye could be produced by chance than that the telescope could have originated by chance. In other words, we are to infer a designer of the telescope from the telescope and likewise a Creator from the design of the eye.

Paley did much to stem the tide of evolutionary thinking, and wrote not only *Natural Theology*, but other books as well, among them his famous *A View Of The Evidences Of Christianity*. Of this work, James Filbeck once said, “[This] work of Paley was popular with all classes; the clergy of England appreciated it, and the ‘king carried it with him in his carriage.’ ”¹⁵⁵ Professor

¹⁵⁴ *Chamber's Encyclopedia*. Vol. 14. Maxwell Scientific International, Inc. New York. 1967. p 392.

¹⁵⁵ Filbeck, James O. *The Christian Evidence Movement*. Quoted in: *Paley's Evidences Of Christianity* by R. Whately. DeHoff Publications. Murfreesboro, Tennessee. 1952. Preface.

T.C. Hammond, principal of Moore Theological College, Sydney, Australia, wrote: "It seems a daring thing to assert that Paley, in 1794, had a clearer concept of the historical situation than many modern writers, but nevertheless it is a fact."¹⁵⁶

Paley's arguments had considerable effect in delaying the acceptance of the concept of evolution. No doubt had he been alive in Darwin's time (i.e.: at the time of publication of *Origin Of Species*), Darwin would have had a much more formidable foe than he did. Even today the teleological argument (i.e.: Paley's argument from design) is incontrovertible.

It is impossible to set the stage for Charles Darwin without mention of the man who had more effect on Darwin's thinking than perhaps any other man except Charles Lyell. The man was Thomas Malthus (1766-1834), a British minister and political economist.

In 1789 Malthus published his chief work, *An Essay On The Principle Of Population*, which was widely printed, distributed, and discussed. Opposing the widely held view that the improvement of man's lot depended upon a fair distribution of wealth, Malthus insisted that the human miseries arose from man's fertility and from his frivolous ways of life. He pointed out that natural populations of plants and animals demonstrated that natural reproduction is stronger than all the potentials for maintaining life. In short, reproductive potential exceeds resources. Malthus argued that the nature of reproduction produces a geometric increase in the numbers of a given species, whereas its food resources tend to remain constant in nature. Malthus applied this concept to man and showed that the increase in his numbers is indeed geometric in nature, while his food support base, even granting technological improvement, only increases at

¹⁵⁶ Hammond, T.C. *Reasoning Faith*. Quoted in: *Paley's Evidences Of Christianity*. (see footnote #155).

an arithmetical rate. Therefore, he concluded that men are doomed to increasing misery as starvation becomes inevitable among the poorer social classes.

Famine, pestilence, and war are inevitable brakes on the increase of human population, Malthus held. He insisted that the human race always tends to outrun its means of subsistence.

The basic concept of Malthus, that excessive fertility provided large numbers of expendable individuals in balanced nature, gave Charles Darwin the foundation he needed for his evolutionary theory. In fact, Darwin wrote:

“In October, 1838 I happened to read for amusement Malthus *On Population*, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under those circumstances favorable variations would tend to be preserved, and unfavorable ones to be destroyed. The result would be the formation of new species. Here, then, I had a theory with which to work.”¹⁵⁷

With Lyell, Malthus, Spencer, and Lamarck “at his side” so to speak, Charles Darwin was ready to begin the work that was to make him famous. It is to that work that we are almost ready to turn.

¹⁵⁷ Darwin, Charles. Quoted In: *The Darwin Reader*. Marston Bates and Philip Humphrey. Scribner's. New York. 1956. p 23.

Spontaneous Generation

4

Spontaneous Generation

Before we embark on the lengthy but interesting story of Charles Darwin, let us, as if parenthetically, add some pertinent comments on other important ongoingings. The 19th century was not monopolized in any shape, form, or fashion by Darwin. Rather, Darwin had to share much of the excitement of the times with other men (many of whom have already been discussed).

The times were changing. So were the personalities. So were ideals and concepts. For, you see, the 19th century marks the time not only of Darwin, but of Louis Pasteur as well. It is to Pasteur's work (or at least, a small portion of it) that we now look for an historical interlude, for Pasteur's work was to have far-reaching effects even on the Neo-Darwinian and Synthetic theories of evolution.

Prior to, and even including, Pasteur's time, belief in spontaneous generation was well nigh universal. Fox and Dose, in their book, *Molecular Evolution and the Origin of Life*, make the following observation:

“For centuries, the concept that life arose spontaneously from inanimate material was a principal doctrine

of how life originated. The spontaneous generation of life was visualized as beginning with either inorganic materials or with putrefying organic matter. The idea can be traced back to the ancient Greeks and even further; it is, in fact, at least as old as the history of man.”¹⁵⁸

Dobzhansky et al. have stated in their book, *Evolution*:

“The idea that different kinds of organisms can be transformed one into the other has existed in the minds of some men ever since the dawn of culture. It was expressed specifically by certain Greek philosophers, such as Anaximander and Empedocles The belief that animals could arise from inorganic matter was widespread during the Middle Ages”¹⁵⁹

Dr. Henry M. Morris reminds the reader: “Spontaneous generation had been accepted as common knowledge at least since the time of Aristotle, and was opposed only by a minority of Christians who recognized it as unscriptural . . . it is well known that Aristotle believed in spontaneous generation.”¹⁶⁰

Most people even up until Pasteur’s time firmly believed in and freely accepted spontaneous generation. The Egyptians had long believed in spontaneous generation. As they looked out over the banks of the Nile River, they saw nothing. After the Nile had flooded the land and receded, frogs, toads, snails and worms appeared. This appearance the Egyptians assumed to be due to spontaneous generation. The Chinese, in examining plants where silk worms were bred, would one day see nothing on the leaves, and the next day would notice aphids (tiny plant lice) covering those same leaves. This appearance “from nothing” the Chinese assumed to be due to spontaneous generation.

Anaximander (611-547 B.C.) taught that men arose from fish. Empedocles (490-435 B.C.) firmly believed that

¹⁵⁸ Fox, Sidney W. and K. Dose. *Molecular Evolution And The Origin Of Life*. Marcel Dekker. New York. 1977. p 2.

¹⁵⁹ Dobzhansky, Theodosius, et al. (see footnote #107) p 9.

¹⁶⁰ Morris, Henry M. (see footnote #117) pp 64, 66.

men evolved from plants. Aristotle's (384-322 B.C.) belief in spontaneous generation has been well-documented. Many others could be mentioned in this regard. Suffice it to say that most people at this time believed in spontaneous generation.

In the Middle Ages a number of scientists performed experiments in which insects, worms, eels, mice, frogs, and other organisms were "produced" from decaying or putrefying material. In fact, Jan Baptista van Helmont (1577-1644 A.D.), an outstanding Belgian scientist, physician, and chemist brought forth experimental evidence to support his view that mice could develop from wheat kernels. He performed an experiment in which he wrapped some wheat kernels and cheese tidbits in a sweat-soaked shirt and stuffed the whole mass into an open container. He left the container, and when he examined it some 20 days later, he noted that due to some mysterious influence of the human sweat, the wheat kernels had "spontaneously generated" into baby mice! As Fox and Dose observed: "This sort of evidence of spontaneous generation was respected until Francesco Redi (1626-1697), an Italian physician, showed that the white maggots in rotting meat result from the laying of eggs by flies, and are simply larvae that develop into flies."¹⁶¹

Indeed, this sort of evidence was respected. Even famous scientists believed in spontaneous generation. Sir William Harvey (1578-1657), the famous English physician who proved the idea that the blood circulated through the body, believed in spontaneous generation. Francis Bacon (1561-1626), the outstanding English philosopher who established many important concepts about logic, reasoning, and experimental science, believed in spontaneous generation. Rene Descartes (1596-1650), the French mathematical genius who invented analytic geometry, believed in spontaneous generation. These were hardly ignorant men. Yet all three (and the

¹⁶¹ Fox, Sidney W. and K. Dose. (see footnote #158) p 2.

list could be greatly expanded) considered the origin of living forms from lifeless material to be beyond-dispute as a "fact" of science.

In 1668 the Italian physician Francesco Redi proved conclusively that maggots are not spontaneously produced from meats, as so many people of his day suspected. He took three wide-mouthed jars and placed into each of them some meat and/or fish. One jar he left completely open. One jar he covered with a mesh net covering, while placing an airtight cover on the third. He then waited and watched to see what would happen. Most biology students today can recite the results of Redi's famous experiments. Only in the open jar (where the female fly could land to deposit her eggs on the meat/fish) did maggots develop.

A particularly heated discussion over spontaneous generation occurred between the Englishman John Needham (1713-1781) and the Italian Lazzaro Spallanzani (1729-1799). The two men performed quite similar experiments but obtained widely differing results. Needham used his data to support the idea that spontaneous generation can occur. Spallanzani said just the opposite after interpreting his data. In the experiments, liquids containing organic matter, such as mutton gravy, were enclosed in vessels, heated, and put aside. Later the vessels were examined for putrefaction. Each experimenter closed his vessel. Spallanzani sealed his hermetically; Needham stoppered his with corks. Spallanzani boiled the contents of his vessels for long periods of time; Needham heated his in a bed of hot ashes. Upon being opened, Needham's vessels were found to have microorganisms within them, and smelled of putrefaction. Some of Spallanzani's vessels remained completely free of microbes.

Needham then concluded that spontaneous generation was an inevitable consequence of the existence of organic matter. Spallanzani concluded that growth would not be observed if proper precautions were taken in sterilization.

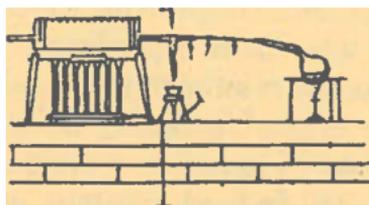
It remained for Louis Pasteur to put spontaneous generation to rest once and for all (or at least, so it would seem). Louis Pasteur (1822-1895) was a chemist — one of the true benefactors of mankind. Born in the little French town of Dole, he became interested in chemistry when he was studying at the Royal College at Besancon. In 1847 he received his degree in physical science, and was appointed assistant in the laboratory at the University of Paris. Later, as a result of his successful work with tartaric acid, he was made a professor of chemistry at Strasbourg. A few years later he was made dean and professor of science at the University of Lille. His motto, it has been said, was “Travailler, travailler, toujours!” — Work, always work! Indeed, Pasteur was a very busy man.

In modern times, the most marked turn in thinking on the subject of the origin of life occurred as the result of Pasteur's celebrated experiments. His controversy was with his contemporary and countryman, F.A. Pouchet. In fact, the controversy between Pouchet and Pasteur was reminiscent of that between Needham and Spallanzani. Like Spallanzani, Pasteur carried out meticulous experiments.

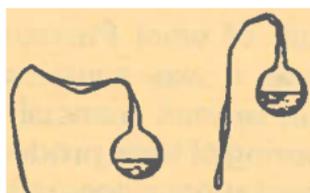
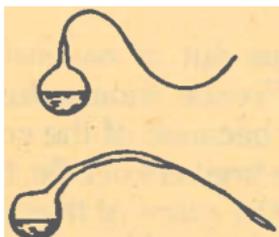
Much of what Pasteur did was out of necessity as much as it was anything. The French wine industries were in serious financial trouble because of the continual souring of their products. The brewers of Lille, thinking spontaneous generation was the cause of their problem, sought out Pasteur's help in this problem. Little did they know their request would be responsible for a major change in the direction of scientific thinking.

Pasteur's experiments are explained in exact detail, complete with illustrations in his now-famous paper, “On The Organized Bodies Which Exist In The Atmosphere; Examination Of The Doctrine of Spontaneous

Generation.”¹⁶² In summary of his tedious experiments, it may be stated that Pasteur proved that air contains microorganisms in non-uniform distribution. By heating air before passing it into sterile broth, Pasteur destroyed microorganisms which would otherwise have flourished. In order to answer the charge that the “vital force” had



been destroyed by this heat, Pasteur refined the experiment to use swan-neck (or “S”-neck) flasks. These allowed unheated air to enter, yet trapped the bacteria in the necks so that the broth, though open to the air, remained sterile.



¹⁶² *Annales des sciences naturelles*. 4th series. Vol. 16. pp 5-98. [Note: An English translation with comments is available in the work, *Milestones in Microbiology*, Thomas Brock, Editor. American Society for Microbiology. Washington, D.C. 1975. pp 43-48.]

As Dr. Thomas Brock has pointed out: "We should marvel at the logic, the clarity, and above all the simplicity of these experiments. In a few decisive blows Pasteur has ended the controversy concerning spontaneous generation. His experiments were easily reproducible, and this made it simple for others to accept his conclusions."¹⁶³ In his triumphal lecture at the Sorbonne in 1864, Pasteur said, "Never will the doctrine of spontaneous generation recover from the mortal blow struck by this simple experiment. There is the question of so-called spontaneous generation. Can matter organize itself? In other words, are there beings that can come into the world without parents, without ancestors? . . . No, today there is no circumstance known under which one could affirm that microscopical beings have come into the world without germs, without parents resembling themselves."¹⁶⁴

Drs. Boardman, Koontz, and Morris, in their book, *Science And Creation*, remark:

"In 1864, over 200 years after Redi, Pasteur finally settled the argument. He showed that even the microbes, the last hope of the spontaneous generationists, also needed parents. Pasteur's experiments were brilliantly planned and executed and were accompanied by a devastating line of argumentation which was calculated not only to win the argument but to vanquish the foe. When he got through, no one could doubt that the reason the broth in his sterile flasks did not spoil was because bacteria from the outside could not get in. No new germs were able to generate themselves spontaneously inside the flasks though both the broth and air in the flasks were good. So thoroughly did he demolish the theory of spontaneous generation that it has been intellectually impossible for anyone to ever again champion Pouchet . . . Our school books have always told us that Pasteur's triumph over Pouchet, the advocate of spontaneous gen-

¹⁶³ Brock, Thomas. (see footnote #162) p 48.

¹⁶⁴ Pasteur, Louis. Quoted in footnote #158. pp 4-5.

eration, was a great triumph for science and reason over superstition.”¹⁶⁵

It is easy to see why this work, published only a few years after Darwin’s *Origin Of Species*, would eventually influence all Darwinian and Neo-Darwinian thought, for, as evolutionist Dr. G.A. Kerkut tells us in his book, *Implications Of Evolution*, in order for evolution to be true, spontaneous generation must have occurred! ¹⁶⁶

¹⁶⁵ Broadman, W.W., R.F. Koontz, and H.M. Morris. *Science And Creation*. Creation-Science Research Center. San Diego, California. 1973. p 114.

¹⁶⁶ Kerkut, G.A. *Implications of Evolution*. Pergamon Press. London. 1960. p 6.

Charles Darwin
The Man Whose Time
Had Come

5

Charles Darwin — The Man Whose Time Had Come

Charles Darwin was born the same day as the Great Emancipator, Abraham Lincoln, February 12, 1809. He was born in Shrewsbury, England, the son of Robert Darwin, a wealthy physician. His mother died early in his life, and his father's strong influence molded him in many ways which it might not have had his mother been alive to act as a buffer. As a boy, Charles enjoyed the out-of-doors, and was a collector of pebbles, bird's eggs, insects, and plants. Despite his interest in nature, his grades at the Shrewsbury Grammar School were poor. He made little progress in either Latin or Greek, a failure which greatly displeased his intellectual father. During his middle teenage years he was still absorbed in bird-shooting and rat-catching. This, according to his father, would cause him to come to no good end.

Dr. Darwin therefore sent Charles and his elder brother Erasmus (named after the boys' grandfather) to the University of Edinburgh to study medicine, as he was determined that the boys would not grow up to be idle sportsmen. At Edinburgh, Darwin made no greater success than he had in grammar school. The lectures were dull, he once wrote to his father, but he found the operating clinics even worse. There, while visiting the op-

erating theater in which he observed a screaming child being operated upon without anesthetic, he turned and ran from both the room and the field of medicine, never again to return to either. It became evident that Charles Darwin was not going to be a surgeon/physician.

Next, history tells us, Darwin tried his hand for a while at studying law. However, it soon became evident that he had no talent in this field either. He therefore abandoned it, too. His formidable father then decreed that Charles should become a minister. Thus, at the age of 19 he agreed to accept the creed of the Church of England, and went to Cambridge University to study theology. He worked hard enough to maintain the required grades, and oddly enough earned a degree in theology — the only degree, in fact, he ever held. As Dr. Henry Morris has commented: “The only college degree he ever earned was in theology, and this was with a very undistinguished record. He was not inclined toward a career as a clergyman, and was in fact, only a nominal believer in Christianity.”¹⁶⁷ Dr. J.B. Birdsell gives this account:

“. . . the life he really loved was a very different one. In his free time he ran around with a sporting crowd and shot small game. He continued his varied collecting and read widely in the writings of Lamarck and the personal narratives of von Humboldt’s travels in tropical America. At about this time he reread the works of his grandfather, Erasmus Darwin, who had had some evolutionary glimmerings showing through his writings.

“The stage was now set for Charles Darwin to become an obscure clergyman in a country church and to leave no mark upon the life of his century.”¹⁶⁸

Such was not to be Darwin’s destiny, however. Although he did not do well at each university he attended, he did accomplish something important at each — he

¹⁶⁷ Morris, Henry M. (see footnote #117) p 52.

¹⁶⁸ Birdsell, J.B. (see footnote #5) p 27.

had become the intimate friend of men who were naturalists. Through his Cambridge contacts he received an invitation to join the Honor Second Extensive Exploratory Scientific Expedition aboard H.M.S. *Beagle*. The captain, Robert Fitzroy, needed a companion with whom he could eat and converse, and consequently he asked Darwin to make the voyage. In return, Fitzroy promised Darwin that he could act as the ship's naturalist, even though the ship already had a naturalist (the ship's surgeon). Charles was eager to accept, but his stubborn father refused him permission to go, and refused him financial support as well. However, his mother's family, the Wedgwoods of Pottery fame, intervened on his behalf and his father finally yielded and agreed to finance the trip.

Late in 1831, the 235-ton H.M.S. *Beagle* set sail from England for five years of surveying and mapping. It was not only the ship which was launched, but the career of Charles Darwin as well. Darwin was 22 at the time. The young naturalist sailed around both coasts of South America, and visited the Galapagos Islands where he encountered the famous finches he wrote so much about. The ship sailed to New Zealand and Australia, then returned home, almost exactly five years after its departure. In those five years there is no doubt that Darwin learned things that no professor in all of the universities of Europe could have taught him. He collected birds, reptiles, insects, fish, barnacles, and plants. He saw armadillos in Brazil and naked savages in Tierra del Fuego. At 27, now a seasoned naturalist, he returned to his native England with trunks full of meticulously kept books and journals. The foundation was laid for what was later to come.

But Darwin's ideas took a long time to hatch. Still subordinate to his father, and not an overly aggressive individual in the first place, Darwin needed time to develop his own beliefs and abilities. No doubt the fact that evolution was not a popular topic of the time also prevented his rushing into print immediately. Then, of course, there were other matters at hand.

Darwin married soon after the return of the *Beagle*, and bought a house in the English countryside where he spent the rest of his life. During almost all of his long life he lived in ill health, so that he could work only a few hours a day. His ill health, however, did not occur until after his marriage. Dr. John Klotz says:

“Darwin lived in ill health most of his life. Huxley believes this was an escape mechanism fostered by the devotion of his wife, who became an ideal nurse just as Darwin became the ideal patient. His reluctance to commit himself publicly and in print to belief in evolution sprang ultimately, Huxley believes, from some unacknowledged inner conflict partly rooted in his relations with his father and partly due to his deeply religious wife, who was opposed to his unorthodox ideas. His father, Robert, deplored Charles’ intense devotion to nature and natural history and was apparently hostile to the whole idea of evolution. Darwin’s chronic ill health did not begin until after his marriage . . .”¹⁶⁹

For eight years after his arrival back in England he worked with barnacles, always wondering why scientists could not agree on how many species of barnacles there were. Darwin traveled to London in 1837, where he worked on his journals and notebooks from the voyage. A year after reaching London he read Malthus’ paper, *An Essay On The Principle Of Population*. To say that Malthus’ work influenced Darwin is to entirely understate the issue. It was Malthus’ work that fired the spark in Darwin’s mind. Its ideas struck him so forcibly as to provide him with the missing foundation for his future theory. He suddenly “realized” that under the circumstances in which reproductive capacities exceed the available food supply that favorable variations in individuals would tend to be preserved, while those less fit would be unlikely to survive. *This concept of differential survival in terms of fitness is directly traceable to the stimulus provided by Malthus.*¹⁷⁰

¹⁶⁹ Klotz, John (see footnote #128) p 33.

¹⁷⁰ See our footnote #157 for substantiation of this point.

In 1842 Darwin wrote out a brief statement of the theory he had formed to account for the origin of species, with a more complete draft being drawn up in 1844. The main points of his statement were these:

1. Overproduction. Plants and animals produce far more offspring than can survive.
2. Variation. No two living things are exactly alike.
3. Struggle for existence. Since more living things are produced than can survive, a sort of struggle goes on among them.
4. Survival of the fittest. (Natural Selection) Since there is endless variation, some organisms are better fitted for the struggle for existence than others.
5. Inheritance of acquired characteristics. Descendants of the "fit" organisms would inherit the qualities which made their ancestors fit, and gradually new species would arise, well-adapted to their environment and very different from their remote ancestors.

Darwin worked for two decades getting this theory ready to be made public. In so doing, he almost lost the race to be recognized as its originator. In the summer of 1858 Darwin received an essay, "On The Tendency Of Varieties To Depart Indefinitely From The Original Type," from Alfred Russell Wallace in Malaya. In a few pages of his essay, Wallace had summarized what Darwin had been working on for over 20 years.¹⁷¹

Unlike Darwin, Wallace had moved quickly. His synthesis of ideas came as a matter of slashing insight. The ideas themselves came to him as he lay fever-ridden on the island of Ternate in the Dutch Indies. He wrote the paper in a matter of days, and sent it to Darwin with the request that Darwin take it to Lyell for his opinion. Darwin was about to suppress the publication of his own work when Lyell suggested otherwise. Both Darwin's and Wallace's papers were read before the Linnaean

¹⁷¹ Wallace's independent discovery of natural selection and his correspondence with Darwin have already been fully discussed. No further discussion is felt to be necessary here.

Society in 1858, with little attention given to either.

Shaken by Wallace's essay, yet urged on by Lyell, Darwin worked to condense what was previously to be a 4-volume set into one volume. On November 24, 1859 *The Origin Of Species By Natural Selection* first appeared. All 1,025 copies of the first edition were sold the first day. Its publication insured that Darwin would receive major credit for the hypothesis of organic evolution by natural selection. And so he has!

The Origin Of Species contains two chapters showing that variation is a universal property of all organisms, both those under domestication and those in nature. These are followed by a chapter on the struggle for existence which discusses the rapid increase in plants and animals as well as the results to individuals and varieties of the same species. A chapter is devoted to the survival of the fittest, or natural selection, as well as one on the laws of variation, use and disuse combined with natural selection. Darwin then devotes two chapters to the difficulties of the theory. There is a chapter on the variability of instinct and habit, followed by one on the effects of hybridization. A chapter is devoted to the imperfection of the geological record. The next chapter Darwin devoted to the geological succession of organic beings, followed by two chapters on the geographical distribution of animals. One chapter is devoted to the discussion of classification, morphology, embryology, and vestigial organs. Darwin's views and conclusions are summed up in the final chapter.

The success of Darwin's book was phenomenal. In 17 years it had sold 16,000 copies — a remarkable achievement in that day and time. Dr. Henry M. Morris observes:

“It is doubtful if any other scientist has ever received as much praise and adulation as has Darwin. He was even honored in what amounted almost to a religious worship service in a great convocation held in 1959 at the University of Chicago, on the occasion of the one-hundredth anniversary of the publication of his famous

book, *The Origin Of Species By Natural Selection* . . . It was clearly his *Origin Of Species* which acquired for him his super-reputation.”¹⁷²

C. D. Darlington has said: “We owe it to him that the world was brought to believe in evolution; we ought to be duly grateful”¹⁷³

Why was Darwin’s book so popular? Why was this “new” brand of evolution more acceptable than the others before it? There are many reasons. Much of Darwin’s acceptance has to do with the times. Darlington says:

“During the 18th century a cleavage of opinion developed between those who held to the Biblical story of Creation and those who assumed some kind of evolution. In general the idea of evolution was familiar to students of what was already called natural history, but the evolutionary point of view had to be expressed with caution. Governments almost everywhere wished to maintain the religious beliefs of the uneducated masses . . . Darwinism, therefore, began as a theory that evolution could be explained by natural selection. It ended as a theory that evolution could be explained just as you would like it to be explained.”¹⁷⁴

Dr. Henry Morris says:

“. . . It is an interesting comment on the temper of the times and man’s eagerness to discover a justifiable reason for rejecting God as his Creator that the first edition of the *Origin* was sold out before it was published

“The most significant fact about Darwin is not his stature as a scientist, but his influence as a symbol. His contribution came at just the right time to catalyze an explosive reaction, transforming in one generation a society which was already seething in inner rebellion against the predominant theological and Biblical view of

¹⁷² Morris, Henry M. (see footnote #117) pp 51-52.

¹⁷³ Darlington, C.D. (see footnote #41) p 60.

¹⁷⁴ *Ibid.* p 61.

the world into a world in open and often violent rebellion against its Creator.”¹⁷⁵

In the words of Dr. E.O. Dodson, the period following Darwin was:

“... characterized by extreme enthusiasm together with an uncritical acceptance of whatever data were claimed to support Darwinism. Negative evidence was given little weight, while absurd extremes of interpretations, in order to make observed facts fit Darwinian theory, were quite common.”¹⁷⁶

George Bernard Shaw wrote:

“If you can realize how insufferably the world was oppressed by the notion that everything that happened was an arbitrary personal act of an arbitrary personal God of dangerous, jealous and cruel personal character, you will understand how the world jumped at Darwin.”¹⁷⁷

Dr. W. H. Rusch makes this observation:

“So it seems as if Darwin’s prime claim to fame lies in this, that at the precise time when fear and dislike of God was on the increase he happened to synthesize the previous evolution theories into a single presentation, clothing it in a hypothesis that seemed adequate to explain the marvelous adaptation of living things, by the mere action of natural forces, without the necessity of bringing in divine intervention.”¹⁷⁸

Darlington feels that:

“He was able to put his ideas across not so much because of his scientific integrity, but because of his opportunism, his equivocation, and his lack of historical sense. Though his admirers will not like to believe it, he

¹⁷⁵ Morris, Henry M. (see footnote #117) p 53.

¹⁷⁶ Dodson, E.O. *A Textbook On Evolution*. Sanders. Philadelphia. 1952. p 23.

¹⁷⁷ Shaw, G.B. Quoted in: *Is Evolution Proved?*. D. Dewar and H.S. Shelton, authors. Hollis & Carter. London. 1947. p 4.

¹⁷⁸ Rusch, Wilbert H. (see footnote #14) p 22.

accomplished his revolution by personal weakness and strategic talent more than by scientific virtue.”¹⁷⁹

Drs. Bales and Clark feel that perhaps Darwin’s theory was accepted because: “Many a false theory gets crystallized by time and absorbed into the body of scientific doctrine through lack of adequate criticism when it is formulated.”¹⁸⁰

More reasons could be offered for the acceptance of Darwin’s work.¹⁸¹ In summary, however, it can be simply stated that Darwin, whatever the surrounding reasons for his popularity, found himself in the right place at the right time. Criticism of his theory was not adequate, and time was on his side. The people of that day had nothing else which was plausible. Darwin gave them that something.

That the popular acceptance of evolution dates from Darwin’s *Origin Of Species* is doubted by no one. It was a book which was to influence many. Yet even its author was influenced as he wrote and studied — influenced by others before and during his time. Most of the people who profoundly influenced Charles Darwin have already been discussed. Yet one remains to be fully investigated, and his influence on Charles Darwin fully appreciated. His name — Sir Charles Lyell.

Lyell’s influence on Darwin cannot be overemphasized. Though Malthus, Spencer, Wallace, Lamarck, and Erasmus Darwin influenced Darwin, none influenced him so profoundly as Lyell. Charles Darwin himself recognized the influence Lyell had on him. He rec-

¹⁷⁹ Darlington, C.D. (see footnote #41) p 66.

¹⁸⁰ Clark, Robert T. and J.D. Bales. (see footnote #29) p 107.

¹⁸¹ Dobzhansky, for example, comments: “Darwin was a great synthesist; he developed an ability to see relationships between apparently unrelated facts even before conceiving the theory of evolution itself . . . an additional, highly important factor that contributed to Darwin’s success was the intellectual climate of the first half of the nineteenth century, and Darwin’s ability to take advantage of it.” (see footnote #107, p 12).

ognized Lyell as “head of the uniformitarians.”¹⁸² Darwin read Lyell’s book, *Principles Of Geology*, while he was on his five year voyage aboard the *Beagle*. As he expressed it:

“When [I was] starting on the voyage of the *Beagle*, the sagacious Henslow, who, like all other geologists, believed at that time in successive cataclysms, advised me to get and study the first volume of ‘Principles,’ which had then just been published, but on no account to accept the views therein advocated. How differently would any one now speak of the ‘Principles!’ I am proud to remember that the first place, namely, St. Jago, in the Cape de Verde archipelago, in which I geologized, convinced me of the infinite superiority of Lyell’s views over those advocated in any other work known to me.”¹⁸³

In fact, Darwin said he studied Lyell “attentively; and the book was of the highest service to me in many ways.”¹⁸⁴ In a letter to Lyell’s secretary (February 23, 1875) after Lyell’s death, Darwin wrote, “I never forget that almost everything which I have done in science I owe to the study of his great works.”¹⁸⁵ Dr. Mayr observes:

“But what effect did Lyell have on Darwin? Everyone agrees that it was profound; there was no other person whom Darwin admired as greatly as Lyell. *Principles Of Geology*, by Lyell, was Darwin’s favorite reading on the *Beagle*, and gave his geological interests new direction. After the return of the *Beagle* to England, Darwin received more stimulation and encouragement from Lyell than from any other of his friends. Indeed, Lyell became a father figure for him and stayed so for the rest of his life. Darwin’s whole way of writing, particularly in the *Origin Of Species*, was modeled after the *Principles*. There is no dispute over these facts.”¹⁸⁶

¹⁸² *Life and Letters of Charles Darwin*. Vol. II, p 121 (see footnote #76).

¹⁸³ *Ibid.* Vol. I. p 60.

¹⁸⁴ *Ibid.* Vol. I. p 52.

¹⁸⁵ *Ibid.* Vol. II. p 374.

¹⁸⁶ Mayr, Ernst. (see footnote #27) p 985.

Dr. Henry Morris states:

“Darwin was also much influenced by Thomas Malthus and his concept of the ‘struggle for existence’ among human populations. But probably his most important immediate predecessor was Charles Lyell, with his geological dogma of uniformitarianism. The vast span of geologic time, with its supposed gradual progression of life forms into systems of higher and higher complexity, was of course an absolute necessity for any viable theory of evolution. Darwin frequently acknowledged his debt to Lyell, even though he was evidently always quite reluctant to give credit to his other predecessors. Lyell rejected the predominant catastrophist theory of geology and persuaded his contemporaries that all the geologic strata had been laid down slowly over vast ages of time. Darwin found this framework made to order for his ideas of natural selection which would certainly require tremendous lengths of time to be effective.”¹⁸⁷

Dr. Loren Eiseley makes the following statement: “Darwin and Wallace were Lyell’s intellectual children. Both would have failed to be what they were without the *Principles Of Geology* to guide them.”¹⁸⁸

But perhaps Darwin himself summed up the matter best when he said, “I feel as if my books came half out of Sir Charles Lyell’s brain.”¹⁸⁹ Such was the influence of Lyell on Charles Darwin.

It seems quite strange that Darwin avoided (with the singular exception of Lyell) giving any credit to his predecessors. It is almost as if he purposefully left out any references to those men who had gone before him.

“It does seem strange that Charles Darwin would never acknowledge his intellectual debt to these predecessors. His admirers speak of him as though he were the paragon of the careful, open-minded scientist, humble,

¹⁸⁷ Morris, Henry M. (see footnote #117) pp 55-56.

¹⁸⁸ Eiseley, Loren C. (see footnote #47) p 106.

¹⁸⁹ Darwin, Charles. (see footnote #84)

interested solely in the hard-headed observation and understanding of facts.”¹⁹⁰

Dr. George Gaylord Simpson, in a review of Charles Darwin’s autobiography, made the following comments on this very point:

“Darwin himself . . . wrote he ‘never happened to come across a single naturalist who seemed to doubt about the permanence of species,’ and he acknowledged no debt to his predecessors. These are extraordinary statements. They cannot be literally true, yet Darwin cannot be consciously lying, and he therefore may be judged unconsciously misleading, naive, forgetful, or all three. His own grandfather, Erasmus Darwin, whose work Charles knew very well, was a pioneer evolutionist. Darwin was also familiar with the work of Lamarck, and had certainly met a few naturalists who had flirted with the idea of evolution . . . Of all this, Darwin says that none of these forerunners had any effect on him. Then, in almost the next breath, he admits that hearing evolutionary views supported and praised rather early in life may have favored his upholding them later.”¹⁹¹

Darlington sheds some light on this matter when he remarks:

“Darwin’s attitude toward his precursors now becomes clear. It also explains to us something we otherwise have great difficulty in understanding: the secret of his success in converting the world to evolution.

“No doubt Darwin was able to cut himself off so completely from his historical forerunners because he succeeded so well in separating science from history in his own mind. The science of evolution was real; the history of the idea of evolution was unreal. The kindest interpretation we can put on his attitude is that he was looking forward all of the time, wrapped up in his own ideas and his own inquiries. He could not spare the time

¹⁹⁰ Morris, Henry M. (see footnote #117) p 56.

¹⁹¹ Simpson, George G. “Charles Darwin In Search Of Himself.” Review of *Autobiography Of Charles Darwin* by Nora Barlow. *IN: Scientific American*. Vol. 199. 1958. p 199.

to look back. Deep in his unconscious he must have known that the past contained the origins of his ideas and that his predecessors were not quite so cheap as he made them out to be. But he wanted to think out his ideas for himself.

“This is the kindest interpretation. But we have to record that Samuel Butler advanced a less kind interpretation. He pointed out that the first edition of *Origin Of Species* contained 45 references to ‘my theory.’ But no one could quite tell what ‘my theory’ might be. Was it the theory that evolution had taken place? Was it the theory of natural selection? Or was it the shifting combination of selection and direction? . . . Darwin gradually cut out the references to ‘my theory.’ But by that time the public all over the world had begun to think of it as Darwin’s theory.

“Whatever the cause, the effect served Darwin splendidly. That he appeared to come suddenly out of nothing, without herald or harbinger, was one of the factors that contributed principally to his success.”¹⁹²

Indeed, this is true. The world now recognizes Darwin as the founder of evolutionary thought. Through his purposeful omission of credit to the works of his predecessors, he accomplished what he obviously set out to do — to see that the name of Charles Darwin became synonymous with evolution. He accomplished his goals through the deliberate and willful misuse of the works of others, without ever giving proper credit to whom it was due.

This causes us to wonder what kind of man Charles Darwin was. What motivated him? What spurred him on? What were his likes and dislikes? What was his final state of life?

Darwin was not always a man against God. When he began his studies to become a minister, he believed in God. He said, in speaking of his belief in God:

“But I was very unwilling to give up my belief; I feel sure

¹⁹² Darlington, C.D. (see footnote #41) pp 64-65.

of this, for I can well remember often and often inventing day-dreams of old letters between distinguished Romans, and manuscripts being discovered at Pompeii or elsewhere, which confirmed in the most striking manner all that was written in the Gospels. But I found it more and more difficult, with free scope given to my imagination, to invent evidence which would suffice to convince me. Thus disbelief crept over me at a very slow rate, but at last was complete. The rate was so slow that I felt no distress." 193

Drs. Bales and Clark observe:

"First, it is noteworthy that Charles Darwin lost his faith in Christianity and the miraculous before he had formulated his hypothesis of evolution. This is not to say that he had no evolutionary ideas before this time; for he did, . . . But it is still true that he had lost his faith in creation before he set out to discover how life in its varied forms could come about by the working of natural laws. In other words, with Darwin, as it will be shown to be true of others, evolution came in to fill up the void that was being created by the departure of faith in the God who creates.

"There are some who think that Darwin accepted the theory of evolution only after many, many years of studying the subject. This, however, is not the case. As his religious faith ebbed his faith in evolution developed. It came in to fill up the void that was being left by his rejection of creation. And, of course, if anything took the place of the idea of creation it had to be some form of evolution." 194

Yet in all of his intellectual wanderings, Darwin never became an atheist. He wrote in 1879 that: "In my most extreme fluctuations I have never been an atheist in the sense of denying the existence of God. I think that gen-

¹⁹³ *Life and Letters of Charles Darwin.* (see footnote #76) Vol. I. pp 277-278. Compare also John C. Greene, *Darwin and the Modern World View.* The New American Library. New York. 1963. pp 16-17.

¹⁹⁴ Clark, Robert T. and J.D. Bales. (see footnote #29) pp 31-32, 35.

erally (and more and more as I grow older), but not always, that an Agnostic would be the more correct description of my state of mind.”¹⁹⁵ To J.D. Hooker on July 12, 1870 he wrote: “My theology is a simple muddle; I cannot look at the universe as the result of blind chance, yet I can see no evidence of beneficent design of any kind, in the details.”¹⁹⁶

The question of God’s existence never left Darwin. In fact, it was on his mind during the last years of his life.

“The Duke of Argyll has recorded a few words on this subject, spoken by my father in the last year of his life. ‘. . . in the course of that conversation I said to Mr. Darwin, with reference to some of his own remarkable works on the “Fertilization Of Orchids,” and upon “The Earthworms,” and various other observations he made of the wonderful contrivances for certain purposes in nature — I said it was impossible to look at these without seeing that they were the effect and the expression of mind. I shall never forget Mr. Darwin’s answer. He looked at me very hard and said, “Well, that often comes over me with overwhelming force; but at other times,” and he shook his head vaguely, adding, ‘it seems to go away.’ ”¹⁹⁷

After the publication of the *Life And Letters Of Charles Darwin* by his son, the *Atlantic Monthly*, in reviewing the book, draws up an estimate of the religious life of the great transmutationist:

“The blank page in this charming biography is the page of spiritual life. There is nothing written there. The entire absence of an element which enters commonly into all men’s lives in some degree is a circumstance as significant as it is astonishing The spiritual element in life is not remote, but it is not a matter of sensation, and Darwin lived as if there were no such thing; it belongs to the region of emotion and imagination, and those perceptions which deal with the nature of man in its contrast with the material world. Poetry, art, music — Dar-

¹⁹⁵ *Life and Letters of Charles Darwin*. (see footnote #76). Vol. I. p 274.

¹⁹⁶ *More Letters of Charles Darwin*. (see footnote #32) Vol. I. p 321.

¹⁹⁷ *Life and Letters of Charles Darwin*. (see footnote #76) Vol. I. p 285.

win's insensibility to the higher life — for so men agree to call it — was partly if not wholly, induced by his absorption in scientific pursuits in the spirit of materialism Great as Darwin was as a thinker, and winning as he remains as a man, those elements in which he was deficient are the noblest part of our nature.

“On finishing the story of his life, the reflection rises involuntarily in the mind that this man, in Wordsworth's line, ‘hath faculties that he has never used.’ ”¹⁹⁸

The comment from Bales and Clark is this:

“Darwin had not only neglected, but had actually opposed and suppressed his convictions concerning God. Small wonder that these convictions wavered and often became weaker . . . Darwin recognized that his hypothesis of evolution flowed away from, rather than towards, God. On August 8, 1860, in a letter to Huxley he spoke of him as ‘My good and kind agent for the propagation of the Gospel — i.e. the devil's gospel.’ ”¹⁹⁹

In writing to Asa Gray, November 26, 1860, Darwin expressed regret that he could not go as far as Gray with reference to design:

“But I grieve to say that I cannot honestly go as far as you do about Design. I am conscious that I am in an utterly hopeless muddle. I cannot think that the world, as we see it, is the result of chance; and yet I cannot look at each separate thing as the result of Design Again, I say I am, and shall ever remain, in a hopeless muddle.”²⁰⁰

“Perhaps there was never a better instance of a man throwing away the baby with the bath water. Darwin was determined to escape from design and a personal God at all costs. He did so by deciding that either every trivial detail in nature must be designed or else that there was no design at all. Since the former possibility did not ring true, he refused to discuss the subject seriously any

¹⁹⁸ “Darwin's Life.” *IN: Atlantic Monthly*, April, 1888. p 560. Quoted by Mary Frederick, *Religion and Evolution Since 1859*. University of Notre Dame Press. 1934. p 24.

¹⁹⁹ Clark, Robert T. and J.D. Bales. (see footnote #29) pp 44-45.

²⁰⁰ *Life and Letters of Charles Darwin* (see footnote #76) Vol. II. p 146.

more. As Raven has so well remarked, 'His letters exhibit a resolution not to follow his thoughts to their logical conclusion.' " ²⁰¹

Darwin has often been called the "Newton of biology." Dr. Jacques Barzun, professor of History and Dean of the Graduate Faculties at Columbia University says that this is a very "loose description indeed," and that

"Darwin was not a thinker, and he did not originate the ideas that he used. He vacillated, added, retracted, and confused his own traces. As soon as he crossed the dividing line between the realm of events and the realm of theory he became 'metaphysical' in the bad sense. His power of drawing out the implications of his own theories was at no time very remarkable but when it came to the moral order it disappeared altogether, as that penetrating evolutionist, Nietzsche, observed with some disdain." ²⁰²

Darlington reminds us that "On the other hand, his ideas were not, as he imagined, unusually original." ²⁰³

To people fairly familiar with Darwin's life and works these statements do not come as any great surprise. Darwin's success was not so much in his brilliant scientific achievements as it was in his timing. But most people today are not aware of the fact that Darwin himself, later in his life, had serious doubts about the universal efficacy of natural selection. As Dr. W.H. Rusch reminds

"By 1862 he had begun to waver, and by 1865 he was talking to an increasing extent of the direct action of the environment and of use and disuse as factors of change. To a considerable extent, his change of view was brought about by the criticism of a Scottish engineer, who argued against single variations ever being perpetuated. If one individual, he pointed out, showed a favorable variation while its neighbors did not, the variation would soon tend

²⁰¹ Clark, R.E.D. *Darwin: Before and After*. The Paternoster Press. London. 1948. pp 88-89.

²⁰² Barzun, Jacques. (see footnote #7) p 84.

²⁰³ Darlington, C.D. (see footnote #41) p 66.

to be lost by crossing. Darwin recognized the justice of Jenkin's argument and made frequent references to them. 'Fleeming Jenkin has given me much trouble,' Darwin wrote to Hooker. He also wrote to Wallace: 'Jenkin argued in the *North British Review* against single variations ever being perpetuated, and has convinced me.' In the sixth edition of the *Origin*, Darwin writes: 'Nevertheless, until reading an able and valuable article in the *North British Review*, I did not appreciate how rarely single variations, whether slight or strongly marked, could be perpetuated' (p 84). The result was that Darwin felt forced to fall back on Lamarckism, around which he built his theory of pangenesis and gemmules as carriers of acquired characteristics.

"But the public, including many scientists, paid not the slightest attention to these changes in the mind and works of their oracle. Darwin was and remained the man who had made evolution acceptable by proposing a definite cause."²⁰⁴

What were the results of Darwin's work? What has happened since the publication in November, 1859 of *Origin Of Species*? Perhaps the results are aptly described by the evolutionist Mayr in his work, "The Nature Of The Darwinian Revolution," as he views the results through an evolutionist's looking glass:

1. [Revolution in thinking on] the age of the earth.
2. Refutation of both catastrophism (progressionism) and of a steady-state world.
3. Refutation of the concept of an automatic upward evolution.
4. The rejection of creationism.
5. The replacement of essentialism and nominalism by population thinking.
6. The abolition of anthropocentrism.²⁰⁵

From the evolutionary view, these were the results of Darwin's work. Of course, the refutation of catastroph-

²⁰⁴ Rusch, Wilbert H. (see footnote #14) pp 22-23.

²⁰⁵ Mayr, Ernst. (see footnote #27) p 988.

ism and creationism have not occurred as Dr. Mayr asserts, but *as far as the evolutionists are concerned* the refutation is complete enough. Creation, of course, is very much still alive, all the disclaimers of the evolutionists notwithstanding. In the eyes of many in the world, however, the items listed above have “come to pass.” More will be said about this later.

Let us conclude this section on Charles Darwin with this pertinent quote from Dr. Henry Morris:

“The time was ripe for the Darwinian theory. As noted above, it really wasn’t Darwin’s theory, but he was the one who was advocating it at the time when it became propitious to renounce Lamarckianism and adopt natural selection instead. Huxley, Lyell, and others prodded Darwin to publish his book, which he had been painfully working on for many years, and it soon became famous. Huxley, along with Spencer, Haeckel, and others immediately opened a relentless evolutionary propaganda campaign, and it wasn’t long until essentially the whole world was converted to evolution.”²⁰⁶

In 1882 Charles Darwin, the man who made evolution popular, passed from the scenes of this earthly life, leaving his theory in the hands of his successors — for better or for worse.

Darwin’s work, and his book, did not come out completely unscathed throughout all this time. Many disagreed, some violently. Few actually took the time and effort to repel the theory publicly, though some tried. Darwin’s former professor, Dr. Adam Sedgwick, commented about *Origin Of Species*:

“I have read your book with more pain than pleasure. Parts of it I admire greatly, parts I laughed at until my sides were almost sore; other parts I read with absolute sorrow, because I think them utterly false and grievously mischievous.”²⁰⁷

²⁰⁶ Morris, Henry M. (see footnote #117) p 62.

²⁰⁷ Sedgwick, Adam. *Darwin’s Life and Letters*. Appleton & Co. New York. 1889. Vol. II. p 43.

Others disagreed as well. Both Darwin the man and his evolutionary ideas were publicly and privately attacked. But, as Birdsell points out: "Fortunately, he did not have to undertake his own public defense, for he could not have done it effectively. He was saved that effort by Thomas Huxley (1825-1894), a well-known British biologist and skillful writer, who became his dogged defender."²⁰⁸

Darwin had two very dedicated disciples. One of them was Harvard's Dr. Asa Gray in America (who will be discussed later). The other was Thomas Huxley in England.

The last of seven children, Thomas Henry Huxley was born on May 4, 1825 in Ealing, a small village on the outskirts of London. Huxley mentions in his *Autobiography* that he inherited from his mother his quick wit and his physical appearance. From his father he says he inherited a hot temper and a tenacious attitude. As a young man he had a goal: "I will leave my mark somewhere, and it shall be clear and distinct — T.H.H., his mark — and free from the abominable blur of cant, humbug, and self-seeking which surrounds everything in this present world."²⁰⁹

Although Huxley himself would have become an engineer, his parents had different plans for his life. They sent him to medical school. Sometime in 1839 he had a similar experience to the one Charles Darwin had at medical school. Huxley attended a postmortem examination. Upon seeing the human body cut open, the young Huxley became violently ill and had to be removed. He eventually made it through medical school, however, and was admitted as a "fellow" in the Royal Society in 1851 at the early age of 26.

Like Darwin, and the botanist Joseph Hooker, Hux-

²⁰⁸ Birdsell, J.B. (see footnote #5) p 29.

²⁰⁹ Huxley, Leonard. *Life and Letters of Thomas Huxley*. Appleton. New York. 1900. Vol. I. p 69 (letter to his sister, Elizabeth, Nov. 21, 1850).

ley undertook a voyage on an English ship during his youth. He signed on the H.M.S. *Rattlesnake*, under Captain Owen Stanley, as assistant ship's surgeon. The ship left England in 1846 (one year after Huxley had graduated from medical school), traveled to Rio de Janeiro, crossed the South Atlantic to the Cape of Good Hope, and moved on to Australia. While on this cruise, Huxley devoted most of his time to studies of coelenterates and mollusks. He was a fair artist and illustrated his notebooks with various sketches of plants, animals, and humans. His first scientific paper, written in 1845 prior to his trip, described a previously unknown layer in the human scalp, a membrane still known as "Huxley's layer."²¹⁰

Huxley returned to England in 1850 and began immediately to work on his memoirs. At first he was unable to find a job, having tried universities in England, Scotland, and Canada, but to no avail. His family was poor, and he had no other means of support (Darwin, on the other hand, had been left a very comfortable inheritance and wanted for nothing). However, he eventually was able to find work, and was even invited to present papers at the Royal Institution (the first of which he presented in 1852). Through such connections he made friends with the "scientific elite" of his day — men such as Herbert Spencer, Joseph Hooker, Charles Lyell, and even Charles Darwin. Little did he know these would soon be his life's companions and fellow Darwinists!

In 1859, when Darwin published *Origin Of Species*, Huxley was astounded. Even though he had known of Darwin's work, he hadn't expected the kind of book Darwin had produced. Previously Huxley had been hostile toward transformationism. With the publication of *Origin Of Species*, he became a full-fledged supporter of it. Blinderman says: "Huxley was converted almost instan-

²¹⁰ Foster, M. and E.R. Lankester. *The Scientific Memoirs of Thomas Henry Huxley*. Macmillan. London. 1898-1903. Vol I. p 1.

taneously and, like St. Paul, who had been similarly illuminated, he proceeded to convert the Gentiles.”²¹¹ Dr. Henry M. Morris observes:

“ . . . Thomas Huxley . . . was probably more responsible than any other single individual for the rapid and widespread acceptance of Darwinian evolution, through his constant and effective speaking and writing. Huxley was an evolutionist before Darwin, but the latter’s book gave him the needed scientific support for it, or so he thought. He became known as ‘Darwin’s bulldog.’ ”²¹²

That Huxley was an adamant supporter of Darwin is evident from his statements to Darwin:

“I trust you will not allow yourself to be in any way disgusted or annoyed by the considerable abuse and misrepresentation which, unless I greatly mistake, is in store for you. Depend upon it, you have earned ‘the lasting gratitude of all thoughtful men. And as to the curs which will bark and yelp, you must recollect that some of your friends, at any rate, are endowed with an amount of combativeness which (though you have often and justly rebuked it) may stand you in good stead. I am sharpening up my claws and beak in readiness.”²¹³

Little wonder he became known as “Darwin’s bulldog!” Blinderman says, “. . . Huxley was a pugnacious defender of heresy. His appetite for fighting was enormous, and while he modestly depreciated his controversial talent, . . . he never resisted the temptation to enter into, or to initiate, one of those long controversies that make the annals of Victorian science exciting reading.”²¹⁴ Blinderman goes on to give the following account of Huxley’s works in defense of Darwinism:

“But a hot temper alone is not sufficient for the popularizer of science; he must also have some acquaintance

²¹¹ Blinderman, Charles S. “Thomas Henry Huxley.” *IN: Scientific Monthly*. April, 1957. p 174.

²¹² Morris, Henry M. (see footnote #117) p 58.

²¹³ Huxley, Leonard. (see footnote #209) Vol. I. p 189. (letter of November 23, 1859).

²¹⁴ Blinderman, Charles S. (see footnote #211) pp 174-175.

with the material he is to present to the public. Huxley was, with Charles Darwin, the foremost representative of biological science in England during the last century; he made a number of original discoveries, promulgated the discoveries of others, and instructed scores of student investigators, such as Michael Foster and Henry Fairfield Osborn, who disseminated throughout the world his method of laboratory training. The four decades Huxley spent in the laboratory and in the classroom earned for him a respect in the market place he could never have achieved solely on the merits of pug-nacity.

“Besides the essential basic knowledge that he had at his command and his useful gladiatorial temperament, Huxley was also proficient in the art of persuasion, able to excite those who were left cold by brute facts. Sometimes it was as much to hear a stimulating lecturer who overpowered one with reasoned facts presented in beautiful language as to be educated in the subject that people came to listen to Huxley. He was determined to popularize science outside the small group of wealthy dilettantes who came to show off their finery at the Royal Institution. His determination was that he should be remembered as a friend of the people, but it was to achieve more than posthumous fame as a humanitarian that Huxley undertook in 1855 a regular series of lectures to working men. Displeased with his middle-class audiences, Huxley enjoyed talking to a ‘fustian audience,’ and he spared no pains to make his discourses to them as persuasive and enrapturing as his talks to his more sophisticated auditors at the Royal Institution.

“‘I must and will make people see what grandeur there is [in an] interest in Biological Science,’ he wrote, some time after he had been given a position as professor of natural history and paleontology in the Royal School of Mines in 1854. Always careful to keep to the mean between the incomprehensibly complex and the insultingly simple, he displayed for his audiences the long range of evolution and the methods by which it was verified by geology, biology, and anatomy, repeatedly asserting that Darwin was the Newton of biology.”²¹⁵

²¹⁵ *Ibid.* p 175.

It was in 1860, less than a year after Darwin's work had been published, that Huxley became famous as the champion of Darwinism. The occasion was the meeting of the British Association for the Advancement of Science at the Sheldonian Theatre at Oxford University. The program was a debate on natural selection, with over 700 people in attendance. Samuel Wilberforce, Bishop of Oxford (coached by anti-Darwinian anatomist Robert Owen) took the platform and lashed out at the absent Darwin and his evolutionary views. After his tirade, Wilberforce turned to Huxley to ask the now-famous question, half facetiously and half maliciously, inquiring whether Huxley had descended from an ape on his grandfather's or his grandmother's side. Huxley, who by now was known as the "bishop eater," accepted the challenge of Wilberforce and replied that he would rather be descended from a monkey than from a man who used his knowledge and eloquence to misrepresent those searching for the truth.

The effect was devastating, as the audience broke out in laughter in favor of Huxley. Now the relatively unknown anatomist and paleontologist was suddenly catapulted into notoriety. Throughout the 1860's and 1870's Huxley produced one essay after another, lectured in all manner of places, and wrote a number of books — all devoted to the propagation of Darwin's theory. He was awarded almost yearly various positions in the world of science: examiner in physiology and comparative anatomy in the University of London, then Fullerian professor of comparative anatomy at the Royal Institution, and later Hunterian professor at the Royal College of Surgeons. He was president of the Ethnological Society, of the Geological Society, of the British Association for the Advancement of Science, or the Royal Society. He was the first dean of the newly established Royal College of Science, a member of ten Royal Commissions investigating everything from salmon parasites to technical education, and editor or prime mover behind the inauguration of periodicals such as *Nature*.

Huxley was the most popular, most sought-after lecturer on science in all of England. As Blinderman states:

“He had a work to do in England, a messianic purpose, and he dedicated to that purpose his tireless energy and his vast resources of knowledge and ability. And he did attain the success his heart desired, for Huxley was recognized as a prophet in his own country.”²¹⁶

Huxley often lectured to the “working class” on evolution and with apparent success. “My working men stick by me wonderfully. By Friday evening they will all be convinced that they are monkeys.”²¹⁷ He once delivered a series of lectures at the Philosophical Institute at Edinburgh, which was greeted with thunderous applause as he declared man’s descent from simian ancestry.

In 1863, eight years before Darwin’s *Descent Of Man*, Huxley published *Evidences As To Man’s Place In Nature*. It was published amidst much turmoil, because it dealt with human evolution — a subject in which Huxley had a major interest (and a subject that Darwin had carefully avoided in *Origin Of Species*). It has been said that just as Lyell’s *Principles Of Geology* paved the way for Darwin’s *Origin*, so Huxley’s work paved the way for Darwin’s later book, *Descent Of Man*.

In 1885 Huxley retired from all of his official functions, including the presidency of the Royal Society and an active professorship at the Royal College of Science, to dabble, oddly enough, in theology. He had touched on it previously, but not with such vigor. For example, in 1876 he gave a presentation to the Metaphysical Society in which he tried to prove the resurrection of Jesus to be false. Earlier in 1868 he had spoken to a Presbyterian audience and told them that it was not “Divine breath” that gave power to life, but instead a certain mixture of chemicals such as oxygen, hydrogen, nitrogen, and car-

²¹⁶ *Ibid.* p 172.

²¹⁷ Huxley, Leonard. (see footnote #209) Vol. I. p 205 (letter of March 22, 1861).

bon. (He was even nicknamed “Huxley the Moleculite.”)

It was Thomas Huxley who gave us the word “agnostic.”²¹⁸ He coined it to describe his position, and felt that it was the very essence of science. He said it was a confession of ignorance about things we do not know — and perhaps *cannot* know! His prime example was God’s existence and the existence of man’s soul. Huxley insisted on two things (1) that Darwinism had plainly obvious religious implications, and therefore science and theology could never meet; (2) that the Scriptures cannot be taken as valid scientific text. Huxley considered men fools for believing in “. . . the myths in Genesis. But my sole point is to get the people who persist in regarding them as statements of fact to understand that they are fools.”²¹⁹

Why was Huxley such an avid defender of Darwinism? It was simply because to him it was Darwinism or nothing.

“I really believe that the alternative is either Darwinism or nothing, for I do not know of any rational conception or theory of the organic universe which has any scientific position at all beside Mr. Darwin’s . . . Whatever may be the objections to his views, certainly all other theories are absolutely out of court.”²²⁰

On the afternoon of June 29, 1894 Huxley died, as a result of influenza, bronchitis, and failing kidneys. Huxley had once said, “. . . the cosmos remains always beautiful and profoundly interesting in every corner — and if I has as many lives as a cat, I would leave no corner unexplored.”²²¹ Huxley had, however, only one life to give.

²¹⁸ *Ibid.* Vol. III. p 97.

²¹⁹ *Ibid.* Vol. II. p 429.

²²⁰ Huxley, T.H. *Darwiniana*. D. Appleton & Co. New York. 1896. p 467.

²²¹ “The Huxley Papers” in the Imperial College of Science and Technology. London. Vol. 15. pp 82-83. (letter to John Simon, March 11, 1891).

And he gave it to Darwinian evolution!

The other distinguished defender of Darwinism was Dr. Asa Gray (1810-1888) of Harvard. Gray was born in Sauquoit, New York, the son of a tanner. As a boy he helped to feed bark into the mill and drove the old horse that furnished the power. In the days of Gray's youth, spelling matches were very popular, and Gray was a champion speller. His father insisted that he study medicine, which he did. But by the time he graduated from medical school he had become so deeply interested in botany that he never practiced medicine. Instead, he taught school in the winter and collected plants in the summer.

Gray considered going with the Wilkes expedition to the Antarctic, but instead joined Dr. John Torrey (1796-1873), the best-known American botanist of the time, in writing a *Flora Of North America*, which described all the plants of the country known at that time. Botany students even today are familiar with Gray's classic textbook, *Manual Of The Botany Of Northern United States*, first written by Gray in 1848. Gray became so well-known that he was appointed professor of botany at Harvard.

In 1859 when Darwin published *Origin Of Species*, it came as no great surprise to Gray. For years he and Darwin had been exchanging letters on the subject of species. Darwin, in fact, had first initiated the exchange when he wrote a letter to Gray (after reading his *Manual Of The Botany Of Northern United States*) asking for more information on the Alpine flora of North America. Darwin was most gratified by Gray's response, in which Gray gave him all he had requested. Gray later even mentioned Darwin in a series of articles he wrote for the *American Journal Of Science* (the first installment of which appeared in 1856). Gray obviously sensed Darwin's deep involvement in a study of the species problem along entirely new lines. Gray told Yale geologists late in 1856 that the settlement of "a series of pretty interest-

ing general questions [about species] is perhaps at hand.”²²²

Indeed, Gray’s estimation was correct. As Paul F. Boller assesses the matter:

“Gray did not have to wait long to learn what Darwin was up to. On July 20, 1857 Darwin wrote, somewhat apologetically, to explain ‘how I view my work.’ Then, after stating that he had been accumulating facts bearing on the question of the origin of species for the past nineteen years, he went straight to the point: ‘I must tell you that I have come to the heterodox conclusion that there are no such things as independently created species — that species are only strongly defined varieties.’ He added, ruefully: ‘I know that this will make you despise me.’ But Gray, acutely aware by this time of the inadequacies of the prevailing view of species, was by no means shocked by Darwin’s heterodox conclusion. He did, indeed, emphasize the grave difficulties confronting the derivative thesis, but he discussed Darwin’s ideas with such friendliness and understanding that Darwin decided to send him a detailed outline of his theory of the origin of species. ‘As you seem interested in the subject,’ Darwin wrote on September 7, 1857, ‘and as it is an immense advantage to me to write to you and to hear, ever so briefly, what you think, I will enclose . . . the briefest extract of my notion on the means by which Nature makes her species.’ He enclosed a summary, in six long paragraphs, of his explanation of the evolution of species by means of variation, struggle for existence, and natural selection. Thus Gray became one of three men (Hooker and Charles Lyell, the English geologist, had already seen an abstract of Darwin’s theory prepared in 1844) to have advance knowledge of the Darwinian theory. Anxious not to publish until he had overcome every objection to his hypothesis, Darwin asked Gray not to mention his doctrine publicly. Gray respected his confidence, although he could not resist telling Dana a few weeks later that ‘you may be sure that before long there must be one

²²² Gray, Asa. Quoted in: *American Thought in Transition: The Impact of Evolutionary Naturalism, 1865-1900*. P.F. Boller, Jr. author. Rand McNally. Chicago. 1969. p 5.

more resurrection of the development theory in a new form, obviating many of the arguments against it, and presenting a more respectable and more formidable appearance than it ever had before’

“But the cat was soon out of the bag. On July 4, 1858, Darwin wrote to tell Gray of his receipt of Alfred Russell Wallace’s essay on species, containing views ‘most curiously coincident even in expressions’ with his own. Lyell and Hooker, he explained, had decided to submit Wallace’s paper to the Linnaean Society, together with his own abstract of 1844 and his brief explanation of natural selection for Gray, and he wished to ascertain the exact date of his letter to Gray the previous year. In this fashion, Darwin’s letter to Gray in September, 1857, helped establish Darwin’s priority over Wallace in conceiving the idea of natural selection. The presentation of the Darwin-Wallace papers to the Linnaean Society in July, 1858, attracted astonishingly little attention in the scientific world. Later that month Darwin began working on a fuller exposition of his views in *Origin Of Species*.”²²³

On November 24, 1859 *Origin Of Species* was published in England, with four references to Gray’s works: on American trees, on naturalized plants in the United States, on the rarity of intermediate forms, and on Alpine plants. Gray read (between Christmas and New Year’s days) the copy he received from Darwin. He was bothered because of the obvious impact he knew Darwin’s work would have on religion. Yet he nevertheless wrote to Hooker that the book “is done in a masterly manner It is crammed full of most interesting matter, well expressed, close, cogent; and taken as a system makes out a better case than I had supposed possible.”²²⁴ He wrote to Darwin: “I am free to say that I never learnt so much from one book as I have from yours.”²²⁵

Dr. Louis Agassiz, Harvard’s Swiss-born professor of natural history, began an all-out attack on Darwin’s book

²²³ *Ibid.* pp 5-6.

²²⁴ *Ibid.* p 7.

²²⁵ *Ibid.*

in America.²²⁶ Gray, determined that Darwin “shall have fair play” in America, came to Darwin’s aid. As Boller recalls the events surrounding the times:

“In March, 1860 a superb review of a revolutionary new book appeared in the *American Journal of Science and Arts*. The book was Charles Darwin’s *Origin Of Species*, which had appeared in England the previous November, and the reviewer was Asa Gray, professor of natural history and director of the herbarium at Harvard University. Gray’s review essay was thorough, informed, perceptive, lucid, sympathetic, thoughtful, suggestive, and witty; and Darwin regarded it as one of the ablest notices that his book received. In it the Harvard botanist predicted a ‘spirited conflict among opinions’ about the the book similar to the ‘conflict in nature among races in the struggle for life which Mr. Darwin describes.’ He was quite right; the controversy over Darwin’s views was spirited indeed.

“In his long review of *Origin Of Species* in 1860, Asa Gray did not concern himself with Buffon or Lamarck. He concentrated on Darwin’s main point — evolutionary development by means of natural selection — and he was disposed to accept much of what Darwin was proposing. Gray began his review by contrasting the views of his Harvard colleague Louis Agassiz on the supernatural origin and distribution of species (which Gray called ‘theistic to excess’) with those of Darwin (‘a legitimate attempt to expand the domain of natural or physical science’), and then he declared:

‘Having no prepossession in favor of naturalistic theories, but struck with the eminent ability of Mr. Darwin’s work, and charmed with its fairness, our humbler duty will be performed if, laying aside prejudice as much as we can, we shall succeed in giving a fair account of its methods and arguments

“Gray was eminently fair. With copious quotations from Darwin’s work, he discussed the concepts of struggle for existence (which he accepted as undeniable),

²²⁶ Louis Agassiz will be discussed later in this text.

variation (the actual causes of which, he noted, were unknown), and natural selection (the applicability of which he was not yet prepared to extend to as wide a range of cases as was Darwin). While acknowledging that the new theory was 'perfectly compatible with an atheistic view of the universe,' he singled out Darwin's incidental references to a Creator as an indication that Darwin 'implies that all was done wisely, in the largest sense designedly, and by an intelligent first cause.' He also insisted that Darwin could not be charged with 'the atheism of fortuity,' since *Origin* assigned 'real causes for harmonious and systematic results,' and he concluded by stating his own 'profound conviction that there is order in the universe; that order presupposes mind; design, will; and mind or will, personality.' " 227

What was Darwin's reaction to Gray's review? He was delighted! Darwin declared: "Your review seems to me admirable; by far the best which I have read." 228

The battle was on. Gray prepared a series of articles, aimed at educating the general public on Darwin's ideas, for the July, August and October (1860) issues of *Atlantic Monthly*. He resumed his debates with Agassiz before the American Academy and the Cambridge Scientific Club. Darwin himself found Gray's *Atlantic Monthly* articles so good that he reprinted them as a pamphlet and distributed them widely in England. Darwin replied on one occasion: "How splendidly Asa Gray is fighting the battle. He fights like a hero in defence." 229 To Thomas Huxley, Darwin spoke these words about Gray: "He goes on fighting like a Trojan." 230 To Charles Lyell, Darwin wrote concerning Gray: "He is a thorough master of the subject." 231 To Gray, Darwin wrote:

" . . . that you know my books as well as I do myself; and

227 Boller, P.F. (see footnote #222) pp 1, 3-4.

228 *Ibid.* p 7.

229 *Ibid.* p 8.

230 *Ibid.*

231 *Ibid.*

bring to the question new lines of illustration and argument in a manner which excited my astonishment and almost my envy! . . . you never touch the subject without making it clearer. I look at it as even more extraordinary that you never say a word or use an epithet which does not express fully my meaning . . .” 232

The bed, however, was *not all roses*. Darwin and Gray did not agree on everything. As Boller reminds us:

“But already Darwin was beginning to draw apart from Gray over the matter of design in nature. From the very beginning Gray’s objective as an exponent of Darwinism had been twofold: (1) to uphold freedom of scientific inquiry in the United States by securing a fair and unbiased hearing for Darwin’s views, and (2) to convince both scientific materialists and religious believers that natural selection was not incompatible with theism. That he succeeded in his first purpose — his labors for Darwin in the United States have been justly compared to those of Huxley (Darwin’s ‘bulldog’) in England — is not open to question. He was, however, considerably less successful in his second endeavor, to reconcile Darwinism with design.

“Gray touched only briefly on the question of design in his first review of *Origin*. Thereafter, however, he came gradually to place major emphasis on this problem in his publications relating to Darwinism. When he prepared a collection of his various papers on evolution for publication in 1876 (*Darwiniana*), he added a long chapter on ‘Evolutionary Teleology.’ Four years later he published a book entitled *Natural Science and Religion*, based on lectures presented to students at the Yale Divinity School, which was devoted almost exclusively to this problem. Meanwhile, the opinions that he and Darwin were exchanging on the subject, though friendly, became increasingly irreconcilable.” 233

Gray wrote:

“We infer design from certain arrangements and results;

232 *Ibid.*

233 *Ibid.*

and we have no other way of ascertaining it . . . Difficult as it may be to conceive and impossible to demonstrate design in a whole of which the series of parts appear to be contingent, the alternative may be yet more difficult and less satisfactory. If all Nature is a piece — as modern physical philosophy insists — then it seems clear that design must in some way, and in some sense pervade the system, or be wholly absent from it. Of the alternatives, the predication of design — special, general, or universal, as the case may be — is most natural to the mind.”²³⁴

In the end Darwin and Gray came to a parting of the ways. Darwin became an agnostic. He wrote to Gray:

“I am inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of what we may call change. Not that this notion *at all* satisfies me. I feel most deeply that the whole subject is too profound for the human intellect. A dog might as well speculate on the mind of Newton. Let each man hope and believe what he can. Certainly I agree with you that my views are not at all necessarily atheistical. The lightning kills a man, whether a good or bad one, owing to the excessively complex action of natural laws. A child (who may turn out to be an idiot) is born by the action of even more complex laws, and I can see no reason why a man, or other animal, may not have been expressly designed by an omniscient Creator, who foresaw every future event and consequence. But the more I think the more bewildered I become.”²³⁵

Gray continued on as he had been — trying to believe in God and Darwinism at the same time. He continued to praise Darwin’s work, yet was conspicuously silent when Darwin’s *Descent Of Man* was published in 1871. After its publication, Darwin wrote to Gray: “I shall probably receive a few stabs from your polished stiletto of a pen.”²³⁶ Gray responded: “Almost thou persuadest me to have been ‘a hairy quadruped, of arboreal habits, fur-

²³⁴ *Ibid.* p 10.

²³⁵ *Ibid.* pp 10-11.

²³⁶ *Ibid.* p 11.

nished with a tail and pointed ears' etc.”²³⁷

Gray, in his last book, *Natural Science And Religion* (1880) committed himself to Darwinism more than ever. He said: “We are sharers not only of animal but of vegetable life, sharers with the higher brute animals in common instincts and feelings and affections.”²³⁸ Yet to the end he continued to insist that “natural variation, the struggle for life, and natural selection” were “only the order or mode in which [the] Creator, in his own perfect wisdom, sees fit to act.”²³⁹

Asa Gray was a peculiar case. He was considered by many to be a Christian because of his strong stand that a Creator was necessary to make evolution work, and because of his strong stand on teleology. Darwin, in fact, used Gray often to try to prove to people that it was possible to be a Christian *and* an evolutionist. To this day men tell the public the same thing — that Asa Gray was *both* a Christian *and* an evolutionist (and therefore the same is possible today). But the position of theistic evolution which Gray advocated is no more acceptable or plausible today than it was in his time. It simply will not work!²⁴⁰

A closer look at Gray's life reveals that he was a nominal “Christian” — if that. Anyone even vaguely familiar with his speeches and writings knows that Christianity took a back-seat to science as far as he was concerned. He wrote that the Bible was “not handed down to us for our instruction in scientific knowledge, and . . . it is our duty to ground our scientific beliefs upon observation and inference, unmixed with considerations of a different order . . .”²⁴¹ If there ever was a theistic evolutionist, it was Asa Gray. He tried desperately throughout his en-

²³⁷ *Ibid.*

²³⁸ *Ibid.*

²³⁹ *Ibid.*

²⁴⁰ See our footnote #19.

²⁴¹ Boller, P.F. (see footnote #222) p 9.

tire adult life to “merge” evolution with the Bible. He never succeeded. He capitulated much more than he ever gained. As Dr. Bolton Davidheister says: “He was not the Christian believer some would have us believe he was.”²⁴²

Huxley and Gray were not, of course, the only defending disciples Darwin had. There were others, though most of them were not as glamorous or well-known as Huxley and Gray. For example, there was Jeffries Wyman, the Harvard anatomist and ethnologist. A colleague of Louis Agassiz, Wyman thought that the idea of the immediate creation of species was preposterous. He severely regretted that Agassiz would not use his great learning to promote Darwinian evolution. Of Agassiz, Wyman said: “He was just the man who ought to have taken up the evolution theory and worked it into good shape, which his knowledge of embryology and paleontology would have enabled him to do. He has lost a golden opportunity, but there is no use in talking of that.”²⁴³ Wyman, also a theist, defended Darwin’s theory, all the while maintaining (as did Gray) that evolution and the Bible are reconcilable. However, Wyman progressed much farther into evolutionary thinking than did Gray — and much quicker. Concerning man, Wyman said that man “must have gone through a period when he was passing out of the animal into the human state, when he was not yet provided with tools of any sort, and when he lived simply the life of a brute.”²⁴⁴

Other supporters of Darwin moved much slower than Wyman. For example, Arnold Guyot, the Princeton geographer, started out like Agassiz, believing that nature was a manifestation of God. He held to this belief for

²⁴² Davidheiser, Bolton. “History of Evolution: II.” *IN: And God Created*. Kelly L. Segraves, Editor. Creation-Science Research Center. San Diego, California. 1973. p 93.

²⁴³ Boller, P.F. (see footnote #222) p 14.

²⁴⁴ *Ibid.*

a while, but in time came to accept (with some reservations) the idea of evolution.

James Dwight Dana, the Yale geologist, was similarly slow to accept this new idea of species as proposed by Darwin. He did not get around to reading *Origin Of Species* until 1863. Then he made it clear to Darwin that geology still did not have enough facts to prove that life had evolved through a method of derivation from species to species. Darwin said to Dana: "Do not suppose that I think that, with your strong convictions and immense knowledge, you could have been converted. The utmost that I could have hoped would have been that you might have been here or there staggered."²⁴⁵ Boller relates to us the rest of the story:

"Dana refused to be staggered at first. In the second edition of *Manual Of Geology* (1871), he insisted that geology 'has brought to light no facts sustaining a theory that derives species from others.' In 1874, however, he conceded that the 'evolution of the system of life went forward through the derivation of species from species,' though he insisted there had been 'abrupt transitions between species' and that for man 'there was required . . . the special act of a Being above nature.' Toward the end of his life he told a clergyman: 'While admitting the derivation of man from an inferior species, I believe that there was a Divine creative act at the origin of men; that the event was as truly a creation as if it had been from earth or inorganic matter to man.' Gray once wrote Dana that he wondered 'if you quite get hold just right of Darwinian natural selection.' Gray's doubts were probably justified; Dana seems never to have grasped Darwin's basic point fully. Still, the Yale geologist, a strict creationist in the beginning, had come farther along the evolutionary path by the end of his life than Darwin had ever thought possible. 'To change,' Dana once wrote, 'is always seeming fickleness.' Then he added: 'But not to change with the advance of science is worse; it is persistence in error.' "²⁴⁶

²⁴⁵ *Ibid.* p 15.

²⁴⁶ *Ibid.*

Another gradual convert to Darwinism was Joseph LeConte, Georgia-born geologist who taught at the University of California. LeConte was a student of Agassiz. As late as 1872 he still did not profess to be an evolutionist. LeConte stressed Lamarckianism as being as equally important as Darwin's natural selection.

"In *Evolution and Its Relation to Religious Thought* (1888), LeConte explained adaptive modification in living organisms in four ways. The first two were Lamarckian: (1) changes in organisms resulting from the effect of the physical environment (heat and cold, dryness and moisture) and inherited by the offspring; (2) structural changes (also passed on to the offspring) in living beings brought about by the increased use or disuse of organs. The second two factors were Darwinian: (3) natural selection or survival of the fittest, and; (4) sexual selection."²⁴⁷

LeConte believed in evolution, but he believed it was carried out by Divine plan. He insisted that there was:

"a God *immanent*, a God resident *in Nature*, at all times and in all places directing every event and determining every phenomenon According to this view the phenomena of Nature are naught else than the different forms of one omnipresent divine energy or will . . . [and] the law of evolution naught else than the mode of operation of the same divine energy in originating and developing the cosmos — the divine method of creation; and Science is the systematic knowledge of these divine thoughts and ways" ²⁴⁸

And so gradually, like Gray, LeConte came to be an evolutionist — or at least a theistic evolutionist.

George F. Wright, the Oberlin geologist, was an expert in glaciation. He followed the lead of Gray in making his peace with evolution. In fact, Gray and Wright were friends, and in 1882 when he wrote *Studies In Science And Religion*, he dedicated that work to Gray. Wright

²⁴⁷ *Ibid.* p 16.

²⁴⁸ *Ibid.*

recognized that pure Darwinism left no place for the Gospel, so he accepted something less than pure Darwinism. He had his own brand of theistic evolution, just as Gray did. He said: “. . . there must be a divinity shaping the ends of organic life, let natural selection rough hew them as it will.”²⁴⁹

William Keith Brooks, professor of morphology at Johns Hopkins University and a specialist in marine zoology, agreed with Wright and Gray that natural selection did not rule out the possibility or necessity of God. He was a former student of Agassiz, yet was an early convert to Darwinism. He was another of the theistic evolutionists. He held that science tells us what takes place, and how, but most remain forever silent as to the primal cause or final purpose of the universe.

Edward D. Cope, though not exactly a Darwinian, certainly bears mentioning here. He was Quaker in background, and famous for his works in vertebrate paleontology. He explained in his 1871 “The Method of Creation Of Organic Forms,” that natural selection could not explain “the causes of the origin of the fittest.” Cope was America’s leading Lamarckian. When Weismann proved in 1880 that characteristics were not inherited, Cope refused to accept the evidence. He never abandoned Lamarckianism. In fact, in 1896 he presented a paper to the American Society of Naturalists entitled “Inheritance of Acquired Characteristics.” By this time he had piled hypothesis upon hypothesis and coined scores of clumsy new words — catagenesis, bathnogenesis, erogogenesis, emphytogenesis, statogenesis, and mnemogenesis — to bolster his position. He died a Lamarckian, and even today some are attempting to revitalize his old stand.

Not all American scientists became involved directly in the public controversy surrounding Darwin’s book. Two who did not were Joseph Leidy and Othneil C.

²⁴⁹ *Ibid.* p 17.

Marsh. Leidy, usually referred to as the founder of vertebrate paleontology in the United States, has been called a “John The Baptist” for Darwin. Even before Darwin made his views public, Leidy was gathering fossil “evidence” to support evolution. He was the first to exploit the rich fossil beds of the West. With Gray, Leidy was one of the first to accept Darwinism and upon receiving his copy of *Origin* he helped get Darwin elected a member of the Academy of Natural Sciences of Philadelphia. Leidy, too, was a theistic evolutionist of sorts.

Marsh, Yale paleontologist, also avoided the evolutionary controversy. Marsh did a great deal of work with fossil birds. In fact, Darwin was so impressed with Marsh’s work that he wrote: “Your work on these old birds, and on the many fossil animals of North America, has afforded the best support of the theory of evolution, which has appeared within the last twenty years.”²⁵⁰ Marsh had also done a great deal of work on fossil horses. Marsh was an ardent Darwinian evolutionist. He regarded his work as “the stepping stones by which the evolutionist of today leads the doubting brother across the shallow remnant of the gulf once thought impassable.”²⁵¹ Huxley, who visited America in 1876 to lecture on evolution, saw Marsh’s horse fossils and said of Marsh’s collection that it was “the most wonderful thing I ever saw. I believe you are a magician. Whatever I want, you conjure up. [These specimens] demonstrated the evolution of the horse beyond question, and for the first time indicated the direct line of descent of an existing animal.”²⁵² One of Marsh’s most famous statements was made in 1877 to the American Association for the Advancement of Science: “To doubt evolution today is to doubt science, and science is only another name for truth.”²⁵³

²⁵⁰ *Ibid.* p 19.

²⁵¹ *Ibid.*

²⁵² *Ibid.*

²⁵³ *Ibid.*

In Europe, the leading proponent of Darwinian evolution besides Huxley was Ernst Haeckel. In fact, he was so anti-Christian and pro-evolution, that Darwinians thought it might even hurt their cause. As it turned out, Haeckel's activities apparently diverted attacks from Darwin to Haeckel himself, thereby indirectly aiding Darwin's cause. Haeckel was a German anatomist. It is said that in his early life Haeckel was a very religious person. However, in his later life he was anything but that.

Haeckel is responsible for formulating the "great biogenetic law," which states that the ontogeny (development of the individual) recapitulates (repeats) the phylogeny (development of the race). The general idea is that embryos, in their development, repeat the evolutionary history of their ancestors. Darwin had regarded embryonic recapitulation as a very strong evidence of evolution (he devoted 12 pages to embryology as a proof of this theory in *Origin Of Species*).

Haeckel is now looked upon with disrepute, as is his "biogenetic law." As it turned out, the illustrations and drawings that Haeckel used to substantiate his "biogenetic law" (he was an accomplished artist) were nothing but lies and forgeries. As Davidheiser points out: "He even faked his drawings, which created a scandal in his day."²⁵⁴ Dr. W.R. Thompson, who wrote the "Introduction" to the 6th Edition of *Origin Of Species*, said in that introduction:

“. . . When the convergence of embryos was not satisfactory, Haeckel altered the illustrations of them to fit his theory; the alterations were slight but significant.”²⁵⁵

Even scientists of Haeckel's day recognized the falsehoods. Professor L. Rutimeyer of the University of Basel and Professor Wilhem His, Sr. of the University of Leip-

²⁵⁴ Davidheiser, Bolton. (see footnote #242) p 92.

²⁵⁵ Thompson, W.R. "Introduction" to *Origin Of Species*. J.M. Dent & Sons. London. 1963. p xv, xvi.

zig openly accused Haeckel of falsifying his drawings,²⁵⁶ and backed up their accusations with facts!

Today Haeckel's embryonic recapitulation is not used by informed evolutionists as a "proof" of evolution. It has fallen on bad times as a result of Haeckel's frauds. As Davidheiser observes: "Ernst Haeckel . . . is not considered as great a man now as he was."²⁵⁷²⁵⁸ In his effort to "prove" evolution via embryology he became overzealous and in the end did what the Darwinians were fearful all along that he would do — he brought the theory into disrepute. The theory and its proponents have not fully recovered to this very day.

Not everyone, however, was pro-Darwin. It is no secret that Darwin had his foes as well as his friends. Chief among that number was Swiss-born Louis Agassiz, Harvard's professor of natural history. Born May 28, 1807, Agassiz grew up in a very home-centered family. His father was a preacher/schoolmaster, and his mother was the daughter of a prominent physician. He had a younger brother, Auguste, and several sisters. Even in his younger years he showed tendencies toward becoming a naturalist. He kept all sorts of animals in his room (the one he shared with Auguste) and even had an outdoor aquarium.

Agassiz started in his higher education to become a medical doctor, with parents and relatives supplying the scarce money. But, he had an overpowering desire to be a naturalist, not a medical doctor. His training was received at least in part at the University of Heidelberg. One of his closest friends at the university was Alexander Braun, who also had a keen interest in natural history.

²⁵⁶ For an excellent treatise on this problem, see *The Spiritual Sword*, April, 1971, pp 11-14 ("Embryology — Evidence for Evolution?" by Russell C. Artist). Available from the Getwell Church of Christ, 1511 Getwell, Memphis, Tennessee 38111.

²⁵⁷ Davidheiser, Bolton. (see footnote #242) p 92.

²⁵⁸ For an excellent rebuttal of Haeckel's frauds, see footnote #256, pp 13-14.

Braun invited Agassiz to spend a summer with his family and he accepted. He and Alexander would catch the specimens and Alexander's sister, Ceçile, would draw pictures of them. As it turns out, Agassiz fell madly in love with Cecile.

Agassiz and Braun traveled to Munich to complete their medical training. While there, Professor von Martius called Agassiz to see him. It was von Martius who had traveled with Dr. von Spix to Brazil years earlier on a naturalistic expedition. Unfortunately, von Spix died and von Martius had no time to classify the specimens they had brought back. He asked Agassiz to do it for him, and without pay. So great was Agassiz's love for this kind of work that he accepted, even with his heavy schedule of classes. He did not tell his parents until he had completed the work, as he knew what their reaction would be. He was being kept in school at considerable financial sacrifice — to learn medicine — not taxonomy!

Agassiz worked with Brazilian fishes, and completed the Doctor of Philosophy degree even before he completed his medical degree. He wrote up the work on the first part of the Brazilian collection, and dedicated it to Cuvier, who was delighted. At the age of 23, in the spring of 1830, he completed his medical degree.

He desired to support himself through the sale of his books, but the works (as good as they were) were simply too expensive and technical to be popular. He saw he would have to enter medical practice. He did practice medicine for a while, but his heart was not in it and he made little money. Through a small financial gift from a friend who was a preacher, Agassiz was able to go to Paris to study. On his second evening there he was invited to Cuvier's home. Much to his dismay, Cuvier presented Agassiz with a portfolio of fossil fish and fifteen years' worth of notes. Alexander Humboldt also paid Agassiz a visit, and provided him with enough money to continue his studies in Paris a while longer.

Agassiz finally married Cecile, and accepted a teaching position in his native Switzerland, though he was of-

ferred several in Paris. A born teacher, his lectures were even attended by many of the townspeople. Agassiz remained in Neuchatel for 14 years teaching natural history. He did visit the British Isles, where he set forth his theories of glaciation for which he became so popular. But Agassiz had a burning desire to travel to America. The king of Prussia, because of Humboldt's request, gave Agassiz a grant to get him to America. He arrived in 1846. He wanted mainly to study natural history and geology, but he became involved in extensive lecturing. Because of Cecile's deteriorating health, she had remained in Switzerland. While Louis was in America, she died. He later married Elizabeth Cary, an intelligent, gracious, refined lady from a prominent family. They seemed the perfect match. She received no money from her family, and even opened a very successful school for girls, which helped support Agassiz while he was out roaming the country as a naturalist.

Agassiz accepted a position with Harvard, and founded the museum of comparative anatomy there. He had a remarkable talent for raising money but was terrible at handling it. He was addicted to cigar smoking, and was sometimes the epitome of the absent-minded professor. He had a son, in whom he was at first disappointed because Alexander was more interested in engineering than in biology. However, Alexander later became a famous biologist in his own right and even donated millions of dollars to Harvard.

In 1865 he and his wife took a trip to Brazil where he lectured. Mrs. Agassiz later wrote a book, *Seaside Studies*, about that trip. In the early 1870's a wealthy businessman from New York offered Penikese Island in Buzzards Bay to Agassiz as a campus for a school of natural history. Agassiz accepted, but the school (which opened in 1873) was shortlived. Its successor was the famous Marine Biological Laboratory on the mainland at Woods Hole.

No one seems to know exactly what Agassiz's religious convictions were. But one thing is for certain. He

violently opposed Darwin. He attacked Darwin's theory at an extremely vital point — its inability to show evidences of the transformation of one kind of living (or fossilized) animal or plant into another. Agassiz accepted long geologic time, which was very popular in America. He got into trouble with Bible-believers when he said he felt that all men did not descend from Adam and Eve but originated in different parts of the world. Like Cuvier, he believed that there had been a series of creations interspersed with catastrophes, each of which killed off the previous creation. However, he also saw a progression from lower to higher types. In 1859 he published a work arguing for fixity of species — the same year Darwin published *Origin Of Species* arguing against it.

Agassiz gave the Graham lectures in 1862, a little more than two years after *Origin* was published. In those lectures he never mentioned Darwin by name, but he let it be known that he disagreed with the theory of natural selection which was so popular at the time. In his books, lectures, and articles he waged a militant campaign against Darwin, and in favor of his own brand of creationism. He was definitely a believer in God, though so far as we know he connected himself with no particular religious group. He once wrote, “the great object of our museums should be to exhibit the whole animal kingdom as a manifestation of the Supreme Intellect!”²⁵⁹ Agassiz even said that so far as he was concerned, every form of plant and animal represented “a thought of God” at the moment of creation.²⁶⁰

Agassiz probably did not understand all of Darwin's theory. Yet he understood enough to know that it had serious spiritual implications if it was true. That is something Asa Gray, Agassiz's Harvard colleague, never could come to grips with. Agassiz did. Agassiz was the chief among men of science to oppose Darwin, and he

²⁵⁹ Boller, P.F. (see footnote #222) p 13.

²⁶⁰ *Ibid.*

did it well. One of his most famous statements was: “All the facts proclaim aloud the one God, whom we know, adore, and love.”²⁶¹ Agassiz died on December 12, 1873 — an undaunted foe of Darwinism.

Other American scientists opposed Darwin, though probably none as fiercely as Agassiz. Edward Hitchcock, Massachusetts geologist, president of Amherst College, and one of the earliest students of glacial theory in the United States, violently opposed Darwinism. He insisted that evolution rendered belief in God unnecessary, destroyed the idea of immortality, and led to the grossest materialism.

Timothy A. Conrad, Quaker conchologist and paleontologist, bitterly opposed evolution as well. He believed in the fixity of species. So did F.A.P. Bernard, who orally castigated Darwin in his inaugural address in 1864 as president of the American Association for the Advancement of Science. Matthew Fontaine Maury, the founding father of modern oceanography, firmly rejected Darwinism as being irreconcilable with the Bible. He wrote:

“The Bible, they say, was not written for scientific purposes and is therefore no authority in matters of science. I beg pardon. The Bible is authority for everything it touches. The agents concerned in the physical economy of our planets are ministers of Him who made it and the Bible.”²⁶²

The names of the people, both in the scientific and non-scientific disciplines, who either opposed or accepted Darwinism are legion. It is no less true of today’s times. That brings us to the next important personality in the history of evolutionary thought — Hugo deVries.

Darwin did not suggest a mechanism whereby the variations between species could come about. He did not

²⁶¹ Agassiz, Louis. Quoted in: *A Symposium on Creation: VI*. D.W. Patten, Editor. Baker Book House. Grand Rapids, Michigan. 1977. p. 134.

²⁶² Boller, P.F. (see footnote #222) p 13.

tell us how the individual acquired the characteristics which he regarded as having greater survival value. As Dobzhansky has observed:

“Darwin’s ignorance of the laws of heredity had two important effects. In the first place, it prevented him from ever resolving completely the relationship between natural selection and the ‘effects of use and disuse,’ he never completely discarded the Lamarckian theory of the inheritance of acquired adaptations. Secondly, he was unable to answer the criticism of Fleming Jenkin, who maintained that if hereditary traits were transmitted by particles in miscible fluids, the initial effects of natural selection would be nullified by crossing between selected individuals and the rest of the population”²⁶³

It remained for Hugo deVries (1848-1935), the great Dutch botanist, to suggest a mechanism for these changes and thus for evolution. According to both Darwin and Lamarck, changes were supposed to have come about very gradually, by small, infinitely minute additions, so slowly and gradually as to be almost unnoticeable. The theory of deVries changed all that.

Hugo deVries was one of three men who rediscovered Gregor Mendel’s laws,²⁶⁴ the other two being Correns of Germany and Tschermak of Austria. DeVries’ theory

²⁶³ Dobzhansky, Theodosius *et al.* (see footnote #107) p 15.

²⁶⁴ Gregor Mendel was an Austrian monk, born in 1822, the son of a poor farmer. He entered the monastery of Brunn, Austria (today known as Brno, Czechoslovakia) where he taught and carried out experiments in plant breeding. He was a biologist of note, who worked for 8 years, making meticulous notes on his works. While working with garden peas, he recognized “dominant” and “recessive” traits, and developed what we know today as the Mendelian laws of genetics (including the popular Mendelian ratio). Enthusiastic over his discovery, he wrote a paper on it, which he read to the Natural History Society of Brunn, Austria in 1866. At this time, scientific men were all absorbed with Darwin’s theory of evolution and since Mendel’s works did not fit well with Darwin’s ideas, his discoveries were ignored. Mendel gave up teaching and research to become abbot of the monastery. He died in 1884, and even his

was the result of his work with a common American weed whose light-yellow blossoms brighten our roadsides in Autumn. The weed was the evening primrose (*Oenothera lamarckiana*), which deVries found growing in an abandoned potato field. Specimens were transplanted by deVries to his garden, where he performed many experiments with them.

DeVries found that the evening primrose did not always breed true — that is, even when both parents were alike, the next generation sometimes showed gross changes. New types appeared, which would then breed true — that is, their offspring were like the parent plants, not the grandparents. These abrupt changes deVries called “mutations,” and the new types he called species. He decided that new species were thus brought about by sharp, definite mutations, not the small, ever-ongoing variations of Darwin and Lamarck. Evolution then, was considered to be a series of mutations occurring in pure lines, with natural selection occupying little or no place in the scheme of things.²⁶⁵

“New species,” deVries said, “rose suddenly, spontaneously, by steps, by jumps. They jumped out among the offspring.”²⁶⁶ DeVries’ theory of evolution by large mutations was at first hailed with much enthusiasm by evolutionists. At last a mechanism had been found which

²⁶⁴ Continued

closest friends had no idea of the gravity of his work and the impact it would have in later years in solving many of the riddles of heredity.

For 34 years Mendel’s findings lay forgotten, gathering dust on library shelves, while other scientists struggled to shed some light on the very problems with which his work dealt. It was in 1900 when deVries, Correns, and Tschermak came across Mendel’s works and recognized their true worth. This “rediscovery” opened up entirely new avenues of experimentation and knowledge.

²⁶⁵ It was deVries who said, “Natural selection may explain the survival of the fittest, but it cannot explain the arrival of the fittest,” in his work *Species and Varieties, Their Origin by Mutation*. 1905. pp 825-826.

²⁶⁶ DeVries, Hugo. Quoted in Footnote #111. p 100.

could explain evolution! But the enthusiasm was short-lived. As Byron Nelson comments in his book, *After Its Kind*:

“This theory, while it aroused great hopes among evolutionists for a few years, soon went the way of its fellows, when it was learned that the ‘new’ species of plants which deVries thought he had seen produced in his garden were discovered to be but one of the many varieties of forms which the *Oenothera* is privileged by the Creator to have.”²⁶⁷

Dr. John Klotz says in this regard:

“However, the new ‘species’ of deVries were not species, but rather — varieties, to be sure, which were quite different, but nevertheless only varieties. Moreover, most, if not all, of deVries’ ‘mutations’ were not mutations as we know them today, but were due to the breeding out of recessive characters present in the stock but not showing themselves.”²⁶⁸

Dr. W.H. Rusch observes:

“However, serious defects soon became apparent in the new theory, since the large mutations observed by deVries turned out to be rather rare. Smaller mutations were found to occur more frequently. Furthermore, organisms that developed large mutations were usually less capable of surviving than the normal form. Taxonomists pointed out that natural species do not differ from one another by single large traits but rather by a large number of smaller traits. It was also discovered that pure lines in nature are rather rare, being confined to self-fertilizing plants.”²⁶⁹

Professor William Bateson, writing in *Science*, has commented:

“Twenty years ago deVries made what looked like a promising attempt to supply this (evidence of new species appearing among natural offspring) as far as *Oe-*

²⁶⁷ Nelson, Byron. (see footnote #111) p 100.

²⁶⁸ Klotz, J.W. (see footnote #128) p 41.

²⁶⁹ Rusch, Wilbert H (see footnote #14) p 25.

nothera is concerned . . . but in application to that phenomenon the theory of mutation falls. We see novel forms appearing, but they are no new species of *Oenothera*. For that which comes out is no new creation.”²⁷⁰

And so it came to be that deVries’ mutation theory, which was at first thought to answer the question on the origin of species, had its day of glory and then fell into disrepute. It soon came to be realized that deVries’ “mutations” weren’t really mutations at all, at least for the most part. DeVries published his work, *Species and Varieties, Their Origin By Mutation*, in 1905. Less than 15 years later Professor Jeffrey of Harvard echoed the sentiments of evolutionists the world over when he said, “The mutation theory of deVries may now be relegated to the limbo of discarded hypotheses.”²⁷¹ This seemed to be the end of the matter. However, it was not, as we shall discover in a later section.

According to Darwin, changes from species to species should have survival value. Evolution will therefore be an upward process, with continued improvement. Accordingly, only those characteristics which are beneficial and helpful should evolve. Characteristics which are either harmful or useless should be less likely to develop, and should be quickly eliminated if they do. However, there are many examples of harmful or useless characteristics in animals.²⁷²

In order to “explain” or meet this objection, Haacke, in 1893, invented the term “orthogenesis.” Two of the leading proponents of orthogenesis were the paleontologist Theodor Eimer and the botanist Karl von Naegeli.

“They and their co-workers suggested that the guiding factor in evolution might not be natural selection at all, but some undefined force within the organism which would cause it to evolve along certain lines. Thus, when an undesirable character developed, its development

²⁷⁰ Bateson, William. *Science*. January 20, 1922.

²⁷¹ Jeffrey. *Science*. April 3, 1914.

²⁷² Cf: Klotz, J.W. (see footnote #128) pp 42-43.

was due to this force within the organism that was causing it to evolve in this direction. This would very easily explain the development of nonuseful and even harmful characters.”²⁷³

“Lecomte duNouy’s *Human Destiny* propounds his telefinalism, which is another form of orthogenesis. DuNouy organized his philosophy in several steps. The first is the beginning of life represented by simple organized organisms. Then there is an evolution of life toward more and more complex forms. The result of this rather long process is man and his mind, the birth of thought and of moral and spiritual ideas. There was a spontaneous and independent development of these ideas in different parts of the earth. All this is brought about by a directing will. The second law of thermodynamics holds that every energy transformation results in less energy being available, which means that ultimately there will be no energy available at all. However, this law applies to all the universe, and applied to evolution it would mean that evolution should result in less and less varied forms, tending to level off. Instead evolution holds to a systematic increase in different forms. To DuNouy this necessitates the introduction of the concept of a guiding and directing Will as well as the recognition of a goal, or end, as the result of the evolutionary process as a whole and man in particular.”²⁷⁴

Is orthogenesis popular today? Is it considered by most informed people as an intelligent answer to these problems? Dr. Klotz says:

“Most scientists today have rejected orthogenesis. For them it is too philosophical. An undefined force within the organism does not lend itself to measurement. Most of them concur in the opinion of Simpson that this appeal to the unknown, inherent in all theories such as orthogenesis, is metaphysical and not scientific . . . most scientists insist that there is no evidence for orthogenesis. Jepsen, an outstanding paleontologist himself, says that after a considerable search he has not found among vertebrate fossils a single proved example of orthogen-

²⁷³ *Ibid.* p 44.

²⁷⁴ Rusch, Wilbert H. (see footnote #14) p 26.

esis in either the descriptive or the theory sense. . . . Shull sums up the feeling by saying somewhat facetiously that what the world needs most is not a good five-cent cigar, but a workable and correct theory of orthogenesis.”²⁷⁵

Within more recent times another theory has arisen to try to explain that life, like mind, arose miraculously. From the primitive life form to the complex organism called man, life kept “emerging” on higher and higher levels in sudden and novel appearances. This theory is often referred to as “emergent” evolution. Credit for the coining of the phrase is usually given to George Henry Lewes, although the man most popular for his work on the theory is C.L. Morgan (1853-1936). Morgan was then followed by the French philosopher Henri Bergson (1859-1941) who proposed the concept of “creative evolution” (actually nothing more than a form of orthogenesis). Bergson held that evolution is a creative process, marked by a spiritual force. To him, life is a universal stream of becoming, in which at successive stages new types appear. These new types would not appear, Bergson felt, unless there was something urging life on and directing it.

Basic to emergent evolution is the idea that the whole is *more* than the sum of its parts. An example of such “emergence” might be water, the result of combining hydrogen and oxygen. Both are colorless, tasteless gases, yet from these comes a compound, water, with properties quite different from either of the two parent substances. Emergent evolutionists believe that this is how evolution occurred (which would neatly explain the absence of intermediate forms in the fossil record). But as Dr. Klotz points out:

“Emergent evolution has been championed particularly by philosophers and psychologists. For the average biologist it is too philosophical. . . . In general, however,

²⁷⁵ Klotz, J.W. (see footnote #128) pp 44-45.

the theory has met with very little acceptance among biologists.”²⁷⁶

Emergent evolution is not in vogue today.²⁷⁷

²⁷⁶ *Ibid.* p 46.

²⁷⁷ The reader may wonder why Dr. Richard B. Goldschmidt’s “systemic mutations” and Dr. G.G. Simpson’s “quantum evolution” are not discussed here. This is *not* an oversight. These two men and their theories will be discussed at a later point in the text, in light of Neo-Darwinism.

The Scopes Trial

6

The Scopes Trial

The history of evolutionary thought is marked with important events — the publication of Darwin's *Origin Of Species*, Huxley's debate with Wilberforce, and many others. But few of these events are comparable (in many ways) to the milestone which the Scopes trial represents. The year was 1925. The place was Dayton, Tennessee. The man was John Thomas Scopes, a young science teacher and football coach. The events which took place, as recorded below, were destined to change the entire history of evolutionary thought.

The occasion was, in essence, instigated by the American Civil Liberties Union. The A.C.L.U. advertised in Tennessee newspapers that it would finance a court trial for any teacher who would be willing to test the constitutionality of the Tennessee law (the Butler Act) which forbade the teaching of evolution in public schools. A New Yorker working in Tennessee, George Rappelyea, saw the advertisement in a Chattanooga paper, and persuaded the county superintendent of schools and the head of the county board of education that a trial would be beneficial. With their foreknowledge, Rappelyea met John Thomas Scopes in a drugstore²⁷⁸ in downtown

²⁷⁸ To this day the table and drugstore can still be seen in Dayton, Tennessee, along with a plaque commemorating the occasion.

Dayton to discuss the idea. Reluctantly, Scopes agreed to admit that he had taught evolution in the schools,²⁷⁹ contrary to Tennessee state law, and to let himself be arrested on that charge.

Why was the A.C.L.U. involved in such a matter? Davidheiser feels that:

“The *alleged* reason why the American Civil Liberties Union sponsored the trial was because the civil liberties were threatened, but the *real* reason seems to have been to educate the public to the theory of evolution and to discredit the Bible.”²⁸⁰

Another writer, in speaking of Scopes’ lawyers, said that they rushed to his defense “not that they cared for their client, but to lay hold of an opportunity to vent their spleen against the Bible and the Christian religion.”²⁸¹ Still another writer, in a newspaper editorial, said:

“Ostensibly this [the calling of ‘expert’ witnesses] was for the purpose of showing that the defendant had not broken the law, but really for the purpose of having the testimony of these so-called experts broadcast through the newspapers.”²⁸²

It is often said that the A.C.L.U. paid all the bills, but this is misleading, however, since “The \$10,000 needed to finance the defense was raised chiefly through an appeal to members of the American Association for the Advancement of Science.”²⁸³

The trial began on July 10, 1925 at Dayton. It was the very first trial ever to be broadcast by radio. It has been said that more words were cabled overseas about this

²⁷⁹ In 1925 Tennessee law forbade the teaching in tax-supported schools that human beings evolved from lower forms of life.

²⁸⁰ Davidheiser, Bolton. “The Scopes Trial.” *IN: A Symposium On Creation: III.* D.W. Patten, Editor. Baker Book House. Grand Rapids, Michigan. 1971. p 105.

²⁸¹ *Christian Standard*. September 12, 1925.

²⁸² From an editorial called “The Dayton Trial,” quoted by Davidheiser (see footnote #280) p 106.

²⁸³ *Science*. Vol. 122. July 1, 1955. p 23.

trial than about anything that had previously happened in American history.²⁸⁴ The leader of the prosecution team was William Jennings Bryan (the “Great Commoner”), three-time nominee for the Presidency by the Democrats, and formerly Woodrow Wilson’s Secretary of State. His son, Willian Jennings Bryan, Jr., was one of his associates at the trial. The other renowned member of the defense team was the Attorney General of the State of Tennessee, A.T. Stewart.

The defense was led by the renowned criminal lawyer and agnostic, Clarence Darrow. He was a favorite defense attorney for known criminals, and had worked with the A.C.L.U. before. Scopes later reported that immediately before the trial began, Darrow leaned over to him and whispered, “Don’t worry, son, we’ll show them a few tricks.”²⁸⁵ And with that, the show was on. Assisting Darrow were Arthur Garfield Hayes and Dudley Field Malone.

Did John Thomas Scopes *really* teach evolution? or did he merely agree to admit that he had taught evolution? In *Life* magazine, Scopes was quoted as saying that he merely substituted for the biology teacher and commented: “I doubt very much that I taught his class evolution.”²⁸⁶ In his book, *Center Of The Storm*, Scopes said:

“To tell the truth, I wasn’t sure I had taught evolution. Robinson (the owner of the drugstore) and the others apparently weren’t concerned about this technicality. I had expressed willingness to stand trial. That was enough.”²⁸⁷

²⁸⁴ *The World’s Most Famous Court Trial: A Complete Stenographic Report*. National Book Co. 1925. p 316.

²⁸⁵ *Reader’s Digest*. March, 1961. p 137.

²⁸⁶ Scopes, John Thomas. Quoted in: *Life* magazine. Dec. 9, 1966. no page number.

²⁸⁷ Scopes, John Thomas. *Center of the Storm*. Holt, Rinehart, & Winston. 1967. p 60. (see also p 134).

As the trial got underway, Clarence Darrow asked the court's permission to call "expert witnesses" to give their testimony on evolution and the Bible. William Jennings Bryan, Jr. opposed this, stating the "experts" would merely give their *opinions*, which had no bearing on the case. After hearing a few of these "expert" witnesses, the judge (Judge Ralston) decided against using their testimony, although he did permit it to be read later into the court record (in the *absence* of the jury) for the use of the next court (after the anticipated appeal).

On the third day of the trial, Darrow objected to the opening prayer which preceded each trial, saying it was prejudicial to his case. The judge declared that since it was not a novel thing instigated just for this particular trial, but rather a tradition of long standing, the prayer would continue. However, to placate Darrow and Charles Potter (minister of the West Side Unitarian Denomination in New York City, who had come to Dayton to lead in signing a petition requesting that since the judge refused to discontinue opening prayers, opportunity should be given to Unitarians, Jews, and Congregationalists to lead the prayers) the opening prayers were led by ministers of various religious groups chosen by the local ministerial association (who, as it turned out, were all pro-evolutionists).

Darrow introduced witness after witness to substantiate that one could accept evolution and the Bible, too. Professor Maynard Metcalf of Johns Hopkins University and Professor Kirtley F. Mather, Harvard geologist, were just two among that number. Professor Metcalf testified: "There is no conflict, no least degree of conflict, between the Bible and fact of evolution, but the literalist interpretation of the words of the Bible is not only puerile; it is insulting both to God and to human intelligence."²⁸⁸ Professor Mather said, "The theories of evolution commonly accepted in the scientific world do not deny any rea-

²⁸⁸ *The World's Most Famous Court Trial: A Complete Stenographic Record.* (see footnote #284) p 242.

sonable interpretation of the stories of divine creation as recorded in the Bible”²⁸⁹

The part of the trial which has probably received the most recognition is the part where Mr. Darrow questioned Mr. Bryan:

“Mr. Bryan did not need to submit to this questioning and the judge reminded him of this, but Mr. Bryan felt it might be interpreted as an admission that the Bible could not stand up under the attack of unbelievers. He was not a Bible scholar and Mr. Darrow asked the questions which he thought would be the most difficult and embarrassing. Mr. Bryan did not do very well; he, in turn, was to have the opportunity to question Mr. Darrow, but this never happened.

“Mr. Darrow’s behavior, moreover, was such that he was cited for contempt of court. This could have been very serious for him, but when he apologized, the judge freely forgave him.”²⁹⁰

The Scopes “Monkey Trial,” as it came to be known, dominated the press for weeks and months. Darrow continued to lambast and ridicule Bryan, who never retaliated. In one speech Mr. Malone (Darrow’s assistant) said:

“We do not fear all the truth they can present as facts. We are ready. We stand with progress. We stand with intelligence. We feel that we stand with the fundamental freedoms in America. We are not afraid. Where is fear? We defy it.”

Then, turning and pointing a finger at William Jennings Bryan, Mr. Malone shouted, “There is fear!” One New York reporter said that “the crowd went out of control — cheering, stamping, pounding on desks — until it was necessary to adjourn for fifteen minutes to restore order.”²⁹¹ Mr. Scopes later remarked, “My heart went out

²⁸⁹ *Ibid.* p 248.

²⁹⁰ Davidheiser, Bolton. (see footnote #280) pp 110-111.

²⁹¹ Cole, Fay-Cooper. “A Witness at the Scopes Trial.” *IN: Scientific American*. January, 1959. p 127.

to the old soldier (Bryan) . . .”²⁹² Davidheiser assesses the situation with these words:

“The enemies of Biblical Christianity^a soon gained the upper hand. The *ridicule* of Mr. Darrow, the *rationalism* of his so-called ‘experts,’ the (humanistic) *religion* of the liberal ministers like Mr. Potter, and the *reporting* of the East Coast reporters all took their toll, reporting for such publications as the *Baltimore Sun*, *The Nation*, *The New Republic*, etc. Hence, one might logically ask who was on trial by whom? Was it Scopes by the Tennessee court, or was it the Bible, Bryan and creation by the A.C.L.U. lawyers and East Coast journalists?

“The man with whom Mr. Bryan probably had his last interview said, ‘Four days after the trial ended I talked with him at some length, and he was even then quivering with hurt at the epithets which had been applied to him. He was a crushed and broken man.’ The following day he died. Even this did not end the insults, for under a dateline three days after his death, a magazine, *The Nation*, referred to him as ‘. . . the fraud which he is
’ ”²⁹³

The jury had been barred from most of the court proceedings, yet took only nine minutes to find Scopes guilty. Oddly enough, Darrow had said he *wanted* his client found *guilty*, so he could appeal the case to higher courts, thereby continuing to keep evolution before the public eye. After his conviction, Scopes made the only statement he had uttered during the whole trial:

“Your honor, I feel that I have been convicted of violating an unjust statute. I will continue in the future, as I have in the past, to oppose this law in any way I can. Any other action would be in violation of my ideal of academic freedom — that is, to teach the truth as guaranteed in our constitution, or personal religious freedom. I think the fine is unjust.”²⁹⁴

²⁹² *Reader's Digest*. March, 1961. p 137.

²⁹³ Davidheiser, Bolton. (see footnote #280) pp 112-113.

²⁹⁴ *The World's Most Famous Court Trial: A Complete Stenographic Record*. (see footnote #284) p 313.

Scopes was fined \$100, the minimum possible under the law. The *Baltimore Sun* offered to pay it for him. So did William Jennings Bryan. The case was appealed to the Tennessee State Supreme Court, which upheld the rulings but reversed the verdict on a technicality. It seems that by Tennessee law any fine over \$50 had to be imposed by a jury. Since the judge had mistakenly set the fine for Scopes, the verdict was reversed.

What was the impact of the Scopes trial? Grabiner and Miller²⁹⁵ have carefully examined some of the impact in their work, "Effects of the Scopes Trial." And much could be said on this subject. But perhaps the best summarization, at least in this writer's opinion, is given by Dr. Davidheiser when he says:

"Thus the Scopes Trial actually was rather different from the way it is generally described to the public. Customarily, Clarence Darrow is presented as the hero of the affair, while the truth is that he conducted himself in a shameful manner. The real hero of the Scopes Trial was William Jennings Bryan. When the defense lawyers tried to use embryonic development as an example of evolution to give the impression that evolution was an observable fact, it was Bryan who set the record straight. One of the points which the defense considered very important for them to establish was their contention that there is no contradiction between the Bible and the theory of evolution. Again it was Bryan who showed that there really is a conflict and that no expert in science nor anyone else can successfully assert otherwise. While Darrow insulted and humiliated him from the beginning of the trial to its very end, Mr. Bryan did not resort to this tactic. Instead, he made a number of gracious remarks which we might have included in this account of the trial, but did not. He did not yield to vindictiveness.

"It is unfortunate that the public is more willing to accept an entertaining fictionalization of history than to exert the effort to find out alternate versions for themselves"

²⁹⁵ Grabiner, Judith and P.D. Miller. "Effects of the Scopes Trial." *IN: Science*. Vol. 185. September 6, 1974.

“Some thought that reports of what occurred at the trial would damage the cause of evolution. However, on the contrary, the evolutionists have used it to state repeatedly that although Darrow ‘lost’ the trial, he ‘won’ the case and that since the time of the Scopes Trial no intelligent person can any longer doubt the truth of evolution.”²⁹⁶

With this assessment we are in agreement. Darrow indeed “lost the battle but won the war” in regard to evolution. Through his efforts, sponsored by the A.C.L.U., evolution was now in the forefront. It was a matter of public information, no longer something to be discussed only the marbled halls of learning by the academicians. People on the street were talking about it. Newspapers printed stories about it. Books were written about it. And the end was nowhere in sight. It still is not, over 55 years later!

²⁹⁶ Davidheiser, Bolton. (see footnote #280) pp 116-117.

After The Scopes Trial

7

After The Scopes Trial

What are the more recent changes that have occurred in evolutionary thought, many of which are results in one way or another of the Scopes trial? There are several which bear mentioning in their own right. For example, in 1967 the State of Tennessee repealed its anti-evolution law (the Butler Act; it was *not* repealed as a result of the Scopes trial). A public school teacher had been expelled for teaching evolution in the classroom. The teacher filed a suit against the State, charging that academic freedom was at stake. Rather than go through another lawsuit, the legislature repealed the law.

In the early 1970's a group of interested parents, who believed their children should be given their own freedom of choice (i.e.: academic freedom), approached the Tennessee State Textbook Commission. These parents requested that textbooks be allowed in public school classrooms which objectively discussed *both* theories of origins, pointing out that academic freedom is a two-way street. The State Textbook Commission gave no encouragement. The Commission's legal officer suggested that legislation would be the only alternative. Thus was born the Tennessee "Genesis Law," as it has been called since. Bills were drawn, amended, and carried in both Senate and House by large majorities (only one dissenting vote in the Senate). On April 30, 1973 the

General Assembly enacted Chapter 377 of the Acts of 1973 amending Tennessee Code Annotated, Section 49-2008 to read:

“Any biology textbook used for teaching in the public school, which expresses an opinion of, or relates to a theory about origins or creation of man and his world shall be prohibited from being used as a textbook in such system unless it specifically states that it is a theory as to the origin and creation of man and his world and is not represented to be scientific fact. Any textbook so used in the public education system which expresses an opinion or relates to a theory or theories shall give in the same textbook and under the same subject commensurated attention to, and an equal amount of emphasis on, the origins and creation of man and his world as the same is recorded in other theories, including, but not limited to, the Genesis account in the Bible. The provisions of the Act shall not apply to use of any textbook now legally in use, until the beginning of the school year of 1975-1976; provided, however, that the textbook requirements stated above shall in no way diminish the duty of the State Textbook Commission to prepare a list of approved standard editions of textbooks for use in the public schools of the state as provided in this section. Each local school board may use textbooks or supplementary material as approved by the State Board of Education. The teaching of all occult or satanical beliefs of human origin is expressly excluded from this Act.

“Provided, however, that the Holy Bible shall not be defined as a textbook, but is hereby declared to be a reference work, and shall not be required to carry the disclaimer above provided for textbooks.

“The provisions of the Act are hereby declared to be severable; and if any of its sections, provisions, clauses, or parts be held unconstitutional or void, then the remainder of this act shall continue in full force and effect, it being the legislative intent now hereby declared that this act would have been adopted even if such unconstitutional or void matter had not been included herein.”

Soon after the law was placed on the books, the National Association of Biology Teachers asked its membership to donate \$25,000 with which to fight the “Gen-

esis Law” in the courts. The N.A.B.T. filed suit in federal court asking that a three judge court be convened to hear the constitutional dispute. Another organization, Americans United for Separation of Church and State, Inc., filed a similar suit in state chancery court.

In 1975 the Tennessee “Genesis Law” (called by some the “second monkey law”) was declared unconstitutional by a five member panel Supreme Court decision, mainly because it was thought to foster religion (since the word “Genesis” appeared in the law). Opponents of the bill raised three main objections to it: (1) that it violates the establishment clause of the Constitution; (2) that there is a sectarian motive behind the Act, and; (3) that it regulates academic freedom. Proponents of the law are currently working to present, in different form, a similar law which will be able to pass the constitutionality test.²⁹⁷

In 1966 a court in Arkansas declared the anti-evolution law of that state to be unconstitutional. The following year the State Supreme Court reversed the decision of the lower court and upheld the constitutionality of the law. Then, November 12, 1968 the United States Supreme Court ruled that any law prohibiting the teaching of evolution in tax-supported schools is unconstitutional.

In 1972, the State Board of Education in California agreed that whenever theories of origins were discussed, both evolution and scientific creation should be taught. At the current time several other states are examining this procedure, or legislation to allow scientific creationism to be taught. As Grabiner and Miller have observed: “. . . attacks on evolution have not ended . . .

²⁹⁷ For two excellent summaries on the problem in Tennessee, see: (1) “Current Status of Evolution” by Curtis Dowdy. *IN: The Church Today: Current Issues, Problems and Challenges*. Freed-Hardeman College, Henderson, Tennessee. 1975. pp 242ff. (2) “Creationism in Tennessee” by Dr. Russell C. Artist. *IN: Firm Foundation*. November 30, 1976. Firm Foundation Publishing House. Box 610. Austin, Texas.

there is still much public hostility to the teaching of evolution.”²⁹⁸ In 1981, for example, at least two states had passed laws allowing the teaching of scientific creationism in public schools (Arkansas and Louisiana).

In the late 1950’s the scientific community took an increased interest in improving the state of high school science instruction. The Federal Government gave financial support to groups of scientists interested in developing new materials. The School Mathematicians Study Group and the Physical Sciences Study Committee are perhaps the best known. The corresponding group of biologists, the American Institute of Biological Sciences (A.I.B.S.) produced the texts known as the Biological Sciences Curriculum Study (B.S.C.S.). The National Science Foundation gave an immediate \$143,000 to initiate the project and by 1975 had spent \$19.8 million to produce and implement the courses in high school biology.²⁹⁹ Other private groups donated funds as well, such as: the Rockefeller Foundation, Asia Foundation, American Institute of Biological Sciences, and the Agency For International Development.

“The total amount spent by the United States for science curricula during 1956-1975 was \$283.9 million (G.A.O. Report, HRD-77-49, p 11). B.S.C.S. Biology represented 1.9% of the total program (53 projects) but received 6.7% of the funds. Thus we see that B.S.C.S. Biology received more than three times the average amount spent for each of the other 52 projects.”³⁰⁰

The B.S.C.S. books were published in 1963. There were three versions of these books written, each separated from the other by its cover color. The “blue version” taught biology from a biochemical slant. The “yellow version” taught the traditional biology. The “green

²⁹⁸ Grabiner, Judith and P.D. Miller (see footnote #295) p 836.

²⁹⁹ 1977 National Science Foundation Hearings on H.R. 11572. Jan/ Feb, 1976, p 607.

³⁰⁰ Ward, Rita Rhodes. “Government Mind Control (#4).” *IN: Voice of Freedom*. Freedom Press, Inc. Dallas, Texas. April, 1978. p 59.

version” taught biology through environmental application. All three books were heavily indoctrinated with evolution. The blue book had the most evolution, while the yellow had the least. The B.S.C.S. books were violently opposed, especially in Texas. Attacks were made both in the pulpit and in the press. In 1964 the State Textbook Commission of the State of Texas, holding hearings on adopting the new biology books, met a concerted campaign against the new books on the grounds that they contained so much evolution. But 1964 was not 1925. This time the books were adopted, unexpurgated. Scientists participated in the hearings, and the prestige and financial support of the Federal Government were behind the B.S.C.S. books. The books were “pushed” through amidst the shouts of a very vocal opposition. As Grabiner and Miller have written: “Not until 1960, when the new Biological Sciences Curriculum Study texts came out, was the treatment of evolution in the most widely used high school texts substantially improved over that found before the Scopes trial.”³⁰¹ Indeed, the B.S.C.S. texts were quite a radical change. They brought evolution into the classroom unashamedly and quite rigorously.

In 1974 a pioneering exception came along in biology textbooks. The Creation Research Society³⁰² with the help of twenty scientists (most with doctorates in biology), prepared a biology textbook for use in public or private schools that employed the theory of scientific creationism rather than the theory of evolution. The book was entitled, *Biology: A Search For Order.In Complexity*, with Drs. John N. Moore and Harold Slusher as editors.³⁰³ Its biology was the equal of any other high school biology text, with the single major exception that scientific creation was suggested in place of evolution. After

³⁰¹ Grabiner, Judith and P.D. Miller (see footnote #295) p 832.

³⁰² Creation Research Society. 2717 Granbrook Road. Ann Arbor, Michigan. 48104.

³⁰³ Teacher’s guide and laboratory manual are also available.

textbook hearings, the book was adopted for use in Texas schools by the State Textbook Commission. In February of 1977 the Dallas school board voted in a 6-3 decision to allow use of this new text in each of the district's more than sixty biology classes. Dr. Nolen Estes, superintendent of the Dallas school system, was the brunt of much criticism as the result of this decision, which he wholly supported. The book is currently being used in other states as well.³⁰⁴

Aside from the textbooks and state laws, what else is changing in evolutionary thought? This is hardly a static situation, as anyone familiar with it readily recognizes. There is so much written, and so much spoken, about evolution that it is becoming almost impossible to keep up with it. Historians of the future will certainly have their work cut out for them in this area.

³⁰⁴ There is also now on the market a pioneering world history book which is written from the view of scientific creationism. It is *Streams of Civilization* by Albert Hymer and Mary Stanton. It is published by Creation-Life Publishers, San Diego, California. 1975.

Neo-Darwinism
and the
Modern Synthetic
Theory of Evolution

8

Neo-Darwinism and the *Modern Synthetic Theory* *Of Evolution*

As we begin to bring this treatise on the history of evolutionary thought to a close, let us now turn our undivided attention to the Neo-Darwinian, synthetic theory of evolution. In 1958 Mentor Books (a division of the New American Library) published a pocketbook edition of Darwin's *Origin Of Species*. The "Introduction" was written by Sir Julian Huxley, the renowned evolutionist and grandson of Sir Thomas Huxley. Huxley said in his introduction:

"Why is the *Origin* such a great book? It convincingly demonstrates the fact of evolution; it provides a vast and well-chosen body of evidence showing that existing animals and plants cannot have been created in their present forms but must have evolved from earlier forms by slow transformation. And secondly, because the theory of natural selection which the *Origin* so fully and lucidly expounds, provides a mechanism by which such transformation could and would automatically be produced.

Natural selection rendered evolution scientifically intelligible.”³⁰⁵

Huxley went on to say:

“Today, a century after the publication of the *Origin*, Darwin’s great discovery of the universal principle of natural selection is firmly and finally established as the sole agency of major evolutionary change.”³⁰⁶

That was in 1958. Yet only two years earlier Dr. W.R. Thompson, F.R.S., Director of the Commonwealth Institute of Biological Control (Ottawa, Ontario, Canada) wrote the “Introduction” to Darwin’s *Origin*, in which he said:

“The long-continued investigations on heredity and variation have undermined the Darwinian position. We now know that the variations determined by environmental changes — the individual differences regarded by Darwin as the material on which natural selection acts — are not hereditary.”³⁰⁷

Hugo deVries, the Dutch botanist, said, “Natural selection may explain the survival of the fittest, but it cannot explain the arrival of the fittest.”³⁰⁸ Alexander Graham Bell, inventor of the telephone and a student of evolution, remarked: “Natural selection does not and cannot produce new species and varieties.”³⁰⁹ Professor Coulter of the University of Chicago said, “The most fundamental objection to the theory of natural selection is that it cannot originate characters; it only selects among characters already existing.”³¹⁰ Coulter also said, “Dar-

³⁰⁵ Darwin, Charles. *Origin Of Species*. New American Library. New York. 1958. p x.

³⁰⁶ *Ibid.* p xiii.

³⁰⁷ Darwin, Charles. (see footnote #255) p xii.

³⁰⁸ DeVries, Hugo. *Species and Varieties, Their Origin by Mutation*. pp 825-826.

³⁰⁹ Bell, Alexander. *World’s Work*. December, 1913. p 177. Quoted in footnote #111, p 94.

³¹⁰ Coulter. *Fundamentals of Plant Breeding*. p 34. Quoted in footnote #111, pp 94-95.

win's explanation of organic evolution is now held to be an inadequate explanation."³¹¹ Professor Scott of Princeton said, "I have never been satisfied that Darwin's explanation is the rightful one."³¹² Another Dr. Scott, President of the Botany Section of the British Association for the Advancement of Science has written: "He [Darwin] has been shorn of his selection theories as completely as Samson was shorn of his locks."³¹³

All of these men, from whom these quotes are taken, are (with the lone exception of Dr. W.R. Thompson), evolutionists, to the best of this writer's knowledge. Yet they say exactly the opposite of what Huxley had to say in his "Introduction" to the *Origin*. Huxley (and others as well) speak of the great "fact" of natural selection in regard to evolution, while Coulter, Scott, and others speak of natural selection as totally deficient as a mechanism of evolution. What is the truth of the matter? This sets the stage for the Neo-Darwinian, synthetic theory of evolution. Let us hear from Dr. Byron Nelson as he assesses the problem:

" 'Natural selection' or 'the survival of the fittest' made a great stir among those eager to get away from the philosophy of existence embodied in the doctrine of special creation. So great was the stir that the terms 'evolution' and 'Darwinism' came to be used synonymously. The enthusiasm that was engendered by it, however, did not last, and gradually this speculation also began to be abandoned. Today it is not accepted as satisfactory by any evolutionist of prominence in the world . . . natural selection has had to be abandoned as a satisfactory explanation of evolution. . . . however much selecting nature may have done in the past, its selecting has never been able to originate anything natural selection can be only a mechanism for the elimination of what already exists."³¹⁴

³¹¹ Coulter. *School Science Series*. p 16. Quoted in footnote #111, pp 98-99.

³¹² Scott. *The Theory of Evolution*. p 25. Quoted in footnote #111, p 99.

³¹³ Scott. *Nature*. September 29, 1921.

³¹⁴ Nelson, Byron. (see footnote #111) pp 93, 99.

With natural selection by *itself* having been shown to be incapable of providing a mechanism for evolution, and with deVries' mutation theory "tossed out" as incapable of providing an evolutionary mechanism, evolutionists began to find themselves without *any* adequate mechanism for evolution. The time was ripe for the modern synthetic theory of evolution (called in some circles Neo-Darwinism).

Neo-Darwinism teaches that the accumulations of micromutations, in conjunction with natural selection, leads to the formation of new varieties and eventually to new species. This new synthetic theory, as it is often called, represents a "marriage" of natural selection with mutations.³¹⁵ Dobzhansky asserts:

"The modern synthetic theory as a generally accepted way of approaching problems of evolution was born in 1937 with the publication of Dobzhansky's *Genetics and the Origin of Species* Since the publication of these books the synthetic theory has been widely recognized as the most plausible explanation of the causes of evolution, and has developed largely because of research stimulated by their publication

"The differences between the modern synthetic theory and that of natural selection as set forth by Darwin reflect advances in scientific knowledge and method since Darwin's day. The most important is the addition of the Mendelian laws of particulate heredity. The knowledge that heredity is determined by specific genes located on chromosomes removes at once the objection of Fleeming Jenkin, since the swamping effect he pointed out can be overcome in various ways. It also gives the

³¹⁵ The reader will remember our statement, at the very end of the discussion on Hugo deVries to the effect that although deVries mutation theory was soon discarded, it would not be the end of the matter. Indeed, it was not, for deVries' mutation theory was resurrected as soon as it was realized that no other suitable mechanism for forward progress in evolution was available. It was once again linked with the natural selection of Darwin and has been the theory in vogue since the late 1920's and 1930's.

evolutionist a mechanism by which he can measure precisely the intensity of selection . . .

“In addition to expanding the factual basis upon which the synthetic theory is founded, modern trends in scientific knowledge have shown that many basic problems can be understood only by assuming that all biological organization, down to the level of molecules, has evolved as a result of *natural selection acting upon genetic variation.*”³¹⁶

And so the modern synthetic theory of evolution is seen to be natural selection *coupled with* genetic mutations. Dr. George Gaylord Simpson, Harvard’s eminent paleontologist, asserted that “Mutations are the ultimate raw material for evolution.”³¹⁷ Dr. Theodosius Dobzhansky, world-renowned geneticist of the University of California at Davis has stated: “The process of mutation is the only known source of new materials of genetic variability, and hence of evolution.”³¹⁸ Dr. Dobzhansky went on to say: “Since mutation is the only known method of origin of new hereditary variability, the mutation process is considered to be the prime source of the materials of evolution.”³¹⁹ Snyder and David, in their book, *The Principles Of Heredity*, exclaim:

“This unique ability of a gene to draw from the surrounding medium the various building blocks needed to duplicate itself and to impress upon them its own pattern, even when that pattern is a changed, or mutated pattern, is at the very center of the process of the evolution of life.

“On this hypothesis a mutation, either natural or induced, is thought of as being an alteration in the chemical

³¹⁶ Dobzhansky, Theodosius, *et al.* (see footnote #107) pp 17, 18.

³¹⁷ Simpson, G.G. and W.S. Beck. *Life: An Introduction to Biology.* Harcourt, Brace, and World. New York. 1965. p 430.

³¹⁸ Dobzhansky, Theodosius. “On the Methods of Evolutionary Biology and Anthropology.” (Part I) *IN: American Scientist.* Vol 45. Dec. 1957. p 385.

³¹⁹ Sinnot, E.W., L.C. Dunn, and T. Dobzhansky. *Principles of Genetics.* (4th edition). Macmillan & Co. New York. 1950 p 315.

arrangement of the molecule. The mutated gene, in its reproduction, duplicates itself in its altered form just as faithfully as it previously copied its original form. This is one of the foundation stones of evolution."³²⁰

Nevertheless, the modern synthetic theory of evolution is still based on both natural selection and mutations, as Hall and Moog of Washington University state in their textbook, *Life Science*:

"From myriad mutations occurring at random over the ages, there have evolved ever more varied and complex beings, including even the possessors of intelligent minds capable of attempting to comprehend the whole scheme. How can orderly progression emerge from randomness? Some philosophically-minded students have preferred to attribute the directiveness of evolutionary change to a supernatural intelligence beyond the realm of scientific inquiry. Yet it is possible to explain the long-continued trends that we find in evolutionary history by gene mutations, recombination, and selection."³²¹

This theory, however, has not been acceptable to *all* leading evolutionists. The late Dr. Richard B. Goldschmidt, evolutionary geneticist of the University of California, challenged the adherents of Neo-Darwinism

"to try to explain the evolution of the following features by accumulation and selection of small mutants: hair in mammals, feathers in birds, segmentation of arthropods and vertebrates, the transformation of gill arches in phylogeny, including the aortic arches, muscles, nerves, etc.; further, teeth, shells of mollusks, ectoskeletons, compound eyes, blood circulation, alternation of generations . . . poison apparatus of snakes, whalebone, and finally primary chemical differences like hemoglobin vs. hemocyanin, etc. Corresponding examples from plants could be given."³²²

³²⁰ Snyder, L.H. and P.R. David. *The Principles of Heredity*. D.C. Heath & Co. Boston, Mass. 1957. p 377.

³²¹ Hall, Thomas and F. Moog. *Life Science*. John Wiley & Sons. New York. 1955. p 442.

³²² Goldschmidt, Richard B. *The Material Basis of Evolution*. Yale University Press. New Haven, Connecticut. 1940. p 7.

Dr. Goldschmidt strongly believed there was a *macro*-evolution and a *micro*evolution, the latter being confined to historical changes in a species. Macroevolution, Goldschmidt asserted, dealt with those changes at the level of the genus or above. He felt that the two forms of evolution were quite different and that the microevolution did not lead to macroevolution. Goldschmidt boldly asserted that "the Neo-Darwinian theory of the geneticists is no longer tenable."³²³

Dr. Goldschmidt simply could not, as a geneticist, bring himself to accept evolution as a result of mutations in the environment. He insisted that there is a limit to the amount of change which can be brought about by an accumulation of mutations. He accepted evolution as a fact, however, and in order to do this postulated that there must be some sort of drastic change which can be produced (*macroevolution*). This kind of change, which is much more extensive than the change produced by "micro-mutations" he designated as "systemic mutations." He believed that such changes might occur during embryonic stages of development. Most individuals in which this occurred would be, he freely admitted, so abnormal that they could not survive, but he postulated that there would be occasional "hopeful monsters"³²⁴ which would be the means of furthering evolution.

For the most part, Goldschmidt's "systemic mutations" have not gained acceptance even to the present time. Dr. Theodosius Dobzhansky, himself an evolutionary geneticist, explains why:

"Another theorist proposes that the marvellous gifts of evolution to the living world came to birth through sudden and drastic 'systemic mutations,' which created 'hopeful monsters' that were later polished down to the final product by evolutionary selection. But these theories amount only to giving more or less fancy names to

³²³ *Ibid.* p 397.

³²⁴ Goldschmidt, Richard B. *Theoretical Genetics*. University of California Press. 1955. pp 485-486.

imaginary phenomena: no one has ever observed the occurrence of a 'systemic mutation' for instance."³²⁵

Ernest A. Hooton, Harvard's famed anthropologist, said:

"Saltatory [moving by leaps rather than gradually] evolution by way of mutation is a very convenient way of bridging over gaps between animal forms . . . Now I am afraid that many . . . have sinned against genetic science and are leaning upon a broken reed when we depend on mutations."³²⁶

Dr. Jack Wood Sears, Chairman of the Biology Department at Harding University, Searcy, Arkansas (and himself a geneticist), has said simply: "But we have not seen . . . systemic mutations."³²⁷

Goldschmidt's theory of "hopeful monsters" has not been without its supporters, however. Dr. Stephen J. Gould, Professor of Geology and Paleontology at Harvard, wrote an article entitled "The Return of Hopeful Monsters" in the June-July (1977) issue of *Natural History*, in which he said:

"As a Darwinian, I wish to defend Goldschmidt's postulate that macroevolution is not simply microevolution extrapolated, and that major structural transitions can occur rapidly without a smooth series of intermediate stages."³²⁸

As Dr. Henry M. Morris has commented:

"Dr. Gould is . . . one of the world's current leaders in evolutionary thought. Along with a number of other modern evolutionists, Gould has recognized the failure of neo-Darwinism (slow and gradual evolution by small beneficial mutations preserved by natural selection) and

³²⁵ Dobzhansky, Theodosius. *IN: Plant Life*. D. Flannigan et al., editors. Simon & Schuster. New York. 1957. p 131.

³²⁶ Hooton, Ernest A. *Apes, Men & Morons*. George Allen & Unwin. 1937. p 118.

³²⁷ Sears, Jack Wood. *Conflict and Harmony in Science and the Bible*. Baker Book House. Grand Rapids, Michigan. 1969. p 57.

³²⁸ Gould, Stephen J. "The Return of Hopeful Monsters." *IN: Natural History*. June/July, 1977. p 24.

has been advocating what he calls ‘punctuated equilibria’ (rapid evolution in small populations followed by stability in large populations) to explain the universal gaps in the fossil record.”³²⁹

And so the controversy rages on, even in the current day and time. Yet there is even more. For example, Dr. George Gaylord Simpson of Harvard (who, “in the opinion of many of the world’s leading scientists, stands alone as an interpreter of evolutionary theory”³³⁰) has suggested yet another model to replace the modern synthetic theory of gradual mutations preserved by natural selection. Dr. Simpson has proposed “skips” in the genetic histories of life forms. He suggested that during a period of time when the radiation level was very high upon the earth (e.g.: as during a magnetic reversal) many drastic changes occurred *all at once* and instead of drifting gradually, for example, from a reptile to a mammal, the reptiles “skipped” the intermediate forms and changed suddenly into mammals. Dr. Simpson calls this, in his popular book, *The Major Features Of Evolution*, “quantum evolution,” and he defines the term in this way:

“For the sake of brevity, the term ‘quantum evolution’ is here applied to the relatively rapid shift of a biotic population in disequilibrium to an equilibrium distinctly unlike an ancestral condition. Such a sequence can occur on a relatively small scale in any sort of population and in any part of the complex evolutionary process.”³³¹

Dr. Simpson’s “quantum evolution” has not amassed to itself a large following, as of yet, probably because it is

³²⁹ Morris, Henry M. *Acts and Facts*. Institute for Creation Research. San Diego, California. August, 1977. p 3 [NOTE TO READER: In October, 1980 a special symposium was held at the Field Museum of Natural History in Chicago. Attending were 160 famous evolutionists, most of whom advocated at that symposium Gould’s “punctuated equilibria” or theories similar to it.]

³³⁰ Simpson, G.G. *The Geography of Evolution*. G.P. Putnam’s Sons. New York. 1965. (quote is found on jacket of book)

³³¹ Simpson, G.G. *The Major Features of Evolution*. Yale University Press. New Haven, Connecticut. 1966.

antagonistic to the nature of genetic mutations. To suggest that a large number of mutations might occur simultaneously, all of which would benefit the organism and move it toward a radically-improved animal, is not consistent with the way in which mutations work. As Dr. Jack Wood Sears has said:

“True, [quantum evolution] . . . would, according to the explanation of . . . its proponents, provide new taxa, but we need more than this assurance. . . . We have not seen quantum evolution”³³²

The 20th century has seen its fair share of eminent evolutionists. Men such as Sir Julian Huxley, Dr. Theodosius Dobzhansky, Dr. George Gaylord Simpson, Dr. Richard B. Goldschmidt, Dr. Stephen J. Gould, Dr. H.J. Muller, Dr. Francisco Ayala, and hundreds of others have taken places of prominence in the constant struggle to show the “truth” (as they see it) of evolution. Dr. Muller, for example, circulated a manifesto (dated May 2, 1966) which stated, in part:

“. . . There are no hypotheses, alternative to the principle of evolution with its ‘tree of life,’ that any competent biologist of today takes seriously. Moreover, the principle is so important for an understanding of the world we live in and of ourselves that the public in general, including students taking biology in high school, should be made aware of it, and of the fact that it is firmly established even as the rotundity of the earth is firmly established.”³³³

The manifesto was signed by 177 scientists from all over the world, all of whom agreed that evolution is a proven “fact” of science. Dr. Muller, an evolutionary geneticist and Nobel Laureate in genetics, is probably more famous for his work with mutations in *Drosophila melanogaster*, the common fruit fly.

³³² Sears, Jack Wood. (see footnote #327) p 57.

³³³ Muller, H.J. Manifesto is given in its entirety in the book *Forty-Two Years On The Firing Line* by J.D. Bales. Lambert Book House. Shreveport, Louisiana. pp 71-77.

Yet the controversy still rages on. Even non-scientists have become involved. The American Humanist Association (A.H.A.) has recently become quite involved in the creation/evolution controversy. The A.H.A. sent, in early 1977, a statement signed by 179 educators, theologians(?), and scientists to all major school districts in the United States affirming that "There are no alternative theories to the principle of evolution . . . that any competent biologist of today takes seriously."³³⁴ The statement calls for "opposition to measures before several state legislatures that would require equal time for creationist views in public schools, rejection of the concept that alleges 'that evolution itself is a tenet of religion of secular humanism.'"³³⁵ The statement goes on to say that

"Evolution is the only presently known scientific and nonreligious explanation for the existence and diversity of living organisms. It is therefore the only view that should be expounded in public school courses on science, which are distinct from those on religion."³³⁶

The entire statement, as it was sent to school districts, was published in the January/February issue of *The Humanist*, published for the American Humanist Association and the American Ethical Union. Along with the published statement was an attack (in several articles) on creationism. Then on Saturday evening, April 30, 1977 at the 36th Annual Conference of the American Humanist Association, Dr. Preston Cloud (University of California, Santa Barbara, geologist) gave a public address entitled, "In the Beginning" which was announced as a "hard-hitting attack on the Book of Genesis and the

³³⁴ The statement is found in *The Humanist*, January/February, 1977. pp 4ff, published by the American Humanist Association.

³³⁵ *Ibid.* (See also *Bible-Science Newsletter*. Bible-Science Association. Minneapolis, Minnesota. July, 1977. p 4.

³³⁶ *Ibid.*

creationist movement.”³³⁷ And so as the history of evolutionary thought moves on, it becomes even more evident that indeed the historians of the future generations will have plenty of work to do. What a tangled mishmash they will find themselves trying feverishly to unravel. Almost everyone, it seems, is on the evolution bandwagon — either *for* or *against*!!

The 20th century has also had its fair share of eminent creationists. Men such as Dr. George McCready Price, Dr. Harry Rimmer, Dr. Henry M. Morris, Dr. Duane T. Gish, Dr. Walter Lammerts, Dr. John Klotz, Dr. Bolton Davidheiser, Dr. John Whitcomb, Dr. John N. Moore, Dr. Harold Slusher, Dr. Gary Parker, Dr. H. Douglas Dean, Dr. Russell C. Artist, and a host of others have dedicated their lives and abilities to the truth of the biblical account of creation and the literal historicity of the Bible.

The final pages of this interesting and controversial tale are yet to be written. Who knows what future historians will say in regard to the theory of evolution and those of us who lived in the 20th century? They cannot say we were complacent, for that is far from true. They cannot say we ignored the issues, for our libraries belie that statement. They cannot say it was of importance only to a select few, because whole nations became embroiled in the controversy.

What will the future historians write? We do not pretend to know. But surely they will be able to see, even if many of us in the 20th century have not, that “the doctrine of origins indeed, is the foundation of every other doctrine.”³³⁸

³³⁷ Cf: *Acts and Facts*. Institute for Creation Research. San Diego, California. June, 1977. p 2.

³³⁸ Morris, Henry M. (see footnote #117) p 26.

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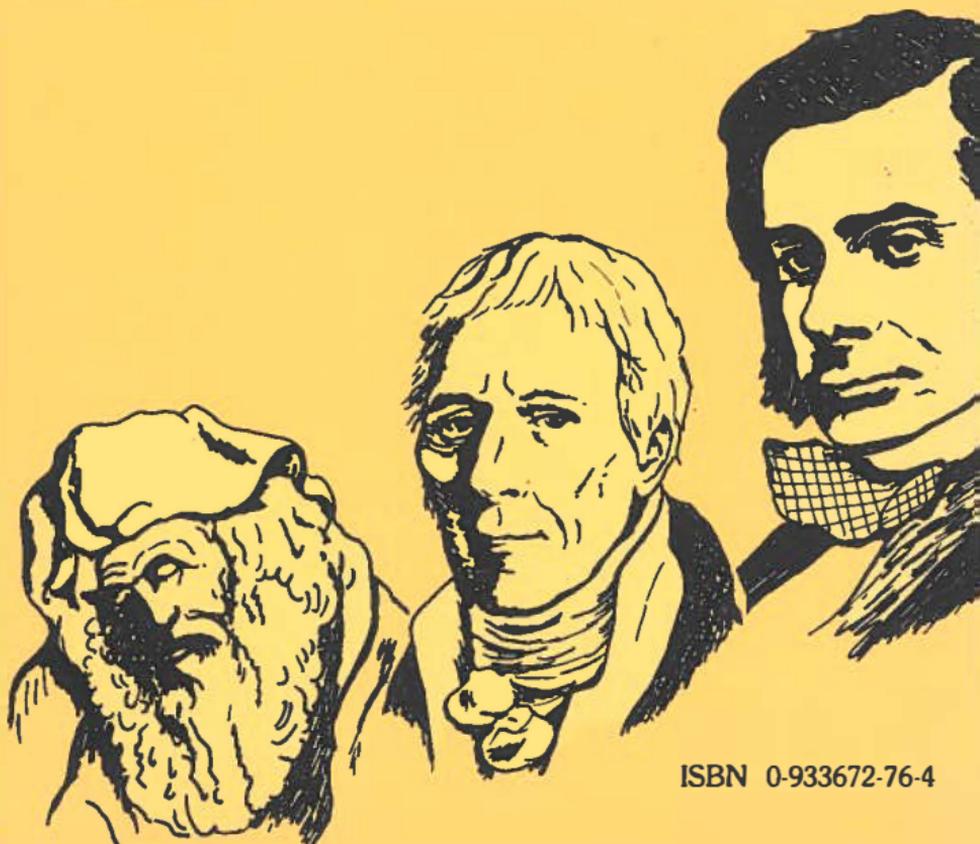
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Bert Thompson is a 32-year old native Texan. He received the B.S. degree in biology from Abilene Christian University in 1971, and the M.S. and Ph.D. degrees in food microbiology from Texas A&M University in 1972 and 1975, respectively. Dr. Thompson is a former Assistant Professor of Veterinary Public Health, College of Veterinary Medicine, Texas A&M University. While teaching in the College of Veterinary Medicine at Texas A&M, Dr. Thompson also served as the Coordinator of the Cooperative Education program in Biomedical Science. Dr. Thompson is a member of the American Society for Microbiology, the Institute of Food Technologists, and the International Association of Milk, Food and Environmental Sanitarians. In addition, he was listed in the 1980 edition of the *International Who's Who*, and the 1978 edition of *American Men & Women of Science*. In 1979 he was selected for inclusions in the prestigious listing of *American Youth in Achievement*, as well as *Personalities of the South*. He is co-editor of a monthly journal on Christian evidences, *Reason & Revelation*, and is one of the founders and board members of Apologetics Press, Inc., a non-profit, tax-exempt corporation dedicated to the defense of historical, New Testament Christianity. He is the author of other books, including *Theistic Evolution*, *Christian Apologetics and Christian Evidences*, and others. Currently, Dr. Thompson is serving as a Professor of Bible & Science at the Alabama Christian School of Religion in Montgomery, Alabama.



ISBN 0-933672-76-4