THE CREATIONIST AND NEO-DARWINIAN VIEWS CONCERNING THE ORIGIN OF THE ORDER PRIMATES COMPARED AND CONTRASTED: A PRELIMINARY ANALYSIS

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After some consideration of the philosophical cautions which should be observed in any scientific discussion, the fossil evidence having to do with primates is reviewed. It is concluded that there is no real evidence to show either that the primates evolved from anything else, or that man evolved among them. The Scriptural view, that man and these other creatures were created separately, is fully as much in accord with the evidence, and is more credible on other grounds.

The Nature of Science and the Science of Nature

Before proceeding to the central thesis it is necessary to set out some basic ideas concerning the nature of science and evolutionary theory as they are presently viewed within the scientific community. Until recently it was a highlight of science to pose as the arbiter of all truth in the physical world through the use of elaborate theories and laws which were viewed as somewhat immutable. With the advent of quantum mechanics and research on the frontiers of knowledge in the related physical sciences this naive view of human investigation of the cosmos has given way to a radical departure from previous scientific conceptions epitomized best by the field of relativity theory in modern physics.[1] Scientific endeavor today is viewed not as a means to the end of acquiring total objective truth but as a valuable yet limited way to increase human knowledge consequent to the limits of human observation.[2]

One of the foremost thinkers in forging this new conception of modern science is Karl Raimund Popper, Professor of the Philosophy of Science, University of London. Popper views science as being composed of five major logical steps: a problem (usually a response to an existing theory of expectation); a proposed solution (new theory); a deduction of testable propositions from the new theory; tests (attempted refutations); and a preference established between competing theories.[3] Popper arrived at this view of scientific method after formulating the concept of three worlds as a philosophical premise: 1.) the world of objective, material things; 2.) the subjective world of mind, and 3.) objective structures which are the products of minds of living creatures, which once produced, exist independently of them.[4] According to this view the aim of science is to refine existing theories thru proposed experiments of refutation in order to arrive at a closer approximation of truth. Science is then viewed as a completely rational, logical enterprise, and scientists as logicians of the first order.

In contradistinction to Popper's methodological approach to modern science there are the equally powerful conceptions of Thomas S. Kuhn, Professor of the Philosophy of Science, University of Chicago, who views science as a sometimes irrational process in which scientists frequently experience conversion in a quasi-religious sense in response to a crisis experience. Thus science is viewed as being in a continual state of revolution with one competing paradigm winning out over another in a never ending sequence.[5] Once again as concerns methodology the view is that science is aim-oriented.

Not all scientists would agree with either of the two views expressed above yet it is these two views that have come largely to dominate scientific enterprise in the West. Einstein believed that science should attempt to formulate vast schemes in an attempt to find a conjectured unified harmony in nature and should not be subservient to the minutiae of aim-oriented scientific investigations.[6]

It is probably true to say that the so-called "pure sciences" are more subject to empirical investigations and explanations than the applied sciences. Mathematics for this reason would stand as the queen of the sciences since it is the most precise both in its formulations and its systems and subsystems of proofs, yet, even the "foundations of mathematics remain wobbly" since the only way to prove simple arithmatic consistent is through the use of transfinite induction, the logical consistency of which is open to serious doubt.[7] Arranged in descending order relative to internal logical consistency one author has suggested the following scheme: mathematics, physics, chemistry, biology, and the social sciences.[8] It is interesting to note that the further one moves away from mathematics the more theories are known by "discoverers" names: e.g. Adlerian, Freudian, Piagetian schools of psychology or Neo-Darwinian and Lamarckian theories of evolution. Recent studies have led to the conclusion that not only is present-day science built on many unsubstantiated premises and "illogical" assumptions but that scientists also fall prey to biases which distort observations such that even scientists of two diametrically opposed theories can both make the same observational mistake.[9]

Biology, being one of the least verifiable sciences, has been overwhelmingly influenced by the idea of evolution. It is important to remember that ideas of evolution did not begin with Darwin but have a long intellectual history. The ancient Babylonians, Egyptians, Indians, Chinese, and Greeks expressed ideas about the evolution of life from inanimate matter.[10] With the rise of modern science at the close of the Middle Ages ideas began to be expressed in a more scientific manner concerning the possible evolution of life. Ultimately this resulted in the noted works of Buffon, Diderot, Herder, and Lamarck.[11]

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Charles Darwin took the works of his predecessors one step further by attempting to systematize in one philosophical and scientific system the doctrine of evolution. Recent writers have criticized Darwin's work on both counts, since in many instances in the *Origin of Species* and later works Darwin seems as intent to explain away as to explain. Philosophers have been particularly vehement in their objections since Darwin's selection theory is guilty of circularity in reasoning.[12] Frequently writers on evolution maintain that Darwin arrived at his theory through the patient accumulation of a vast body of facts which led to his inevitable conclusion. In fact, as one perceptive writer has noted, Darwin, like all of us, began collecting data with a theory already present in his conceptual scheme and only noted those data which were conformable to his theory.[13] Darwin in his works failed to take account of the work of his contemporary, Gregor Mendel, who had presented a paper before the Natural History Society of Brunn, Austria in 1865. Consequently it awaited the independent work of three investigators in the early 20th century before heredity was given its rightful place in biology and evolutionary theory. Today the dominant view of evolution in the Western world is Neo-Darwinism or the synthetic theory of evolution. It is important to note however, that not all evolutionists today subscribe to this theory. Especially is this so in Europe. Some ardent neo-Darwinists either ignore such dissent or attempt to ridicule it to *reductio ad absurdum*.[14]

Additionally there is an admittedly minority group of scientists who do not espouse any form of macroevolutionary theory but express a view which has come to be known as scientific creationism.[15]

It is the premise of this author in agreement with various authorities that none of the above positions is amenable to strict scientific investigation, as theories of biological order or emergence by their very nature are not subject to empirical investigation. The most reasonable position to take on the question of origins is to view the above ideas as models in which to fit relevant data; the more definitive the model the greater the number of facts which can be accomodated within the conceptual constraints.[16]

Since limitations on this paper make it impossible to present a detailed analysis of the biological sciences relative to competing models, I will focus on the origin of man viewed in the light of the two competing models of Neo-Darwinian evolution and scientific creationism.

Neo-Darwinism: Some Basic Assumptions and Concepts

Kerkut has categorized the assumptions of evolutionary theory into seven basic statements as follows:

1. Nonliving things gave rise to living material, i.e. that spontaneous generation occurred.
2. Spontaneous generation occurred only once.
3. Viruses, bacteria, plants and animals are all interrelated.
4. Various invertebrate phyla are interrelated.
5. Protozoa gave rise to the Metazoa.
6. Invertebrates gave rise to the vertebrates.
7. Vertebrates and fish gave rise to the amphibia, the amphibia to the reptiles, and the reptiles to the birds and mammals.[17]

All seven assumptions up to the present moment in time are incapable of empirical verification leaving one writer to conclude: "Neo-Darwinism seems in danger of replacing one set of dogmas about the origin of man by another set."[18]

The foundations of Neo-Darwinism rest on the twin concepts of natural selection and fitness. Natural selection can be defined as the process whereby certain individuals which make up part of the population of a given species contribute more offspring to the succeeding generation than individuals having other characteristics.[19] Fitness has been defined of late as relative reproductive efficiency.[20] It is generally accepted that most evolutionary changes occur during random speciation events through the influence of natural selection. This idea found mathematical expression in the seminal work of R.A. Fisher whose Fundamental Theorem of Natural Selection stated: "The rate of increase in fitness of any organism at any time is equal to its genetic variance in fitness at that time."[21] The strict formulation of the Theorem applies to allelic variation in fitness at a single gene locus, and assumes that the environment remains constant. Although this is impossible, Fisher's Theorem still remains the basic foundational concept in population genetics.[22] Recently several critics of neo-Darwinian orthodoxy have maintained that Fisher's Theorem and mathematical formulations while having validity in limited cases are insufficient and incapable of furnishing a mathematical basis for the understanding of evolution.[23]

Experimental attempts to view natural selection in action have resulted in the highly acclaimed work of Kettlewell with *Biston betularia* in England, and F.J. Ayala's pioneering work with *Drosophila serrata*.[24] While no one can dispute that these studies and others have demonstrated natural selection in action, it is important to remember that in neither case has evolution been demonstrated, since when all is said and done you still have *Biston betularia* and *Drosophila serrata*. Indeed in both cases you are only dealing with gene frequency changes in one or at most two or three loci and it appears to be a reversible phenomenon.[25]

The raw material which furnished the basis for the action of natural selection is genetic mutation. It is an acknowledged fact that the vast majority of mutations are harmful or even lethal to the individual in question since they consist of changes in a very precisely ordered sequence.[26] Of those which do survive in a population the mutation must have taken place in the germ cells in order to be passed on to future progeny. Calculations based on known rates of gene mutation and transmission have yielded a figure for the chance probability of an amoeba being converted into a horse as one in one thousand raised to the power of one million, which according to all known laws in probability theory renders it impossible.[27] While natural selection therefore is held to act as a powerful force to mold the shape of evolution in the orthodox view, recently a controversy has begun in the upper realms of genetic theory. The neutralist school maintains that most genetic mutations are selectively neutral. While this controversy is far from being resolved it appears to bear heavily on a fundamental change in genetic conceptions for the basis of evolu-

tionary theory.[28] Indeed, an amazing thing about life is that mutations are so infrequent when one considers the amount of coding that takes place in the average cell. One noted embryologist and a noted botanist maintain that the present view of selection cannot be true since it cannot account for gene uniqueness or cellular ontogeny, while a noted paleontologist and recognized zoologist believe it inadequate to account for speciation events.[29]

Concerning a genetic approach to the origin of man from the other primates there has been no theoretical formulation yet propounded in sufficient detail to enable any kind of scientific assessment of its feasibility in genetic terms. Much has been made of similarities in protein structure in the various primates with man including attempts by Dickerson and Sarich to calculate divergences from common ancestral stock.[30] It is important to realize that the arranged series are based on molecular morphology which is at most circumstantial evidence for macroevolution. It is open also to serious questions in regards to underlying assumptions from a genetic standpoint and criteria for selecting an appropriate scheme.[31] Additionally there is no evidence for the evolutionary origin of the basic design for the enzymes in question. Evidence like this can be interpreted readily in a creationist framework as one specialist in biochemical taxonomy has recently done.[32] Interestingly enough the time sequence based on protein structure is in conflict with evolutionary estimates sequencing based on radiometric dating, paleomagnetic studies, and paleoecological approaches.[33]

Another problem posed today in evolutionary biology is the Biological Species Concept. According to Mayr, species are "groups of interbreeding natural populations that are reproductively isolated from other such groups."[34] The problem with this definition is that it is highly subjective since it is difficult to assess zones of mating in the wild; and even if such zones could be delineated there is no feasible way to test for reproduction isolation for the vast majority of wild animals and plants.[35] The effects of such arbitrary species concepts can be illustrated by multitudinous examples. For example the nineteenth century witnessed the description and taxonomic naming of sixty species of chili peppers (*Capsicum*). In 1923, Bailey reduced these to a single species. Presently five different species of domesticated chili pepper are recognized.[36] It seems we are left in the position that "a species is what a competent systematist considers to be a species."[37]

Creationism: Some Basic Assumptions and Concepts

The basic underlying assumptions of the creationist position have been summarized as follows:

1. There is an omnipotent, omnipresent, and omniscient God who always was and always will be.
2. Creation and organization of inorganic crystalline rock structures of the earth as well as liquid water.
3. Creation of the atmosphere and elevation of vast amounts of water from surface up into the hot upper atmosphere and perhaps into near-space beyond, in order to sustain a strong 'greenhouse effect' over the earth's surface in its original form. (Some Creationists might differ here.)
4. Formation of the original continents.
5. Creation of various members of the plant kingdom. This was the beginning of biochemical systems, not just biochemical molecules, but complex, highly organized, self-replicating molecular systems.
6. Creation of sun, moon, stars, and other bodies of the heavens.
7. Creation of the sea and air animals.
8. Creation of the various kinds of land animals, each to reproduce after its own kind.
9. Creation of the first man and woman. 'Creationists believe that although man was created having molecular and physical similarities with other created animals, he was also uniquely endowed with a moral and spiritual consciousness not shared with other creatures. Man is a quantum jump beyond the animals'.[38]

As is true of Neo-Darwinism, all of the above assumptions up to the present moment in time are incapable of empirical verification. That this should be true for both models is due to the fact that both consist of axioms which are not open to proof or refutation. This throws new light on the long standing conflict between creationism and Neo-Darwinism as in the words of one researcher: "We may now recognize that neither challenge is fair. If the Neo-Darwinian theory is axiomatic it is not valid for creationists to demand proof of the axioms, and it is not valid for evolutionists to dismiss special creation as unproved so long as it is stated as an axiom".[39]

The creationist model rests on the premise of the primacy of Scripture as the absolute standard in all matters of life and conduct. Over the years there have been various attempts to identify the account of God's creation week with an emergent form of evolution.[40] Such views hold that the Genesis record is a series of truth-pictures which function in the role of mythological accounts shaped to accomodate the ideals of Near-Eastern thought. Such a view does not do justice to the Bible's uniqueness in relation to ancient Near Eastern creation mythologies as numerous Biblical scholars and professional archaeologists have emphasized.[41] Such a concordist view is also open to strong theological objections.[42]

Creationists view life as being organized around certain basic underlying structures, but do not postulate that there is any genetic or hereditary relationship between the various phyla, orders, and families. On the species level creationists maintain that the present phyletic school's definition of species is too narrow and that a return to a concept of a Biblical 'kind' is more in order. Frequently it is stated that Linnaeus held to a fixity of species, but such a statement is clearly in error. As Linnaeus continued his studies of hybridization (for which essential information was grossly lacking in his day) he concluded that in his earlier efforts to discover Genesis kinds he had often set his species locus too low and too narrow.[43] A creationist view applied for example to the Canine family would maintain that *Canis familiaris*, *Canis lupus*, and *Canis latrans* are all part of the same Genesis kind. Studies of these animals bred in captivity as well as chance matings in the wild have continually resulted in fertile offspring, thus refuting

the Biological Species Concept as it is presently applied.[44] Professor R.V. Short of the MRC Unit of Reproductive Biology at Edinburgh University has recently championed the view that the two genera and thirty-three species of wild geese can all interbreed sucessfully with domestic geese and favors scrapping the taxonomic distinctions.[45] Three creation geneticists are currently seeking to investigate through hybridization experiments the limits of genetic variation in selected plant and animal groupings in an attempt to delineate certain Genesis kinds.[46] We shall return to this concept later in this paper when discussing certain species of *Homo* as it seems to have real relevance to the current plethora of taxonomic names for hominids.

Certain creationists believe there is scientific data which can be amassed for a young age for the earth in the neighborhood of 10,000 years—a figure very different from the 4.5 billion years or so which their evolutionary counterparts use in everyday scientific endeavor. While it is impossible to deal with this subject in any great length in this paper it is interesting to note that none of the assumptions underlying the use of radiometric dating methods can be verified since even nuclear decay is extrapolated from minute observations in the laboratory. Harold Slusher, a geophysicist at the University of Texas and Melvin A. Cook, Professor of Metallurgy at the University of Utah have dealt with this subject in great detail.[47] Studies of the earth's magnetic field as it decays over time also yield a maximum age for the earth of approximately 10,000 years. The magnetic field decay involves heating, and a figure of five billion years would have resulted in total vaporization of the earth's elements according to Thomas G. Barnes, Professor of Physics at the University of Texas.[48] Robert G. Whitelaw of VPI and consultant to the U.S. Atomic Energy Commission has analyzed 10,000 dates that have been printed in *Radiocarbon* and has demonstrated that they offer strong support for the creationist position.[49] Robert V. Gentry of Colombia Union College and visiting scientist at the Oak Ridge National Laboratory of the Atomic Energy Commission, top experimentalist in the field of radiohalos, has demonstrated thru the study of polonium halos in silicate minerals of igneous rocks that the radioactive decay rate is not constant. Studies of the trapping of Alpha-decaying heavy nuclei in zircon lead to speculation that all forms of radiometric dating founded on uniform decay rates may be in error.[50] Other information based on uniformitarian assumptions (a hazardous business for both creationist and evolutionist) can be adduced for a young age for the earth such as meteoritic dust accumulation on the lunar surface, sedimentological deposition and subduction in the oceans, ocean chemistry trace elements and demographic studies.[51] Other creationists read the evidence as indicating an old age for the earth.[52]

The creationist model also postulates the occurrence in the earth's recent past of a global flood as recorded in Genesis. The effects of this flood are believed to be evidenced by the nonconformities and paraconformities in the geological column where various strata which according to uniformitarian assumptions are youthful are buried beneath sedimentological layers which are far older. While such an interpretation has yet to be worked out in great detail the broad outlines have been enumerated by a respected hydraulic engineer and numerous geologists.[53] The evolutionary explanation for the 'myth' of the flood is the layering-out of sequences which can occur with river terraces. The rise in sea level that accompanied the end of the glacial period caused peoples on the coasts to lose many miles of land over the years.[54] Burdick and Rusch have reported numerous discoveries of human fossil footprints which have been ignored and overlooked by evolutionary-minded geologists and paleontologists.[55]

In summary the creation model postulates a youthful earth, and thus would of course necessitate a complete rewriting of earth history from a creationist perspective. Since the number of creationists is few the task will be an ongoing project for many years to come till a model approaching the comprehensiveness and testability of the evolution model is propounded. The very fact that both models are so amenable to the data in question reflects once again the philosophical and metaphysical underpinnings of both models and the paucity of their ability to function as valid scientific theories.

Fossils and Fantasies

Since both creation and evolution are presentable as axiomatic statements from which to perceive and correlate relevant biological and other data we then come to really the only record that will enable us to determine the possible validity of either model according to the present state of our knowledge. Michael Day, noted anatomist and evolutionist at Guy's Medical School, London, reminds us:

> Paleontology, or the study of fossils, provides the really crucial evidence concerning the evolution of the Hominidae in the past. However extensive and compelling it may be, the evidence for evolution based on the study of creatures living today can be only indirect . . . Direct evidence of evolution must depend on actual demonstration from the fossil record of a succession of stages representing the transformation of an ancestral into a descendant type . . . that evolution did occur can be scientifically established only by fossilized representative samples of those intermediate types that have been postulated on the basis of indirect evidence.[56]

In comparing the two models relative to predictions concerning the fossil record of plants and animals the evolution model postulates that with the increasing discovery of fossilized remains of past creatures there will emerge a picture of increasing complexity (Dollo's law) and many graduated stages leading from one major type of organism to a succeeding one in a phylogenetic continuum. The creation model, on the other hand predicts that no amount of fossilized material will demonstrate such a gradual change but that the paleontological record will consist of systematic gaps between genera and families (and perhaps in some instances species due to the inadequacy of the present term).

While it is impossible to assess in this brief space specific cases to demonstrate the feasibility of each model relative to each major radiation several quick examples will be cited from the literature. The amphibian to reptilian transition postulated on the basis of the evolution

model foresees the gradual development of a number of features in the reptiles not possessed by any amphibian, living or fossil. Basically, such changes can be grouped into seven major categories: the development of the amniote egg, evolution of the palate, change in patterning of the skull at back of roof table and cheek region, reduction in tabular horn, change in position of typanum and shape and orientation of stapes, changes in vertebral structure and modification of the scales. After a detailed assessment of morphological and physiological changes necessary for such a transition one researcher concluded: "Unfortunately not a single specimen of an appropriate reptilian ancestor is known prior to the appearance of true reptiles. The absence of such ancestral forms leaves many problems of the amphibian- reptilian transition unanswered".[57]

Archaeopteryx is frequently cited as the bird which is a transitional link between reptiles and birds. On the basis of five specimens discovered in the lithographic stone of southern Germany, Archaeopteryx is believed to have possessed feathers, merrythought, rotatable and opposable big toe, and an opisthopubic pelvis, all characters of modern birds. It also possessed a continuating backbone, true teeth, a forelimb furnished with three complete fingers, fully developed fibula, and gastralia or abdominal ribs, all of which are believed to be reptilian characters.[58] For many years this bird has been put forward in evolutionary literature as a precursor to modern birds; yet several of the supposed reptilian characters have been found to be present in modern birds, the juvenile hoatzin (*Opisthocomus hoatzin*) of South America and the juvenile touraco (*Touraco corythaix*) of North Africa.[59] Recently, Professor James A. Jensen of Brigham Young University has reported the discovery of a bird which he believes to be sixty million years older than Archaeopteryx, leaving John Ostrom of Yale to conclude: "It is obvious that we must now look for the ancestors of flying birds in a period much older than that in which Archaeopteryx lived".[60]

The remainder of this paper will deal particularly with the paleontological record of early man but a few general conclusions are in order here related to the fossil record. The fossil record at present appears to be more amenable to the creation model than the evolution model due to the systematic gaps that there are between genera, families, and orders; a fact that cannot be due to a paucity of material as Darwin in the nineteenth century, D. Dwight-Davis a quarter of a century ago, and others since then have pointed out.[61] A recent work has tried to summarize patterns of evolution based solely on paleontological information. Yet, as a reviewer pointed out, the book fails to record details from fossils of morphological transitions between higher taxonomic groups. So up to the present neither ecologists, geneticists, or paleontologists have elucidated macroevolutionary patterns in sufficient detail to be workable or theoretically testable.[62]

Attempting to establish phylogenetic relations based on fossilized forms is extremely difficult if not impossible. This is particularly true in regards to human evolution, as a quick survey of the literature shows; for there are many different evolutionary scenarios based on the same data considered from different viewpoints. Isaac, in a very illuminating essay mentions scenarios constructed by a primatologist, social anthropologist, cultural anthropologist, human biologists, and then offers, as an archaeologist, his scenario.[63] A recent paper reviewing the construction of family trees and evolutionary scenarios for human evolution concluded that the only testable and therefore fairly accurate representation was the cladogram—a branching diagram illustrating the pattern of distribution within a group of related organisms of derived characters which indicates an evolutionary relationship whose exact nature remains unspecified.[64] The authors decided that in the construction of family trees they could offer no clear-cut methodology, largely because of the twin problems of recognizing species in the fossil record and the improbability of correctly ascertaining whether an older fossil is really ancestral to a younger fossilized form or to a living species. Thus they suggest leaving such practices to "the realm of speculation, informed or otherwise". As if this situation would not be frustrating enough, they concluded that, as vague as the aforementioned methodology is there is no methodology at all for the formulation of a scenario. It is 'limited only by the bounds of one's imagination and by the credulity of one's audience'.

The Origin of Primates

The primates are generally believed to be descended from the insectivora. The dates given for the initial departure from insectivora stock is variable from ninety million to as low as sixty-five million years ago. Since Le Gros Clark's pioneering papers on the tree shrew (family *Tupaiidae)* in the mid- 1920's these creatures had been believed to be the ancestral stock from which primates arose; and they were assigned to the order Primates. With the discovery of fossil tree shrews from the Indian Sivalik Miocene deposits with essentially modern characters this view has given way to the belief that tree shrews can only serve to indicate the range of characteristics of the common ancestor of all placental mammals.[65] Elwyn Simons, one of the world's leading primatologists has confessed that: "The early history of placental mammals is still too poorly known for anyone to be able to state when the initial radiation of the Order Primates actually occurred".[66] Since the ancestral primate stock is not known from the fossil record, all accounts of so-called primitive characters in present day prosimians are just speculations based on the author's suppositions as to a possible ancestral type.[67]

The lemurs (suborder *Prosimi*) are believed to be the first primates to have evolved from insectivore stock. Despite detailed research into possible ancestors for the lemurs, which today occupy only the island of Madagascar, there is at present no ancestral type which can be postulated on the basis of paleontological evidence.[68] A similar situation exists for the lorises and tarsiers.[69]

The prosimians are supposed to have given rise to the platyrrhines and the catarrhines. Relatively little work has been done on the platyrrhines in consideration of the wealth of available material. Differences between the two groups can be summarized as follows:

1. Platyrrhini have wide internasal septum, nostrils

open laterally and less inferiorly; Catarrhini possess narrow internasal septum and nostrils open caudally;

2. Platyrrhini thumb is not highly differentiated, thumb (when present) has two phalanges, but lacks degree of efficiency of Cercopithecoidea;

3. Platyrrhini has technically flat nails, the nail in cross section looks more tentlike and is almost a pseudoclaw;

4. All Platyrrhini lack cheek pouches, ischial callosities, and an externally apparent menstrual cycle.[70]

Although the Platyrrhines are readily distinguished from the Catarrhini and have not adapted to as wide a range of ecological niches as the latter, a detailed classification of these monkeys has never been devised. Indeed, leading authorities are in fundamental disagreement as to subfamilies, let alone species. For example, Hershkovitz, after anatomical studies, concludes that the *Callithricidae* (including marmosets and tamarins) are the most primitive of living monkeys and feels they must have separated from the rest of the platyrrhines for a long time.[71] A more recent anatomical analysis sees these as non-primitive characters but holds to the same phylogenetic scheme.[72] Bender and Chu, after studying chromosomal patterns concluded that they are a specialized group and are not at all primitive.[73] Leslie Aiello has now proffered a view that the howler monkey is the ancestral stock from which the anthropoids diverged.[74] Other authorities are divided on the question and the situation is not helped by the fact that the *Callithricidae* are completely unknown in the fossil record. The origin of the Catarrhines from an ancestral stock is still a complete mystery from paleontological research which means that neither for the Platyrrhines nor Catarrhines is there any demonstrable fossil sequences for phylogenetic relations.[75]

Frequently one reads in evolutionary literature that man did not descend from a monkey but from an earlier common ancestor.[76] While fossil evidence needed to document a transition is lacking, such a proposed hypothetical ancestor would certainly be called a monkey in popular speech by anyone who saw it; and the terms monkey and ape are defined by popular usage.[77] Two evolutionists on the basis of detailed anatomical knowledge of extant primates even believe that monkeys have evolved from apes and men in view of their much more specialized structure.[78]

The Origins of the Hominoidea

The *Hominoidea* are believed to have descended from the monkeys; and they comprise gibbons, siamangs, orangutans, chimpanzees, gorillas, and man. There is much disagreement as to the nature of the origin of the *Hominoidea* lineage from monkey stocks. Various forms such as *Aegyptopithecus*, *Parapithecus*, and *Apidium* are considered early representatives. Erich Thenius of the University of Vienna believes that all monkeys and apes arose from a single ancestral stock, the *Omomyidae*, during the early Tertiary; and that through convergent evolution they arrived at their present-day diversity of forms.[79] Adolph Schultz of the University of Zurich believes that the simian primates of the Old World and America originated from different ancient stocks whose exact nature is uncertain.[80]

Interestingly, *Propliopithecus* when first discovered was believed from teeth and mandibular characters to bear a close resemblance to *Limnopithecus* and *Pliopithecus* of the Miocene, and therefore to be close to the ancestry of the gibbons. When *Aeolopithecus* was discovered and demonstrated possibly to be of a lineage much more like modern gibbons than *Propliopithecus* it was then postulated as being most reasonably the exact ancestor of the other *Hominoidea*. One researcher admits that while the lower molars are like those of pongids, *Propliopithecus* is "already too specialized to be ancestral to both hominids and pongids".[81] With the recent discovery of *Aegyptopithecus* from the Fayum in Egypt, by Simons and associates, *Propliopithecus* has now lost his place as a presumed precursor to the Dryopithecines and hence to man.[82] With the passage of time it now appears from the literature that *Propliopithecus* is a small-tailed, monkey-like ape who is believed to be the ancestor of the gibbon. The question of the taxonomic status of *Aeolopithecus* is left insufficiently answered for this writer; although many believe it was the ancestor of the hylobatines.[83]

The ancestry of the orangutan is also poorly understood from the fossil record. Several schemes have been proposed, including a gibbon-like or monkey-like ancestry as well as a knuckle-walking ancestry.[84] The possible ancestor of the gorilla is still missing, while the evolutionary ancestry of the baboon is equally far from demonstrable.[85]

Dryopithecus

Dryopithecus is a fossilized specimen dated to approximately 20-10 million years ago, and has been found in Turkey, Pakistan, Russia, China, and India as well as parts of sub-Saharan Africa. Specimens appear to weigh as much as 150 pounds and as little as 25 pounds. Jolly believes that *D. africanus* was monkey-like in limb proportions. Recent research concludes that *D. africanus* was a quadruped in very much the same respect as modern cercopithecoids. This, of course, does not rule out the possibility that nonquadrupedal adaptations with hominoid affinities existed in early Miocene times; but it certainly excludes *D. africanus* from such a group on the basis of its wrist, inferior radioulnar joints, and forelimb. The dental characteristics of the Dryopithecines are similar to living forms of apes.[86]

Ramapithecus

Ramapithecus is believed to be the first firm link with the *Hominoidae* from the fossil record. The oldest fragments are dated about 14 million years ago and consist of a complete maxilla and matching mandibular fragment from Fort Ternan, Kenya. Based on jaw and canine structure a picture has been built up of *Ramapithecus* as a creature similar to modern human beings by its most ardent proponents, notably David Pilbeam.[87] There are several problems, however, to such an easy evolutionary scheme.

There is a huge gap in the fossil record between the latest ramapithecines and the earliest australopithecines of a minimum of five million years.[88] This five to

eight million year gap is the reason for a major project underway by paleoanthropologists to bridge the time span between primitive *Homo*, *Australopithecus*, and *Ramapithecus*.[89] Added to this is the problem that such a cosmopolitan ape as *Ramapithecus* only gave rise to *Australopithecus* in Africa and not in India, Hungary, Greece, Turkey, or Pakistan. A proferred explanation is that since ramapithecines contained such wide variation one line progressed in Africa or even between East Africa and South Asia while others remained the same or degenerated. The fossil evidence of *Ramapithecus* in Africa, however, is nonexistent.

The specimens collected consist primarily of isolated teeth and fragments of jaw, and no postcranial bones have been uncovered up to the present. Robert B. Eckhardt of the University of Pennsylvania undertook a detailed comparison of the range of variation between groups of teeth belonging to *Dryopithecus sivalensis*, *Dryopithecus indicus*, and *Ramapithecus punjabicus*. He compared a total of 24 different measurements with those of a chimpanzee population at the Yerkes Primate Research Center and a larger sample of wild chimpanzees from a reserve in Liberia. His conclusion is well worth recording:

> On the basis of these tooth-size calculations, at least, there would appear to be little evidence to suggest that several different hominoid species are represented among the Old World dryopithecine fossils of the late Miocene and early Pliocene times. Neither is there compelling evidence for the existence of any distinct hominid species during this interval, unless the designation 'hominid' means simply any individual ape that happens to have small teeth and a correspondingly small face. Fossil hominids such as *Ramapithecus* may well be ancestral to the hominid line in the sense that they are individual members of an evolving phyletic line from which the hominids later diverged. They themselves nevertheless seem to have been apes- morphologically, ecologically, and behaviorally.[90]

Molar shape has frequently been cited in favor of a hominid ancestry; but a recent study concludes that *Ramapithecus* is no more like *Australopithecus* than is *Sivapithecus*.[91] It is important to remember that isolated teeth are usually insufficient to provide information about adaptation or taxonomy since: "Morphological analysis of occlusal surfaces, especially when isolated teeth are evaluated, may not provide definitive answers regarding either adaptation or phylogeny".[92]

The usual published reconstruction of *Ramapithecus* shows a man-like dental arcade which is based on the original work of G.E. Lewis in 1934, followed by Simons in 1961 and thereafter. A recent research study reexamined in detail such a reconstruction and concluded that there is no dental evidence at present to warrant a reconstruction of the palatal arcade as humanlike, or to include *Ramapithecus* in the *Hominidae*, since there are many features in the dentition especially of YPM 13799 that are not typically hominid.[93] It is interesting that a precanine diastema is evident in the photographs of two Indian specimens of *Ramapithecus*, yet this is ignored in published reconstructions.[94]

Also damaging to a hominid status for *Ramapithecus* is the extant Gelada baboon (*Theropithecus gelada*) which dwells in the upper highlands of Ethiopia and has teeth and dental characteristics very similar to *Ramapithecus*.[95] Clark and Andrews after assessing the African evidence believe that it is impossible to assess *Ramapithecus*' exact status but that it may be put either in the family of hominids or pongids whichever way the researcher wishes to read the evidence.[96] It now appears that even Pilbeam has reconsidered and holds the view that *Ramapithecus* is distinct from pongids, dryopithecines, and hominids.[97] Johanson's find of a nearly complete skeleton of a female (Lucy) which was hailed as the first hominid is now also in question, as one writer believes it to be a female member of a late form of *Ramapithecus*.[98] Most authors group it with the Australopithecines, specifically *A. africanus*.[99]

Ramapithecus from all the available evidence at present seems not to have been a hominid despite certain published reports to the contrary. In that case the evolutionary history of the *Hominidae* has a gap of more than twenty million years unfilled by any fossilized ancestral stock. Presently, studies are focusing on the pygmy chimp as an alternative ancestor.[100]

Australopithecus

Australopithecus was first discovered with the uncovering of the Taung child in South Africa by Raymond Dart in 1924. With increasing discovery the total list of *Australopithecus* remains is summarized as follows:

From Africa
Australopithecus africanus
Australopithecus prometheus
Australopithecus transvaalensis
Homo habilis (disputed)
Koobi Fora *Australopithecus*
Lothagam Hill *Australopithecus*
Omo Australopithecus remains (*Paraustralopithecus aethiopicus*)
Paranthropus crassidens
Parathropus robustus
Peninj mandible
Telanthropus capenesis (disputed)
Tchad Hominid (disputed)
Zinjanthropus boisei
From Asia
Meganthropus paleonjavanicus (disputed)[101]

When Professor Dart first announced his finds formally in February of 1925, his report was greeted with consternation by the anthropological community at large.[102] Professor Arthur Keith, the leading authority on fossil men at that time, concluded that the Taung specimen represented a pongid related to the chimpanzee and gorilla, although it possessed a few peculiar characteristics. Professor Eliot Smith, Dart's former teacher, remained unimpressed with Dart's claim of humanity for the specimen, while Dr. W.H.L. Duckworth of Cambridge University believed that the specimen resembled the gorilla rather than the chimpanzee. Finally, Smith Woodward of the British Museum doubted that the new fossil find had any bearing on human ancestry.[103] It remained for Dr. Robert Broom to endorse the new specimen as a genuine creature on the

way to modern man; and he was soon joined by W.E. LeGros Clark.[104] Today the general view is that *Australopithecus* not only belongs to the family of man but that he was also a tool-user. This has been disputed, however, by those who accept the presence of *Homo habilis* on the sites cotemporaneously with the Australopithecines.[105]

The brain case of *Australopithecus* is frequently cited as an indication of being an intermediate between man and extant great apes; however, all of the figures thus far published fall within the accepted range for the apes (range from 404 to 530 cc., average of 459 cc.). Moreover, as Holloway has emphasized, man's brain differs not only by an increase in size but also a change in structure, a difficult if not impossible change to detect in fossilized specimens.[106] Some anatomists have argued that the weight of the brain relative to that of the body may have been greater than in extant apes resulting in a higher cerebral status.[107] The brain/body ratio weights, however, vary tremendously in primates and even is higher in some monkeys than it is in man.[108] Further, the ratio is very much higher in juvenile apes, monkeys, and in children than in adults. The accepted line of reasoning, then, leads to the obvious absurdity that the cerebral area degenerates with age. Not only is this true of hominid encephalization, but it would also appear to be true of fish, reptiles, amphibians, birds, and mammals. Jerison has marshalled a wealth of such data to show that any discussion of vertebrate brain evolution must ignore 'brain-body space' arguments.[109]

Claims have been advanced that the Australopithecines possessed face and jaws that are more in line with human lineages than pongid lines, to which Zuckerman has stated categorically that: "The australopithecine skull is in fact so overwhelmingly simian as opposed to human that the contrary proposition could be equated to an assertion that black is white".[110] Anatomically, if such claims are correct then the foramen magnum should be forward in the region of the middle of the long axis of the skull rather than near the back part as in quadrupeds. LeGros Clark, basing his analysis on three correlated indices: the nuchal area height index, the supraorbital height index, and the condylar position index, stated on this basis that the Australopithecines must have been bipedal.[111] He studied only one skull of *Australopithecus*; and in his published report he gave no tables citing studies of human skulls for comparison. Ashton and Zuckerman, utilizing an extensive collection of specimens of men and australopithecines, confirmed Clark's conclusions about the nuchal area height index and the supraorbital height index, but found that regarding the condylar position the australopithecines were much closer to the ranges for apes than human skulls.[112] Interestingly, while the literature reports Zuckerman's first two conclusions, nothing is ever said about the discordant findings related to the condylar position index, an important issue that Zuckerman himself believes definitely means that the australopithecine skull was balanced like that of apes.[113] The most detailed research seems to indicate that the position of the foramen magnum is independent of the nature of a primate's locomotion and posture.[114]

Three specimens of Australopithecine skulls (*Paranthropus*) possessed a well-marked sagittal crest in the mid-line of the top of the skull, a feature which is never found in humans but occurs in great apes, many species of monkeys, and many of the long-snouted mammals. Generally it is also associated with a nuchal plane which is capped by a nuchal crest, both of which indicate the existence of fairly powerful neck muscles, a necessary apparatus to support the skull on the vertebral column of a quadruped. Studies of several hundred skulls in apes, monkeys, and man demonstrate that the Australopithecines on this basis must have carried their heads like apes and not like men.[115] Robinson has tried to get around this impasse through arguing that the nuchal crests of the Australopithecines were not formed as in other primates through the opposing pull of the posterior fibres of the temporal muscles and nuchal musclature and he differentiated crests into simple and compound.[116] This claim is seen by Zuckerman to have no basis in anatomical fact.[117]

The anatomical characteristics of the Australopithecine pelvis are frequently cited in favor of a designation of *Homo*.[118] Zuckerman and colleagues examined the most complete Australopithecine innominate bone that was available at the time and utilized as comparative material thirty foetal and new-born individuals' innominate bones, forty-three adult human bones, ninety-four innominate bones of the great apes, and a varying number of innominate bones of monkeys and baboons. They concluded that it seemed difficult on this basis to ascribe bipedalism to the Australopithecines.[119] The angle of twist between the main plane of the ilium and the ischiopubic part of the innominate in the Australopithecine cast corresponded to that in macaque, cercopitheque monkey, and baboon; and was well outside the range for apes and adult men (although close to the limits for a new-born baby). Surprisingly, he also found that the angle of twist in man was usually less than in apes which coupled with other observations lead to the conclusion that the gluteus maximus of the Australopithecines was a muscle which abducted the thigh as it appears to do in monkeys and apes rather than extensoring the thigh on the trunk as in man, an aid to erect posture. Further studies have been launched since this preliminary study and they confirm in even more detailed anatomical reasons the above conclusions.[120]

Oxnard, using canonical analysis and other means, has studied the scapulae of forty-one different genera of monkeys and apes and concluded that man is the only living primate that never uses his arms as a normal aid for locomotion.[121] Oxnard's more detailed recent results confirm his earlier conclusion and indicate that *Australopithecus* was an ape in terms of locomotion whatever else may be said.[122] An independent study of the scapula of *A. africanus* from Sterkfontein concluded that the reconstruction indicates pongid, not hominid, affinities.[123] These finds on the shoulder bones tie in well with a report on the humerus of robust Australopithecines which concludes that it was of a size to be expected if it was used for locomotion rather than habitual bipedalism, in the manner of extant apes.[124]

Studies of the Australopithecines' os capitatum have also greatly exaggerated their significance in an effort to support the position for hominid status. A detailed

morphological analysis of the Sterkfontein capitate upon which most assertions are based has failed to support the oft-stated position. Indeed, the researcher noted that the capitate: "conserves, with but little progressive modification, important biomechanical characteristics still found in *Pan*. There are indications that the capitate from Bed I, Olduvai Gorge, although badly damaged, was essentially similar in form".[125]

There is tremendous disagreement at present concerning the relations of the gracile *Australopithecus africanus* and the *robust* and *boisei* species of *Australopithecus*. Features that both specimens seem to commonly possess are small brain size, low, sloping forehead, post-orbital constriction, parabolic dental arcade, and jutting face. *Australopithecus africanus* possesses no sagittal crest and small molars and pre-molars while *Australopithecus robustus* possesses a heavier musculature, sagittal crest, and larger molars and pre-molars.[126] The inference has been made that the gracile species was omnivorous and the robust species was vegetarian. A Canadian investigator, however, from studies of tooth chipping, found that they did not differ substantially in the amount of grit in their diet, which fact would seem to negate the omnivorous-vegetarian distinction.[127] This appears to tie in with the belief currently gaining in favor among the investigators most closely associated with the materials that the two forms are male and female of the same species. This view is based primarily on Richard Leakey's uncovering of the remains of both forms in the same deposit.[128] It should be pointed out that two other competing views are also current in the literature; that of subspecific variation, allopatric in some regions and sympatric in others; and hominid speciation.[129] Jolly has proposed a model of australopithecine dietary habit based on an analogy with the gelada baboon of Ethiopia. Critics have pointed out, however, that such a view is not borne out by studies of extant primates, since *Gorilla gorilla* and *Theropithecus gelada* possess similar dental morphology but dissimilar diets.[130]

Additionally there now appears to be evidence from Johanson and White of a new species of the Australopithecine group- *Australopithecus afarensis*, based on analyses of specimens from Hadar in the Afar region of Ethiopia and Laetolil in Tanzania. These specimens include "Lucy", a forty percent complete skeleton of a three and a half foot tall, small-brained female. Preliminary assessment by Owen Lovejoy of Kent State University has led to the conclusion that Lucy was a facultative biped in spite of her small cranium. Unfortunately a published report of his reconstruction will not appear till late spring of 1981 so an evaluation of this new data would be premature. It is important to note also that Richard Leakey has objected to the new species believing that Lucy is completely separated from the remainder of the group, while Mary Leakey objects on the grounds of a one thousand mile geographic separation and the renaming procedure followed by White and Johanson.[131].

Dart maintained that osteodontokeratic tools and weapons were manufactured by the Australopithecines on the basis of fossil assemblage from Makapan; and this is the view at present accepted by most authorities.[132] Other experts who have undertaken field studies of hyena scavenging and resultant remains are unconvinced, holding to the view that the Makapan assemblage represents the uneaten remains of carnivore kills.[133] Additional evidence has come forward from the research of Brain who believes that the Australopithecines were consumed by some carnivore. Leopards could be indicated, since they seemingly accumulate bones and systematically damage bone. Thus it may well be that the Makapan assemblage is the result of both hyena and leopard kills.[134] Other "tools" found at Shungura Formation, Lower Omo Valley and at Olduvai seem to compromise either facies. Some (especially at Olduvai) may be associated with the stone habitation hut found at the bottom of Bed I (FLK NN1) whose deliberate manufacture seems to indicate the presence of modern man at the site contemporaneously with the Australopithecines and *Homo erectus*. This real hiatus for evolutionists frequently is eliminated altogether in discussions of the materials.[135]

Homo habilis, or "Handy Man", also must be mentioned in our considerations of the Australopithecines. There are four specimens presently designated, all of which were named by Louis Leakey at Olduvai Gorge due to their seeming initial association with tools. Most authorities prefer to class these habilines as a local variation of the gracile Australopithecines; and many of the "tools" are still under debate as the majority resemble naturally produced stones in the area. It has been suggested by some that these *habilis* remains can be correlated with features of KNMER-1470 from Koobi Fora on Lake Turkana, but the definitive anatomical report needed to refute or support such assertions is presently lacking.[136]

What then is the taxonomic status of *Australopithecus*? It is this writer's opinion that the taxonomic status of *Australopithecus* is best summed up in the words of Charles Oxnard:

> The various Australopithecines, viewed as a single group at the higher taxonomic level, are generally more similar to one another than any individual specimen is to any living primate. They are uniquely different from any living form to a degree comparable at least to the differences among living genera. The manner in which they are similar to living apes and man, is either such as is applicable to all living apes and man, or such that displays special morphological resemblances to a particular ape, the orangutan . . . We may well have to accept that it is rather unlikely that any of the Australopithecines . . . can have any direct phylogenetic link with the genus *Homo*.[137]

It seems that the Australopithecines furnish a perfect example of what happens when paleoanthropologists let their imaginations run away with themselves rather than carefully sifting, analysing and evaluating the data in its entirety. Alan Walker has listed some excellent points to be taken into account when attempting to diagnose differences between two genera which bears repeating:

1. The diagnosis should be based on all available parts that are known in common for both genera.
2. The diagnosis should be based on material that

can be shown to be (a) definitely associated or (b) reasonably attributed, and resort should not be made to parts that are doubtfully associated unless this is clearly stated. Where cranial remains of two genera are known and postcranial remains of one can be definitely associated, it is reasonable to attribute a second series of limb bones to the other genus, provided that what has been done is stated and provided that the bones can be distinguished.

3. The diagnosis should be made on the morphology alone and not upon inferences from the morphology. Presumed diet, locomotion, and such should not be used, since these are, after all, only inferences from the morphology and can easily be erroneous. The morphology upon which the inferences are based should be sufficient and has the virtue of being available for checking.

4. Cultural "associations" are not to be recommended, since the proof of such an assertion is not likely to be forthcoming.

5. The geological age of the specimen and the geographical location should play no part in the diagnosis. The known ranges of the genus in time and space can be given as information after the diagnosis.

6. Specimens showing gross pathological features or artificial distortion should not be taken into account without due caution.

7. If the information is available, not only should the maximum number of skeletal parts be used to differentiate genera, but infant and senile material should be treated separately.

8. If the species of the genera are sexually dimorphic and this can be demonstrated, the nature of the dimorphism should be stated.

9. Wherever possible, statistical evidence should be presented to substantiate or amplify statements; for, since taxonomy is a science that deals only with samples, it is by definition a statistical science.

10. Great care should be taken when making statements about taphonomically altered specimens, and especially about measuring them. If distorted specimens have been used, the limits of the distortion should be measured and all factors related to this taken into consideration.[138]

Utilizing the above criteria the author goes on to state his belief that while it is impossible to render a conclusive judgement, KNMER-1470 has many characteristics constantly found in *Australopithecus*, a view corroborated by comparing multivariate statistical data from Oxnard.[139]

Man—his Uniqueness

It is perhaps best at this point, before proceeding to a discussion of *Homo*, to mention several characteristics in which man is distinct from all other beings in the living world, since most books on human evolution spend most of their time talking of similarities. From present evidence those differences can be categorized into psychological, anatomical, physiological, behavioral, and ethical features.

Psychologically man functions on a level far higher than any mammal or living creature that we know of in the indices that we are capable of measuring. Professor Grey Walter, pioneer of uses for the EEG conducted experiments in the 1940's and 1950's in which he amplified the wave patterns of primates 10,000 times in an effort to approximate those of a human. His conclusion was that:

> . . . the mechanisms of the brain reveal a deep physiological division between man and ape, deeper than the superficial physical differences of most distant origin. If the title of soul must be given to the higher functions in question, it must be admitted that the other animals have only a glimmer of the light that so shines before men.[140]

A research study by Jacobsen in 1936 concerning functioning of the frontal association areas in monkeys led to the conclusion that contrary to man, monkeys following unilateral lesions showed no evidence of hemispheral dominance.[141]

If Noam Chomsky is correct in his analysis of deep structures which are manifested in surface structure in generative grammar then neurobiologically this would call for the view that aspects of this structure are wired-in to the brain with certain cortex connections programmed in such a way as to make the emergence of language inevitable and uniquely human.[142] This would appear to have a neurological and ontological link with comparative anatomical studies which have demonstrated that emotional expression in animal species is managed by a neural mechanism in the middle brain stem. This appears to be true also in man; yet the cortical areas for symbolic speech are topographically distant from this deep-lying mesencephalic system, existing only in the associational cortex of the human brain.[143] These capacities for symbolic language depend upon neural mechanisms which develop only in the dominant cerebral hemisphere rather than bilaterally. It is hard to conceive how such an arrangement could have evolved successfully from the cerebral organization of the chimpanzee or other primate.

Much has been made recently of attempts at teaching language to chimpanzees. To mention three well-known cases. Sarah and Lana's training have been based on the principles of operant conditioning while Washoe's training in its earlier stages had been stimulus-response: "This behavior is dependent however on humans to generate and is basically gestural, this does not imply that the chimpanzee has even limited linguistic ability equivalent to man".[144] John Lyons, Professor of Linguistics at the University of Sussex, England believes: "It is still an open question . . . and to some considerable extent a matter of definition, whether apes have been shown capable of learning a communication system that is rightly described as a language".[145] David McNeill, an expert in language development in children is no more optimistic.[145] A further barrier to language acquisition in chimpanzees or any nonhuman primate is anatomical, as Philip Lieberman explains:

> Our data indicate . . . that the nonhuman primates would not be capable of producing human speech even if they had the requisite mental ability. Unlike men, the nonhuman primates do not appear to change the shape of their supralaryngeal vocal tracts by moving their tongues during the production of a cry. The only vocal tract shape that the monkeys and apes use is one similar to a slightly /a/ - like schwa

> . . . Living nonhuman primates lack the anatomic apparatus that is necessary to produce the full range of sounds of human speech. Monkeys and apes inherently could not produce 'articulate' human speech even if they had the requisite mental ability.[147]

It is now realized, after extensive research, that the spontaneous processes of normal language mastery by normal children will not be clarified by ape-language work. Apes and monkeys have a circumscribed intelligence relative to man that will delimit their ability to engage even in symbolic communication with humans.[148] Even such an advocate of ape language as David Premack confesses that chimpanzees cannot produce pure grammatical classes as their ability to relativize and nominalize are lacking.[149] Recent evidence has appeared that pigeons can also be conditioned to utilize symbolic language much as chimpanzees using operant conditioning.[150] It now appears obvious that contrary to earlier exaggerated claims from some of the more vocal members of the evolutionary camp, man's ". . . entire cognitive function, of which his capacity for language is an integral part, is species—specific".[151]

Anatomically, man can be readily distinguished from other primates when complete specimens are available for study. Arthur Keith compared the anatomical characteristics of man with various species of apes and monkeys. Of 1,065 characteristics the chimpanzee shared 369 with man, the orangutan 359, the gorilla 385, the gibbon 117, and the monkey 113. He compiled a list of 312 characters that are exclusive to man.[152]

Anatomical differences concerning the skull can be detailed in sufficient measure to illustrate an unbridgeable gulf between human skulls both fossil and extant and that of the other primates. The example of the 'hunchback' or kyphosis in the basisphenoid area of the skull of man will suffice here:

> In nonhuman primates, the kyphosis is situated in the presphenoid (presellanry kyphosis) . . . the characteristic aspect of the kyphosis of the human skull base is that this angle is wider than that in nonhuman primates. In man the vertex is located above the sella; while it is before the sella in nonhuman primates. In the chimpanzee the location of the vertex most closely approaches the location in man, but it is always found lying just frontal to the sella. In the orang the vertex is found much more frontally with regard to the sella than in the chimpanzee.
>
> As is well known, primates also have a kyphosis of the brain formed by the bending of the hemispheres against the brain stem and the medulla oblongata . . . The vertex of the angle in man is always located above and behind the sella in the fossa interped incularis. In the chimpanzee and the orang, it is located above the sella, but slightly more rostial than in man. The vertex of the angle in lower primates is always rostial but in differing degrees than in the pongids . . . the angle of the brain kyphosis is always greater in man than in nonhuman primates.[153]

Attempts to sketch human evolution in terms of the evolution of the skull while fascinating flights into fantasy have no basis in detailed anatomical analysis. Welker, in a brilliant analysis of brain evolution, maintains that we will never be able to construct a scenario that will have any experimental and verifiable validity. This is due not only to the limited specimens at hand but also the very nature of man's understanding of himself:

> In almost all respects, I have attempted to show that the truth regarding brain evolution is still beyond the horizons of our vision and lies yet veiled by the limitations of our rational verbal concepts and exploratory tools. Unconscious inference and intuition are still preeminent modes of providing understanding of basic truths. However, these truths are often provisional and ephemeral figments limited by the stylistic logic of rational descriptions, operational definitions, and explanations.
>
> Perhaps an insurmountable problem is that the incredibly vast and diversified network of interrelated, perpetually changing neurobiological structures and functions are of such a nature as to be beyond the ken of the thinking, perceiving, analytical and explaining machinery of human brains. The logical operations by which human neural circuits are constrained to function surely do not provide adequate or faithful analogs of the spatiotemporal flux of phenomena that we so pretentiously wish to detect and divine. For example, only a few of the features of these natural phenomena may be sufficiently discrete or optimally suited to be transmitted accurately into our verbal and symbolic language. Consequently, the bulk of reality regarding the dynamic flow of life processes may forever remain hidden behind a veil of ignorance imposed by these intrinsic limitations. If new structures were to evolve to conceive more accurately what now lies still hidden, even then additional impalpable mysteries regarding the function of these newest structures would concurrently have been created.[154]

Comparative studies of fetuses of man and other primates indicate that man differs greatly from the apes in this stage of life. Significantly, the volume of the human brain-casing during fetal life appears to reach the upper limit for safe expulsion from the birth canal and man in the fetal stage is the only primate capable of reverse deformation of the braincase at birth due to the developmental delay of the neurocranium bones.[155]

Perhaps the most obvious anatomic difference between man and the other primates is his upright posture. Recent studies have concluded that analysis of muscle function is not sufficient to reveal all of the essential differences but that the whole behavioral repertoire must be analyzed in terms of function.[156] A gorilla's thigh extensor is power-oriented while man's is speed-oriented. Man also possesses a more effective lateral balance control while walking. Correlated with the above features of the gluteus medius and gluteus minimus are numerous other features of the pelvic girdle and especially the innominate bone that are strikingly unique to man as summarized here:

> (1) . . . the dorsal extension of the dorsum ilii, which brings the gluteus maximus and gluteus medius muscles into a different alignment with the hip joint; (2) the great dorsal extension of the iliac crest, which provides a more extensive attachment for the muscles used in supporting the trunk in the erect posture, and in particular for the powerful sacrospinalis muscle;

(3) a rotation of the sacral articulation associated with a reorientation of the sacrum as a whole relative to the vertical axis of the os innominatum in the upright positions; (4) a great reduction in the total relative height of the ilium; (5) the formation of an angulated and relatively deep greater sciatis notch associated with an accentuation of the ischial spine; (6) the development of a conspicuous and stoutly built anterior inferior iliac spine associated with the attachment of the ilio femoral ligament and the origin of the large rectus muscle; (7) an abbreviation of the body of the ischium with a corresponding approximation of the tuber ischii to the acetabulum; and as a corollary of the previous items; (8) a relative approximation of the sacral articular surface to the acetabullum.[157]

Jenkins has demonstrated that bipedal chimpanzees are not bipedally locomoting as in the human gait but retain the quadrupedal pattern of femoral flexion and extension within a posture that includes a reoriented pelvis. Such biomechanical elements of locomotion in apes and men illustrate once again man's uniqueness.[158]

In summary, man can be recognized from the skeletal material on the basis of the following major points:

1. An enlargement of the brain.
2. An increased thickness of the cranial vault.
3. A reduction in postorbital construction and the size of the temporal fossae.
4. A reduction in facial prognathism.
5. A projecting nose associated with the true anteroinferior nasal spine and protruding nasal bones.
6. An inflated frontal sinus and the development of the supra-orbital torus where nasion is located below the torus.
7. A reduced supramastoid crest.
8. A vertically oriented temporal squama.
9. A mastoid notch which is separated from the occipitomastoid suture and occipital groove by the occipitomastoid crest.
10. Vertically oriented incisors and alveolus with a palate of nearly uniform depth both anteriorly and posteriorly.
11. M_2^2 which are larger than M_3^3 (molars).
12. A mental eminence.
13. An intermebral index where the upper-limb is considerable shorter than the lower limb.[159]

Man is also the only tool-maker despite claims advanced to the contrary by certain members of the evolutionary camp. Warren has defined a tool as "any object extraneous to the bodily equipment of an animal that serves as a functional extension of the organism, permitting it to enlarge the range of its movements or to increase their efficiency in manipulating the environment".[160] On the basis of such a definition it can be stated that only one nonprimate mammal is known to regularly use a tool; the California sea otter who hammers sea urchins against a stone resting on its chest. There are isolated instances of horses, elephants, and goats using sticks as scratching tools but no evidence to indicate continual usage. Therefore only primates among the mammals seem to use tools on a regular basis and manufacture various types for the situation at hand. Evidence has been put forward that chimpanzees utilize novel motor patterns in solving tool problems and occasionally learn to use tools by imitation rather than by trial and error. However, this remains to be demonstrated in wild animals not on reserves. Thus one may conclude that perhaps some of the observed behavior has been copied from human beings.[161] Mary Leakey believes that the above definition of tool use is too general; and that a far more utilitarian definition, and one which immediately distinguishes man from the other primates is that man uses one tool as an instrument to make another rather than simply modifying objects with hands and teeth.[162]

Behaviorally, man also emerges in a class by himself among the primates. Food acquisition is a corporate responsibility, exchange and sharing predominating, a behavior nowhere approached by any other primate. There is also an evident home base in human social groupings which is totally lacking in the great apes. Additionally there are many differences in human hunter-gatherers and apes which are too detailed to go into here.[163]

Man is the only living creature that has the capacity to worship a transcendent being. Freud attempted to relegate religion to that section of the basement wherein were contained the neuroses of man; yet in doing so he ignored both history and psychology since as Rappaport reminds us:

> Neither history nor anthropology knows of societies from which religion has been totally absent, and even those modern states that have attempted to abolish religion have replaced it with beliefs and practices which themselves seem religious. A century ago E.B. Tylor (1971), whom some consider 'the father of modern anthropology', attempted to account for the universality of religion by reference to the psychic unity of mankind. It is the experience of dreaming, common to all men, that has suggested to all men the existence of the soul, he argued, and it is from a primordial belief in the soul that religion in its manifold forms has evolved. But as Durkheim (1961) asked at the beginning of this century: 'How could a vain fantasy have been able to fashion the human consciousness so strongly and so durably?' He argued that it cannot be accepted that 'systems of ideas like religions, which have held so considerable a place in history, and from which, in all times, men have come to receive the energy which they must have to live, should be made up of a tissue of illusions.[164]

Many other distinctive qualities set man apart from the other primates but this section will close with a summary statement from Denis Alexander, formerly of the Institute of Psychiatry in London:

> "I am a man" is one of the most profound things that I can say. It involves the power to conceptualize—to hold an idea long enough in my mind to think about it. It involves conscious self-awareness—the ability to look 'outside myself' and realize what I am. It involves the use of language which has been moulded and influenced by thousands of years of human activity. The fact of linguistic consciousness means that I can be both a subject and an object. I can think about my brain mechanistically, and yet when it

comes to my own choice know that it is not predetermined. As we have seen, nobody could make a prediction which would be binding on me. I am a free agent. Furthermore, my linguistic consciousness means that I can be genuinely creative. I can dream up ideas, create works of art and think thoughts which are genuinely new, which have never been created or thought of exactly that way before. I also have an incredible capacity for learning and memory, which is nowhere near matched by any animal. And I have the ability to adapt through the learning process and to communicate new ideas and learning experiences to my progeny, an ability also possessed by no animal. This means that I can read of man's learned experience written thousands of years ago and they can still have extreme relevance to my own situation today . . . However clever a chimpanzee may be in learning tricks or getting food that is placed beyond its reach, it cannot retain an image long enough in its brain to think about it. An animal could never therefore, imagine, calculate, predict, or make a moral choice, because it could not conceptualize the ideas needed to carry out these activities.[165]

Homo Erectus

The infamous story of *Homo erectus* begins with a Dutch physician, E. Dubois who joined the Dutch army on assignment in Java hoping to uncover the remains of early man. In 1891 along the banks of the Solo River he discovered near the village of Trinil a low-vaulted skull-cap with prominate supraorbital tori. About a year later and some fifty feet from where he had found the skull-cap, Dubois found a femur and assumed that the two were associated. He coined the term *Pithecanthropus erectus*, also associating two molar teeth with the original specimen. Also he discovered a premolar tooth which he also included with the initial finds. Exhibiting these curiously isolated specimens now grouped together at the International Congress of Zoology in Leyden in 1895 Dubois found himself either lauded or castigated by various national anthropological groups. The English favored a human designation, the Germans believed it was an extinct ape, and the French were somewhere in the middle.

Classically *Homo erectus* has been defined by the following matrix of traits: average population brain volumes are substantially lower than those of *Homo sapiens* and much larger than those of *Australopithecus*; neurocrania are long and low, with angulated occipials and relatively flattened frontals; moderate to large supraorbital tori, and thickened vault bones; molars and premolars are smaller than in Australopithecines, both absolutely and relative to body weight; anterior teeth are absolutely as large and relative to cheek teeth, larger than those of the earlier genus.[166]

The Kabuh beds at Trinil which yielded the original *Homo erectus* calvaria, femora, and teeth is fraught with difficulties in dating. The late Marcel Boule, former Director of the French Institute of Human Paleontology after a thorough examination of the skull-cap found by Dubois, concluded that it was most similar to that of chimpanzees and gibbons, and reported that von Koenigswald ascribed two of the molar teeth to an orangutan and one premolar to true man.[167] In summarizing the finds Boule stated:

> If we possessed only the skull and the teeth, we should say that we were dealing with beings, if not identical with, at least closely allied to the Anthropoids. If we had only the femora, we should declare we were dealing with Man . . . We have seen that serious reservations had to be made with regard to the teeth; and whatever the presumptions in favour of the femur belonging to the cranium, some doubt remains, and will still remain, until new and more fortunate excavations put us in possession of less imperfect relics found in close association . . . All attempts at restoration were undertaken on the assumption that the Trinil remains belonged to one and the same creature. Dubois, Manouvrier, McGregor, Osborn and Weinert published reconstructions of the cranium and even of the whole skull. These attempts, which were based principally on human anatomy, were far too hypothetical, since no data were available for the reconstruction of the base of the skull, the whole face, and all the apparatus of the lower jaw. Painted models of a complete *Pithecanthropus* such as have actually been made, are pure flights into fancy.[168]

More recent investigations support his conclusions, as there seems to be insuperable objections anatomically to the belief that the various specimens are interrelated.[169]

Peking Man is believed by many to be *Homo erectus*, but until the actual remains can be rediscovered (if such an event is likely) there can really be no definitive talk of the taxonomic status of an individual(s) whose remains are not available. A detailed anatomical analysis is essential before an adequate judgement can be rendered, although it may be possible that some of the original bones are indeed available.[170]

The remaining specimens that are presently grouped in the *Homo erectus* group are of varying ages geologically and vary widely in their cranial capacities all the way from 775 cc up to 1225 cc.[171] Because of the various problems associated with these specimens it is difficult for a non-specialist to deal with them at any length. It does seem certain that some of the specimens like Heidelberg and Swanscombe are exceptionally modern in appearance, as far as can be judged from those fragments that are available for study.[172] It would seem, from an outsider's point of view, that the taxonomic distinction *Homo erectus* could best be done away with. Either some of the specimens could be grouped into *Homo sapiens erecti*; or the present designation be retained for these specimens only and the rest removed to either a form of Australopithecine or a temporary designation of *Pithecanthropus* till further specimens come to light.[173]

Homo Sapiens

Man from this study emerges with no common ancestor in any of the primate groups. This view is quite distinct from the evolutionary model, although both sides base their conclusions on the same basic data. Remains of *Homo sapiens* date from 250,000 B.P. to c. 15,000 B.P. (by the uniformitarian dating) as sum-

(1) Specimens of the 'intermediate' sapiens group

(a) before c. 100,000 B.P.

Steinheim	Swanscombe
Taubach	Fontechevade
Ehringsdorf	Vertesszollos

(b) between 70,000 and 40,000 B.P.

Genovce 66,000	Saccopastore 60,000
Tabun 40,900	Skuhl 39,700
Krapina	

(2) Specimens of the 'classical neanderthal' group

Europe	Middle East
La Chapelle 35-45,000	Shanidar 50-60,000
Charente 35,000	Galilee 70,000
La Ferrassie 35,000	Jebel Gafza 70,000
La Quina 35-55,000	
Gibraltar I 35-70,000	
Gibraltar II 50,000	
Circeo 35-70,000	**North Africa**
Neanderthal 35-70,000	Haua Fteah 40,700
Le Moustier 35-70,000	

(3) Specimens of the 'Rhodesian' group

Hopefield 40,000
Broken Hill 30,000

(4) Specimens of the 'Solo' sapiens group

Ngandong

(5) Specimens of the 'modern' sapiens group

Europe	Outside Europe
Combe Capelle 34,000	Niah (Borneo) 38,000
Vestonice 26,000	Florisbad (S. Africa)
Piedmont 26,000	Afalou (Algeria) 11,000
Cromagnon 20-30,000	Matjes R. (S. Africa) 11,000
Oberkassel 12-17,000	Natchez (America) 11,000
La Madeleine 12-17,000	Upper Choukoutien? 10,000
and other French	Wadjak (Java)? 10,000
Magdalenians	Singa (Sudan) c. 23,000[174]

Table 1. Fossils identified as Homo sapiens, with the dates ascribed to them. (All "B.P.")

marized in Table 1. There are basically three schools of thought in the evolutionary camp as to the origin of modern day man. The first view is the Hat-rack or Neanderthal theory of unilinear evolution and its chief advocates have been Hrdlicka and C. Loring Brace.[175] The view postulates that there is a simple, direct evolutionary relationship between Australopithecines, *Homo erectus*, Neanderthals, and Cro-Magnon with scarcely any side-branching. The Preneanderthal school splits the origin of man at the time of Steinheim and Swanscombe and believes that Neanderthal in western Europe was an evolutionary dead end. The alternative school, the Presapiens, suggest that *Homo sapiens* originated as a distinct lineage completely separated from the Neanderthal line. They differ in time of separation also with the pre-Neanderthal theory, placing the time of divergence much later than the Presapiens who put the divergence before the Mindel-Riss interglacial and some even before the Mindel glaciation. An older view has held that the Neanderthals were wiped out by an invasion of Cromagnon men from the near East and the Mediterranean moving into north-western Europe; but this view finds little favor today except among the French. It is believed rather that the Neanderthals would have been stiff opposition to an invader, and that they probably were assimilated in a gradualistic way, interbreeding till the gene pool had stabilized.[176]

All of the peoples in question during this period in human pre-history were definitely possessors of a high degree of culture as evidenced by their art, burial practices, and associated cultural assemblages. The old view of Neanderthal as a stooped semi-brutish creature has given way to a more realistic appraisal of his marked capabilities in comparison with *Homo erectus* or the Australopithecines.[177] The origin of human racial types is shrouded in mystery since the gene frequency data needed to answer such a question are lacking and will probably never be forthcoming.[178]

Evolutionary Frauds and Freaks

An interesting sideline to the whole question of the origin of man has been the number of frauds perpetrated in studies of human evolution, including such well-known examples as Piltdown man and *Hesperopithecus harold cookii* (Dawn man). Also interesting are certain finds which have been reported in the literature, yet because they do not fit currently conceived theories of human evolution they are simply ignored and summarily rejected without a fair hearing. The most obvious examples are the Castenedolo, Olmo, and Calaveras skulls, all of which were found in strata dated geologically as Pliocene (ranging in depth from 140 feet to 6½ feet). Sir Arthur Keith was the last anthropologist to do any justice to these skulls; and he concluded that these fossil skulls would have been accepted as genuine had they not so radically contradicted the current evolutionary theories of his day.[179] The original field work done by Professor Guiseppe Sergi of the Instituto di Anthropologia at the University of Rome has never been refuted in a scientific manner. It would seem that most present day anthropologists are unaware of these discoveries since the only recent treatment of these specimens is that of a creationist astronomer.[180]

The last three sections of this paper have been brief because I have not had time to delve into the complexities of these subjects sufficiently for a lengthy treatment. The creationist position does, however, seem more amenable to the archaeological, anthropological, and paleontological evidence than the evolutionary position. A detailed discussion of some of the anthropological topics from a creationist point of view can be found in an excellent work by a noted Canadian anthropologist, Arthur Custance.[181] It should be noted in passing that creationists do not believe in the current schemes advanced to explain the domestication of animals nor in the gradual ascension of man culturally through the phases of hunter-gatherer to agrarian to technological, since there are both Biblical and archaeological data to the contrary. Due to the nature of the material covered in this article, it is obvious that much of the relevant literature on acknowledged humans, but prehistoric ones had to be ignored. However, I hope to continue this research in the future with a view towards proposing a more definitive creationist position concerning human prehistory.

In conclusion, man possesses no phylogenetic affinity to any other primate. This statement is based on analysis of all known fossilized specimens from all areas of the world. Anatomical data cited here present an unbridgeable gap facing the serious evolutionist attempting to construct a feasible model of hominid evolution. Behavioral studies of extant apes and monkeys, both in the wild and in laboratory situations, furnish no conclusive evidence for evolutionary speculations regarding the origin of man. By far the phrase that makes the most sense out of the 'science' of physical anthropology was uttered long ago: "And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth".[182]

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(Continued on page 134)