CHAPTER ONE

1 Human Origins

1.1 WILLIAM JAMES SIDIS

William James Sidis (1898–1944) was perhaps the smartest person who ever lived. Estimates of his IQ range between 250 and 300. At eighteen months he could read the *New York Times*. At two he taught himself Latin. At three he learned Greek. At four he was typing letters in French and English. At five he wrote a treatise on anatomy and stunned people with his mathematical ability. At eight he graduated from Brookline High School in Massachusetts. He was about to enter Harvard, but the entrance board suggested he take a few years off to develop socially. He complied, and entered Harvard at eleven. At sixteen he graduated cum laude, and then became the youngest professor in history. He inferred the possibility of black holes twenty years before Subrahmanyan Chandrasekhar did. As an adult, he could speak more than forty languages and dialects.

Yet the stress of possessing such an amazing intellect took its toll on Sidis. Instead of being appreciated and admired for his intellectual gifts, he was regarded as a freak—an intellectual performer to be stared at rather than a fellow human being to be esteemed. As a teenager at Harvard, he suffered a nervous breakdown. As a professor at Rice University, he was unable to bear the constant media attention. In his early twenties, he resigned his professorship and withdrew from all serious intellectual pursuits. In 1924, a reporter found him working at a low-paying job in a Wall Street office. Sidis told the reporter that all he wanted was anonymity in a job that placed no demands on him. He spent the rest of his life working menial jobs.[1] What does the story of William James Sidis have to do with human origins?

Evolutionists believe that humans evolved from ape-like ancestors and therefore share many features with modern apes. Many evolutionists go further and claim that human capacities merely extend capacities already present in evolutionary ancestors. Darwin himself took this view in *The Descent of Man:*

> The difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind. We have seen that the senses and intuitions, the various emotions and faculties, such as love, memory, attention, curiosity, imitation, reason, etc., of which man boasts, may be found in an incipient, or even sometimes in a well-developed condition, in the lower animals.[2]

Harold Morowitz

Some evolutionists, on the other hand, claim that humans exhibit capacities that are genuinely novel and cannot be explained in terms of the capacities of evolutionary ancestors. These include "emergentists" like Harold Morowitz.[3] They acknowledge that although important similarities between humans and apes exist, there are also far-reaching differences, especially differences in intellectual and moral capacities. For them, extravagant abilities like those of William James Sidis indicate that the difference between humans and other animals is radical, and represents a difference in kind and not, as Darwin held, merely a difference in degree.[4]

Did humans evolve from ape-like ancestors? Did those ape-like ancestors evolve from small furry mammals? Did those small furry mammals evolve from reptiles, which in turn evolved from fish? If we go back in time far enough, is there an evolutionary ancestor of all the organisms that we see? Is that common ancestor a single-celled organism? Did biological evolution from this last universal common ancestor proceed without any intelligent guidance but simply as the result of blind material forces? And did the first life arise through a process of chemical evolution in which non-living matter organized itself spontaneously, again without intelligent guidance?

According to the grand story of evolution, the answer to all these questions is Yes. Notwithstanding, as scientists and critical thinkers, how do we determine whether this story is true? To answer this question, we must examine the processes in nature by which biological complexity and diversity could emerge. Some processes in nature are blind, operating without goals, ends, or purposes. Other processes in nature are intelligent, operating with goals, ends, and purposes. How do we tell the difference, and how do we do so in the case of biological systems? In particular, what sorts of processes must operate in nature to bring about someone like a William James Sidis? Are purely material forces enough or is intelligence also required? These are the questions we will examine in this book.

THREE KEY DEFINITIONS

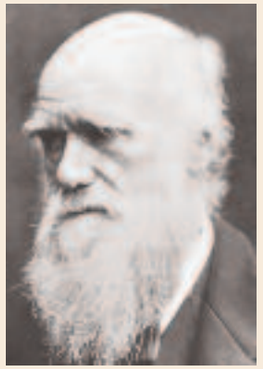
Intelligent Design. *The study of patterns in nature that are best explained as the product of intelligence.*

Intelligence. *Any cause, agent, or process that achieves an end or goal by employing suitable means or instruments.*

Design. *An event, object, or structure that an intelligence brought about by matching means to ends.*

Is Intelligent Design Scientific?

In reflecting on the significance of Darwin's theory, evolutionary biologist Francisco Ayala remarked, "The functional design of organisms and their features would therefore seem to argue for the existence of a designer. It was Darwin's greatest accomplishment to show that the directive organization of living beings can be explained as the result of a natural process, natural selection, without any need to resort to a Creator or other external agent." To this Ayala immediately added, "The origin and adaptation of organisms in their profusion and wondrous variations were thus brought into the realm of science."[5]

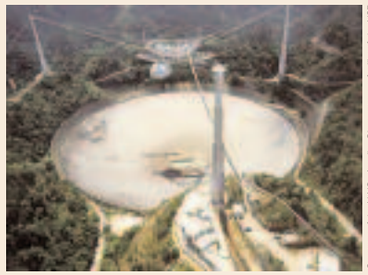


Charles Darwin

Dr. Francis Ayala University of California, Irvine

With this last comment, Ayala clearly suggests that prior to Darwin the study of biological origins was not properly a part of science. And since the study of biological origins prior to Darwin focused heavily on intelligent design, Ayala is in effect claiming that to explain biological complexity and diversity with reference to design cannot properly be regarded as scientific. Philosopher of biology David Hull makes this point explicitly: "He [Darwin] dismissed it [design] not because it was an incorrect scientific explanation, but because it was not a proper scientific explanation at all."[6] *Continued on next page*

But this cannot be right. Many special sciences employ the concept of design. Indeed, many of those sciences would be inconceivable without it. Archeology assumes that humans of past ages have left evidence of their lives and cultures, and that that evidence is distinguishable from the effects of blind material forces. Forensic science assumes that humans, when committing crimes, try to cover their tracks; yet, when they try to cover their tracks, they often fail, and the tracks lead back to them and not, as they would like, to "natural causes." Other special sciences that require the concept of design include artificial intelligence, cryptography, and random number generation.



Courtesy of the NAIC - Arecibo Observatory, a facility of the NSF

The Arecibo radio astronomy dish is located near the northern coast of Puerto Rico. Its 300-meter diameter makes the giant SETI instrument the world's largest.

Nor does design always have to refer to human design. Some psychologists study animal learning and behavior. Animals display intelligence and can design things. For instance, the dams that beavers build are designed. Nor does design have to be confined to Earth. The Search for Extraterrestrial Intelligence (SETI) looks for signs of intelligence in radio signals from outer space. SETI's underlying assumption is that we can sift out naturally occurring radio signals to make out those that are designed.

Leslie Orgel

Francis Crick

Biologists Francis Crick and Leslie Orgel have even proposed that life is too complex to have arisen here on planet Earth and so must have been seeded by intelligent space aliens (traveling to our solar system in spaceships).[7] Though regarded as wildly implausible by some, their theory of *directed panspermia,* as it is called, is nonetheless regarded by the scientific community as falling within the bounds of science. The Crick-Orgel theory proposes a design-based view of life on Earth.

Science itself needs to employ the concept of design to keep itself honest. Plagiarism and data falsification are, unfortunately, far more prevalent in science than anyone would care to admit.[8] *The Chronicle of Higher Education* reports a striking case in point:

> Raymond G. De Vries, an associate professor of medical education at the University of Michigan at Ann Arbor, and three colleagues last year reported surveying more than 3,000 scientists about whether they had ever engaged in misbehavior, such as changing a study because of pressure from a source of funds, or failing to present data that contradict one's own research. One-third of the scientists acknowledged they had committed some form of research misbehavior.[9]

A crucial factor in keeping such abuses in check is our ability to detect them. In all these cases, what is being detected is design.

If design is so readily detectable within various special sciences, and if its detectability is one of the key factors keeping scientists honest, why should design be barred on a priori grounds from biology? What if biological systems exhibit patterns that clearly reveal design? The point of this book is to show that such patterns do exist in biological systems and that there are no good reasons for barring design from biology.

1.2 OUR FOSSIL ANCESTORS?

Let us start by considering why evolutionists think that humans evolved from ape-like ancestors. Evolutionary accounts of the history of the human race take for granted two things: that humans and apes evolved from an earlier common (ape-like) ancestor, and that their evolution did not require any guidance by intelligence. Does the fossil record support this view? Does it support other interpretations?

Humans are classified as belonging to the genus *Homo* and the species *sapiens*. The genus *Homo* in turn falls within the family *Hominidae*, which includes the apes, and, in particular, the chimpanzees (genus Pan). Among extant apes, chimpanzees are thought to be the closest evolutionary cousin of humans. Thus, if humans evolved from ape-like ancestors, their evolution would be entirely at the genus level. Compare this to the evolution of reptiles into mammals, which represents a class-level transition (see chapter 4). Since evolutionists think it plausible that reptiles evolved into mammals (which represents a much higher-level transition), it is hardly surprising that they think it even more plausible that ape-like creatures evolved into humans.

Nevertheless, when one examines the actual data and arguments, the case for human evolution becomes less obvious. The fossil record contains several extinct species within the genus *Homo:* most recently *Homo neanderthalensis* (the Neanderthals, formerly considered a subspecies of *Homo sapiens,* but now increasingly considered a separate species); then *Homo erectus;* and, going even further back, *Homo habilis.* Each of these species had many distinctly human characteristics (for instance, the ability to make tools whose sophistication far exceeds any tools employed by apes).

And yet, there is no clear genealogical evidence demonstrating the evolution from *Homo habilis* into *Homo erectus* into *Homo neanderthalensis* into ourselves, *Homo sapiens.* To be sure, there are similarities. *Homo neanderthalensis* is, by any criterion (anatomical, physiological, cultural) closer to *Homo sapiens* than is *Homo erectus,* and similarly *Homo erectus* is closer to us than is *Homo habilis.* At best, this shows that if humans evolved, then the common ancestor of *Homo sapiens* and *Homo neanderthalensis* is more recent than the common ancestor of *Homo sapiens* and *Homo erectus.* And this common ancestor, in turn, is more recent than the common ancestor of *Homo sapiens* and *Homo habilis.* But such an inference presupposes rather than establishes that humans evolved.

The same problem recurs when we try to argue for human evolution at the genus level. The generally accepted date for the formation of our genus, *Homo*, is about 2.5 million years ago (*Homo habilis* and *Homo rudolfensis* are considered the first true members of our genus). The line leading to our genus, *Homo*, is said to have diverged from the line leading to our closest ape cousins, the chimpanzees, at least 5 million years ago. In the interim are the *Australopithecines*, an extinct genus within the *Hominidae*. They include *Australopithecus anamensis* (circa 4 million years ago), *Australopithecus afarensis* (circa 3.5 million years ago), and *Australopithecus africanus* (circa 2.5 million years ago).

As before, one can argue on the basis of structural similarity in the fossil record that our common ancestor with *Australopithecus africanus* is more recent than our common ancestor with *Australopithecus afarensis,* and that this common ancestor, in turn, is more recent than our common ancestor with *Australopithecus anamensis.* But again, this reasoning is based on the assumption that the *australopithecines* and we humans in fact share a common ape-like ancestor. As we shall see in chapter 5, structural similarity, as exhibited in the fossil record, is not enough by itself to establish such evolutionary connections. What's needed, instead, is independent evidence for the temporal ordering being proposed and for the genealogical connections.

1.3 THE NINETY-EIGHT PERCENT CHIMPANZEE?

Scientists look increasingly to genetic data for independent evidence that humans evolved from ape-like ancestors. The underlying assumption is that life forms that have very similar genetic structures are closely related. In recent years, genome mapping has enabled detailed comparisons to be made between the DNA of humans and chimpanzees. Indeed, the most widely cited evidence for human evolution outside the fossil record is genetic.

The base sequences in human and chimpanzee DNA are 98 percent similar. This fact is taken as decisive confirmation of ape to human evolution. But what does this genetic similarity really mean? Consider, first, that because there are only four nucleotide bases, whenever one lines up distinct strands of DNA, even entirely random strands will, on average, be 25 percent similar. Any claim of similarity faces this discount at the outset.

Consider, further, that humans and chimpanzees don't have exactly the same number of DNA base-pairs. In the 1980s, when the 98 percent similarity figure was first proposed, researchers also thought that the genome of chimpanzees was 10 percent larger than that of humans.[10] But in that case, if one lined up all of human DNA with all of chimpanzee DNA, 10 percent of the chimpanzee DNA would have no human counterpart. Looked at in this way, initial reports of the similarity between human and chimpanzee DNA should have noted at least a 10 percent difference, but they did not. This difference in genome size has largely vanished: current estimates for the length of human and chimpanzee genomes are much closer, with 3.1 billion base-pairs for chimpanzees and 3.2 billion base-pairs for humans.[11]

Where, then, does the "98 percent" figure come from? In 1984, Charles Sibley and Jon Ahlquist performed a DNA–DNA hybridization experiment in which the DNA of each species was heated in order to separate the individual strands, and the strands from the two species were mixed and allowed to recombine.[12] Human DNA combined with chimpanzee DNA, and vice versa. The degree of matching between the strands was measured by heating the human–chimp DNA combination and measuring the temperature at which the combined strands separated. Thus, on thermodynamic grounds, Sibley and Ahlquist found a 1.63 percent difference between the two species, and thus a 98.4 percent identity.

Genetic similarities between humans and chimpanzees parallel other similarities between the two. For instance, humans and chimpanzees share gross morphological similarities. In the eighteenth century, before the universal common ancestry of living

forms was widely accepted, Linnaeus classified the chimpanzee as *Homo troglodytes* ("primitive man"). According to Jonathan Marks, "When the chimpanzee was a novelty in the 18th century, scholars were struck by the overwhelming similarity of human and ape bodies. And why not? Bone for bone, muscle for muscle, organ for organ, the bodies of humans and apes differ only in subtle ways."[13] With so many obvious physical similarities, genetic similarities between humans and chimpanzees are hardly surprising.

Even so, to say that human and chimpanzee DNA are 98 percent similar can be seriously misleading. That's because we tend to think of DNA in terms of written language. DNA strands form sequences from a four-letter alphabet (usually represented by A, T, C, and G). Likewise, books written by humans in English form sequences from a 26-letter alphabet. Yet, there is a crucial difference between the way humans read written texts and the way cells make sense of DNA. If two books written by humans are 98.4 percent similar, they are essentially the same book. That's because such texts are written to be deciphered not by computers or machines but by competent readers who can recognize random errors and skip past them.

On the other hand, if two sequences of DNA are 98 percent similar, their functions may be vastly different. That's because the cell does not possess a capacity for deciphering DNA comparable to that of humans for deciphering texts. Written language incorporates redundancy and contextual cues that enable us to determine the words and meaning of a text even when it has been substantially altered. On the other hand, random errors in DNA (as with random errors in computer code), even if isolated and few, often introduce radical changes in function that can be disastrous if not fatal.

Because of the complex ways that cells use genetic information, very small genetic changes can critically alter biological function. Proteins, which are specified by genes, interact to form higher-order networks that are not evident from nucleotide or amino-acid sequences alone, and thus cannot be discovered from sequence analyses. Consequently, two organisms might have nearly identical sets of genes, and even situate those genes in roughly the same order along a chromosome; and yet utilize those genes so differently as to produce markedly different organisms.

The lesson here is that small changes can have very significant effects on biological systems *if those changes are just the right changes.* In particular, because the gene expression system operates holistically, large-scale reworking of it would require more than the trial-and-error tinkering characteristic of standard evolutionary theory. Rather, its reworking would require multiple coordinated changes. Such changes indicate the activity of a designing intelligence.

PHYSICAL DIFFERENCES BETWEEN HUMANS AND CHIMPANZEES[14]

How similar are humans and chimpanzees when we look not at the level of genes but at the level of gross morphology? Consider the following differences:

1. *The feet of chimpanzees are prehensile, in other words, their feet can grab anything their hands can. Not so for humans.*
2. *Humans have a chin and protruding nose whereas apes do not.*
3. *Human females experience menopause; no other primates do (the only known mammal besides humans to experience menopause is the pilot whale).*
4. *Humans are the only primate in which the breasts of the female are apparent when not nursing.*
5. *Humans have a fatty inner layer of skin as do aquatic mammals like whales and hippopotamuses; apes do not.*
6. *Male apes have a bone in the penis called a baculum (10 millimeters in chimpanzees); humans do not.*
7. *Humans are mostly right-handed. Chimpanzees show no handedness preference.*
8. *Humans sweat; apes do not.*
9. *Humans can consciously hold their breath; apes cannot.*
10. *Humans are the only primates that weep.*

These are just a few of the more obvious physical differences between humans and chimpanzees. But the key difference, of course, resides in the intellectual, linguistic, and moral capacities of humans.

1.4 THE BENEFITS OF BIGGER BRAINS

In explaining human evolution, evolutionists emphasize the evolution of the human brain. They maintain that the greater size and more complex organization of the evolving hominid brain explains key differences in behavior and accomplishment between humans and other animals (notably, the apes). In particular, they see a strict correlation between cognitive capacities and brain size. Thus, cognitive capacities such as those demonstrated by William James Sidis are said to require organisms with sizable brains.

Evolutionists have two competing explanations for how the human brain evolved to its present size and complexity: One is that it evolved through natural selection because bigger brains made hominids smarter and therefore more likely to survive and reproduce. The other, championed by Stephen Jay Gould, argues that bigger hominid brains were at first an accidental byproduct of the evolutionary process, which, only after bigger brains had been present for some time, would make hominids smarter. The first view sees bigger brains as an adaptation—something that confers an immediate benefit. The second view sees bigger brains as a preadaptation—something that is not of immediate benefit but can be turned to advantage later.

No one doubts that the human brain has remarkable capacities. Even so, evolutionists have no detailed scientific explanations of how it evolved. Take a recent report in *Nature* by Michael Hopkin titled "Jaw-Dropping Theory of Human Evolution: Did Mankind Trade Chewing Power for a Bigger Brain?" According to Hopkin,

> Researchers have proposed an answer to the vexing question of how the human brain grew so big. We may owe our superior intelligence to weak jaw muscles, they suggest. A mutation 2.4 million years ago could have left us unable to produce one of the main proteins in primate jaw muscles.… Lacking the constraints of a bulky chewing apparatus, the human skull may have been free to grow, the researchers say.[15]

Think of what is being argued here. Evolutionists are not simply arguing that a very modest mutation affecting jaw muscles gives brains room to grow. Rather, they are arguing that—given room to grow—brains will in fact grow, getting bigger and bigger till—*presto!*—intelligence, language, culture, and amazing people like William James Sidis emerge. This isn't so much an argument as it is wishful speculation. How would we know whether it was true?

Evolutionists rarely rise above such speculation when accounting for human cognitive capacities in terms of brains size. Usually they don't even get that far. Usually they can't even identify a concrete biological feature that might be implicated in the distinctly human aspects of cognition. That's why the jaw-dropping theory of bigger brains aroused so much excitement among evolutionary biologists—here, at least, was an actual genetic mutation that might be implicated in bigger brains and, thus, in human cognition.

A brief survey of the facts concerning the brain's development and complexity suggests that something more than mere brain size is required to explain human intelligence. During the first eighteen months from conception, the brain's neurons are formed, deployed, and connected in a tsunami of activity, at the rate of 250,000 per minute, until 100 billion neurons are arrayed in a powerful, organized matrix. Each neuron may have tens of thousands of finger-like appendages, or dendrites, which connect with other neurons and dendrites in a bafflingly complex circuitry. No two neurons are exactly the same, with the result that the circuitry of each brain is unique. That circuitry is more complex than all of the telephone circuitry on the face of the earth.

Three decades ago science-writer Isaac Asimov was so impressed with the densely organized complexity of the human brain that he wrote: "In Man is a three-pound brain, which, as far as we know, is the most complex and orderly arrangement of matter in the universe."[16] In the intervening years since Asimov offered this insight, the complexity of the human brain has, in light of further scientific investigation, become even more impressive.

Nevertheless, Asimov also held that "there is nothing magic about the creative ability of the human brain, its intuitions, its genius. It is made up of a finite number of cells of finite complexity, arranged in a pattern of finite complexity." Indeed, he saw the human brain as the product of a purely materialistic evolutionary process. Thus, he continued, "When a computer is built of an equal number of equally complex cells in an equally complex arrangement, we will have something that can do just as much as the human brain can do to its uttermost genius."[17]

Asimov said this in 1975. Such a computer has never been built and is not on the horizon. His remarks form not an argument but more wishful speculation. Asimov thought that if a sufficiently powerful computer ran suitable programs—*voila!*—human consciousness and thought would snap into place. But the human brain is nothing like a computer. There is no evidence that consciousness and intelligence can be reduced to computation and complexity. All that neuroscientists have observed is a correlation between complex neural circuitry and intelligent agency. What they lack is any theory of how, if at all, neural circuitry makes intelligent agency happen.

To sum up, evolutionists simply assume that evolution produces bigger brains. And why not? Evolution, after all, is said to have produced everything else of biological significance. Attributing bigger brains to evolution is therefore hardly a stretch. And once bigger brains have evolved, spectacular cognitive abilities are supposed to follow as a matter of course. The complex neurological organization simply occurs, of itself, through chance events and natural forces. But how, exactly? Unfortunately, evolutionists have no answers here. But this lack of answers and uncertainty raises another question: namely, to what extent are bigger brains really necessary for our cognitive abilities?

1.5 THE BENEFITS OF SMALLER BRAINS

It is natural to think that bigger brains equal more intelligence, but this is a misleading simplification. In discussions relating brain size to cognitive capacities, it is important to consider brain size not merely in absolute terms (e.g., weight or volume of brain) but also in relation to body size. Elephants, for instance, have bigger brains than humans. Another crucial factor related to intelligence is the brain's inherent organizational complexity. For instance, compared with the rat, each neuron in the human brain makes between ten and 100 times more synaptic connections.

In the evolutionary literature, all of our spectacular cognitive abilities—mathematical genius, musical genius, poetic genius—are tied, whether directly or indirectly, to our large complex brains.[18] Now, it's certainly true that large complex brains are correlated with increasing intelligence. But correlation, as every scientist will admit, is not causation. Moreover, the correlation is far from perfect. Humans with small or damaged brains have often shown normal or above-normal mental powers. This suggests that human mental powers cannot simply be equated with brain size. Indeed, an evolutionary case can be made for the utility of smaller brains.

An African Grey Parrot

For instance, the expression "bird-brain," in suggesting that someone has a small brain and therefore low intelligence, is a misnomer. Some birds possess remarkable cognitive abilities far beyond anything we might expect on the basis of brain-size. Consider Irene Pepperberg's research with Alex, one of four African Grey parrots that she has trained:

> Alex, the oldest, can count, identify objects, shapes, colors and materials, knows the concepts of same and different, and bosses around lab assistants in order to modify his environment. [The researchers] have begun work with phonics and there is evidence to suggest that, someday, Alex may be able to read.[19]

Given such anomalies as Alex, why should we think that big brains are required for higher cognitive functions? In fact, there are reliable reports of people exhibiting remarkable cognitive function with very much reduced brain matter. For instance, anthropologist Roger Lewin reported a case study by John Lorber, a British neurologist and professor at Sheffield University:

> "There's a young student at this university," says Lorber, "who has an IQ of 126, has gained a first-class honors degree in mathematics, and is socially completely normal. And yet the boy has virtually no brain." The student's physician at the university noticed that the youth had a slightly larger than normal head, and so referred him to Lorber, simply out of interest. "When we did a brain scan on him," Lorber recalls, "we saw that instead of the normal 4.5-centimeter thickness of brain tissue between the ventricles and the cortical surface, there was just a thin layer of mantle measuring a millimeter or so. His cranium is filled mainly with cerebro-spinal fluid."[20]

Or consider the case of pioneer microbiologist Louis Pasteur. As historian of science Stanley Jaki remarks,

Louis Pasteur

> A brain may largely be deteriorated and still function in an outstanding way.…A famous case is that of Pasteur, who at the height of his career suffered a cerebral accident, and yet for many years afterwards did research requiring a high level of abstraction and remained in full possession of everything he learned during his first forty some years. Only the autopsy following his death revealed that he had lived and worked for years with literally one half of his brain, the other half being completely atrophied.[21]

Evolutionists, when confronted with such anomalies, will often remark that the brain contains lots of redundancy. Lorber himself concludes that "there must be a tremendous amount of redundancy or spare capacity in the brain, just as there is with kidney and liver."[22] But that raises another problem. If much of the brain is redundant, then why didn't we evolve the same cognitive abilities without developing larger brains? Redundancy carries hidden costs. Big brains make it difficult for human babies to pass through the birth canal, which, historically, has resulted in heavy casualties—many mothers and babies have died during delivery. Why should the selective advantage of bigger brains with lots of redundancy outweigh the selective advantage of easier births due to smaller brains that, nonetheless, exercise the same cognitive functions, though with lowered redundancy?

There are many deep questions here. Evolutionists may be right that large complex brains have an inherent selective advantage. But that has yet to be established. It remains an open question how our higher mental capacities (such as composing a symphony or proving a deep mathematical theorem) relate to the size and structure of our brains. Evolutionists generally regard mind as simply a function of electro-chemical activity in the brain. But this materialist assumption (that mind is reducible to brain) remains for now without empirical support. What we have are correlations between brain images and conscious mental states. What we do not have is a causal mechanism relating the two.

Quite the contrary. There are now good reasons for thinking that no such causal mechanism exists and that mind is inherently irreducible to brain.[23] This is good news for intelligent design, which treats intelligence as irreducible to material entities and the mechanisms that control their interaction. At the same time, it does not mean that intelligence should be regarded as something "supernatural." Supernatural

explanations invoke miracles and therefore are not properly part of science. Explanations that call on intelligent causes require no miracles but cannot be reduced to materialistic explanations. Indeed, design theorists argue that intelligent causation is perfectly natural, provided that nature is understood aright.

1.6 LANGUAGE AND INTELLIGENCE

When evolutionists look to the fossil record, genetic similarity, and brain size to substantiate human evolution, they are arguing that humans evolved from ape-like ancestors because these share similar physical structures (e.g, bones, cranial capacity, and DNA sequences). But evolutionists also look to cognitive-behavioral similarities between humans and presumed ape-like ancestors to substantiate human evolution. Thus, for instance, some evolutionary theorists will argue that human language is a straightforward evolutionary development from animal communication systems. The evidence is unconvincing.

Take the capacity of apes for simple symbol manipulation. Apes are capable of acquiring a rudimentary communication system. For instance, Barbara King, a biological anthropologist at the College of William and Mary, describes an ape that developed a taste for champagne and learned to refer to it symbolically.[24] King interprets this capacity as further confirmation of our common ancestry with the apes.[25] But what does this ape really know about champagne other than "that bubbly yellow liquid that tastes good"? And even this goes too far, tacitly attributing linguistic practices to apes that they give no evidence of possessing.[26]

Does the ape have any concept of what champagne actually is, namely, an alcoholic beverage made by fermenting grapes, turning it into wine, and then carbonating it? Can the ape acquire this concept as well as the related concepts needed to understand it? Can the ape deploy this concept in an unlimited number of appropriate contexts, the way humans do? Not at all. The difficulty confronting evolution is to explain the vast differences between human and ape capacities, not their similarities. The communication systems of apes and other animals are not on a continuum with human language. The premier linguist of the 20th century, Noam Chomsky, explained this clearly:

> When we study human language, we are approaching what some might call the "human essence," the distinctive qualities of mind that are, so far as we know, unique to man and that are inseparable from any critical phase of human existence, personal or social.…Having mastered a language, one is able to understand an indefinite number of expressions that are new to one's experience, that bear no simple physical resemblance and are in no simple way analogous to the expressions that constitute one's linguistic experience; and one is able, with greater or less facility, to produce such expressions on an appropriate occasion, despite their novelty and independently of detectable stimulus configurations, and to be understood by others who share this still mysterious ability. The normal use of language is, in this sense, a creative activity. This creative aspect of normal language use is one fundamental factor that distinguishes human language from any known system of animal communication.[27]

Chomsky is here responding to a standard maneuver in the evolutionary literature: many evolutionists, upon identifying a similarity between humans and apes (or other animals more generally), use this similarity not to elevate apes but, rather, to lower humans. In particular, such evolutionists downgrade the feature of our humanity that is the assumed basis for the similarity. We've just seen this in the case of human language: because humans and apes both have communication systems, human language is said to be just a more sophisticated (more highly evolved) version of ape communication. Not so. Human language, with its infinite adaptability to different contexts and its ability to generate novel concepts and metaphors, has no counterpart in the communication systems of other animals. Jonathan Marks summarizes the situation as follows:

> For all the interest generated by the sign-language experiments with apes, three things are clear. First they do have the capacity to manipulate a symbol system given to them by humans, and to communicate with it. Second, unfortunately, they have nothing to say. And third, they do not use any such system in the wild.[28]

In the same way, evolutionists tend to downgrade human intelligence when comparing it with ape and animal intelligence. From the vantage of contemporary evolutionary theory, intelligence is not a fundamental feature of reality but a product of evolution acquired by us and other animals because of its value for survival and reproduction. But is that all intelligence is? Might not intelligence, instead, be a fundamental feature of the world, a principle that animates the whole of reality, responsible for the marvelous patterns we see throughout the biophysical universe and reflected in the cognitive capacities of animals—and preeminently so in humans? The very fact that the world is intelligible and that our intelligence is capable of understanding the world points to an underlying intelligence that has adapted our intelligence to the world.

Darwinian evolutionists resist this conclusion by attributing the fit between our intelligence and the world to natural selection. Accordingly, they suggest there is a selective advantage to accurately understanding the world. But this is far from clear. Accurate representations of reality need not enhance, and in fact can be detrimental, to survival and reproduction. Suppose you are accosted by a dog that you don't think is dangerous. Because you don't think the dog is dangerous, you don't exhibit fear and thus are actually less likely to be attacked by the animal. Nevertheless, the reality may be that the dog is extremely dangerous. Thus, by misconstruing the reality of the situation, you actually improve your chances of survival and reproduction.

Intelligence, when viewed as a product of natural selection, is merely a tool for survival and reproduction. Such a tool is under no obligation to give us an accurate understanding of the world. The evolutionary process, as Darwin conceived it, places no premium on accurately representing reality. The process by which our minds evolved, according to Darwin, places a premium solely on survival and reproduction. Since misrepresentations of reality could facilitate survival and reproduction better than accurate representations, there is no reason to think that our minds are adapted to know the actual state of the world. Indeed, our minds are, on standard evolutionary principles, more likely to operate at the expense of truth, preferring expedience and gratification.

Darwin himself felt the force of this objection: "With me the horrid doubt always arises whether the convictions of man's mind, which has been developed from the mind of the lower animals, are of any value or are at all trustworthy."[29] To appreciate the full significance of Darwin's remark, apply the doubt he expresses here to evolutionary theory itself: On what basis can we have confidence in evolutionary theory if it is the product of a human mind that "developed from the mind of the lower animals"? Darwin's theory, as an explanation of how the human mind arose, is therefore self-referentially incoherent—in other words, the theory logically defeats itself. Thus, to the degree that we place confidence in it as an accurate account of our human origins, to that degree we have no basis for placing confidence in it. Alternatively, unless a designing intelligence specifically fitted our conceptual apparatus to the world around us, the convictions of our mind are inherently untrustworthy and can provide us with no reliable understanding of human origins. To sum up, when evolutionists note some similarity between humans and animals, they tend not to elevate animals by seeing in them a partially developed trait that finds its full expression in humans. Rather, they tend to demote humans by dismissing their marvelous gifts as products of a blind evolutionary process that merely embellishes capacities already present in animal ancestors. This is especially the case for language and intelligence. Instead of stressing human distinctiveness, they stress commonality with animals. From an intelligent design perspective, the study of human origins needs to pay proper attention to both human distinctiveness and commonality with animals. Intelligent design is a new science, so how best to do this is an open field of inquiry.

1.7 MORALITY, ALTRUISM, AND GOODNESS

The human characteristic that poses the greatest difficulty for evolutionary theory is not extraordinary cognitive ability. Cognitive ability is usually (though not always) rewarded, at least to some extent. So, even though the evidence for the evolution of cognitive ability may be weak or nonexistent, an evolutionary story can still be told that extraordinary cognitive ability arose because it was useful to our hunter-gatherer ancestors. But what about ethics and, in particular, altruism? What about the willingness of some human beings to risk or sacrifice themselves for others, without reasonable hope of reward? How does evolution explain such acts?

According to evolutionary psychology (currently one of the hottest evolutionary subdisciplines), the story runs as follows: We, and other primates, live in societies structured by moral norms. Those norms facilitate cooperation. They get us to help each other—to behave altruistically. On evolutionary principles, altruism must therefore be a strategy for facilitating survival and reproduction. In particular, altruism does not reflect a designer's intention for us, nor does it reflect any benevolence underlying the universe. According to evolutionary psychology, altruism comes in two versions. In one version, altruism, even though it may require sacrificing oneself, nonetheless may also benefit the survival of kin (blood relatives), thus promoting one's genes, and therefore is likely to be favored by evolution. In the other version, altruism is not really a sacrifice at all but a form of exchange: you scratch my back and I'll scratch yours. The first of these is known as *kin selection,* the second as *reciprocal altruism.*

Photographer: Jim Harrison

Michael Ruse *E. O. Wilson*

The point to realize is that altruism, the kindness we display toward others at a cost to ourselves, is, according to evolutionary psychology, merely grease that keeps evolutionary skids running smoothly. Indeed, evolutionary psychologists and evolutionary ethicists reinterpret all our moral impulses in this light. Michael Ruse and E. O. Wilson are remarkably straightforward in this regard:

DO CHIMPANZEES HELP OTHER CHIMPANZEES?

Yes, if they are related to them or otherwise know them. But in a letter to the science journal *Nature* (October 27, 2005), researchers revealed that chimpanzees will not help unknown chimps, even if helping would cost nothing. They noted,

> Experimental evidence indicates that people willingly incur costs to help strangers in anonymous one-shot interactions, and that altruistic behaviour is motivated, at least in part, by empathy and concern for the welfare of others (hereafter referred to as other-regarding preferences). In contrast, cooperative behaviour in non-human primates is mainly limited to kin and reciprocating partners, and is virtually never extended to unfamiliar individuals. Here we present experimental tests of the existence of other-regarding preferences in non-human primates, and show that chimpanzees (Pan troglodytes) do not take advantage of opportunities to deliver benefits to familiar individuals at no material cost to themselves, suggesting that chimpanzee behaviour is not motivated by other-regarding preferences.[30]

The time has come to take seriously the fact that we humans are modified monkeys, not the favored Creation of a Benevolent God on the Sixth Day. In particular, we must recognize our biological past in trying to understand our interactions with others. We must think again especially about our so-called "ethical principles." The question is not whether biology—specifically, our evolution—is connected with ethics, but how.[31]

As evolutionists, we see that no [ethical] justification of the traditional kind is possible. Morality, or more strictly our belief in morality, is merely an adaptation put in place to further our reproductive ends. Hence the basis of ethics does not lie in God's will.…In an important sense, ethics as we understand it is an illusion fobbed off on us by our genes to get us to cooperate. It is without external grounding. Like Macbeth's dagger, it serves a powerful purpose without existing in substance.[32]

Ethics is illusory inasmuch as it persuades us that it has an objective reference. This is the crux of the biological position. Once it is grasped, everything falls into place.[33]

This ethics-as-illusion view of morality makes perfect sense within an evolutionary worldview. Even so, how do Ruse and Wilson know that ethical principles are merely an illusion? As will become clear in subsequent chapters, the actual evidence for evolutionary theory (especially the grand claim that natural selection is the principle force driving evolution) is slender at best. So to base evolutionary psychology on conventional evolutionary theory is like building a house of cards on a castle of sand.

Equally problematic for Ruse and Wilson is that their evolutionary view of morality cannot be squared with the facts of our moral life. Within traditional morality, the main difficulty is to come to terms with the problem of evil. For evolutionary ethics, by contrast, the main difficulty is to come to terms with the problem of good. Evolutionary theorizing regards reproductive advantage as lying at the root of ethics. Yet it is a fact that people perform acts of kindness that cannot be rationalized on evolutionary principles. Altruism is, as a matter of human practice, not confined simply to one's in-group (those to whom one is genetically related). Nor is altruism outside one's in-group always simply a quid pro quo. People do, in fact, often transcend their drive for reproductive advantage (of their own genes or of their kins'[34]).

Holocaust rescuers, who aided the escape of Jews and others persecuted by the Nazis at great cost and risk to themselves, provide a particularly striking example of genuine altruism. Biologist Jeffrey Schloss, who studies this area, writes:

> Holocaust rescuers exhibited patterns of aid that uniformly violated selectionist [i.e., evolutionist] expectations. Not only was the risk of death clear and ongoing, but it was not confined to the rescuer. Indeed, the rescuer's family, extended family, and friends were all in jeopardy, and recognized to be in jeopardy by the rescuer. Moreover, even if the family escaped death, they often experienced deprivation of food, space, and social commerce; extreme emotional distress; and forfeiture of the rescuer's attention. What's more, rescuing was unlikely to enhance the reputation of the rescuer: Jews, Gypsies, and other aided individuals were typically despised, and assisting them so violated the laws and prevailing social values that the social consequences included ostracism, forfeiture of possessions, and execution. While it is possible to speculate that reputation and group cohesion within subcultural

USHMM, Courtesy of Sytske Hulsman-Bakker

Dutch rescuers, Berend Philip Bakker and Jeltje Bakker-Woudsma, two among many honored for their selfless courage.

enclaves could been enhanced by rescuing, there is little evidence that such enclaves existed, and most rescuers do not testify to belonging to, or knowing of a group that would have extended support or approval, much less reward or esteem for their actions. Moreover, the overwhelming majority were absolutely secretive about their behavior, not even disclosing it to closest friends or family members outside their immediate dwelling. Finally, the "most unvarying" feature of the behavior and attitudes of all the rescuers was the complete absence of group or individual connections to those aided.[35]


AP Images/Tim Graham (80712050B6)

Mother Teresa

How does evolutionary ethics make sense of people who transcend their selfish genes? Genuine human goodness, which looks to the welfare of others even at one's own (and one's genes') expense, is an unresolvable problem for evolutionary ethics. Its proponents have only one way of dealing with goodness, namely, to explain it away. Mother Teresa is a prime target in this regard: If Mother Teresa's acts of goodness on behalf of the poor and sick can be explained away in evolutionary terms, then surely so can all acts of human goodness.

For the prominent proponent of evolutionary psychology E. O. Wilson, goodness depends on "lying, pretense, and deceit, including self-deceit, because the actor is most convincing who believes that his performance is real."[36] Accordingly, Wilson attributes Mother Teresa's acts of goodness to her belief that she will be richly rewarded for them in heaven. In other words, she was simply looking out for number one, acting selfishly in her own self-interest, looking to cash in on the Church's immortality. As Wilson puts it, "Mother Teresa is an extraordinary person but it should not be forgotten that she is secure in the service of Christ and the knowledge of her Church's immortality."[37]

In fact, after Mother Teresa's death in 1997, her published letters revealed that she suffered from depressive episodes throughout her life in which she experienced grave crises of faith, though she remained faithful to her mission to the end.[38] But this wrinkle presents no insuperable difficulty for evolutionary ethics. If Mother Teresa's goodness cannot be dismissed as self-serving, it can be dismissed as maladaptive. Thus, evolutionary ethics can always argue that Mother Teresa's genetic program misfired, so distorting her ethical sensibilities as to make her an evolutionary dead-end, one that evolution would be sure to weed out because it has no use for such extreme do-gooders. To clinch their case, they need merely note that as a Catholic nun, Mother Teresa took a vow of celibacy, left no offspring, and therefore failed to pass on her genes. Thus, instead of treating Mother Teresa as a model of goodness to which we should aspire, evolutionary ethics regards Mother Teresa as either a self-serving hypocrite or a freak of nature with no future.

Such rationalizations of human goodness are now standard fare in the evolutionary psychology and evolutionary ethics literature.[39] Certainly, they denigrate our moral sensibilities. More significantly, however, they don't square with the facts. There is little evidence that those who are motivated to risk or sacrifice themselves for others are, in general, less well adapted than others or that they seek a reward, such as personal comfort, increased status, or more offspring, any of which might be explained by evolutionary psychology. Apart from clear countervailing evidence, their own testimony that they are doing what they think is morally right should be accepted at face value. In that case, however, the question remains: what is the origin of the morality that motivates them? Here an intelligent design approach connects most readily with the approach to ethics known as "natural law" (not to be confused with what evolutionists typically mean by "laws of nature").[40] Within this approach, ethics represents conformity of behavior to the design constraints according to which humans were intended to operate.

1.8 MODIFIED MONKEY OR MODIFIED DIRT?

In responding to criticisms of evolution based on the Bible (which portrays God as creating humans from the earth beneath our feet), Thomas Henry Huxley once remarked, "It is as respectable to be modified monkey as modified dirt."[41] From an intelligent design perspective, the crucial issue is not the respectability of humanity's material precursors (monkeys vs. dirt), but what was producing the modifications that made us what we are. In particular, is the source behind those modifications intelligent or simply the outworking of blind material forces?

Regardless of whether one is a biblical creationist or an atheistic Darwinist or anything in between, all are agreed that humans did not magically materialize out of nothing. Humans arose from preexisting material stuff. Indeed, the very word "human" refers to the earth (humus) that lies beneath our feet. In this respect, monkeys and humans are both modified dirt, and that is true regardless of whether humans are, in addition, modified monkeys. ID is compatible with each of these

possibilities, and there are ID proponents who hold to each. Nonetheless, even those ID proponents who accept that humans descended from primate ancestors do not accept that we evolved in the ordinary sense.

Evolution, as the term is typically used, refers to a process by which organisms change apart from any need for intelligent guidance or intervention. It follows that evolution by intelligent design is not what most people mean by evolution. Nevertheless, once intelligence is allowed as a possible factor in the emergence of humanity, it becomes an open question whether humans are both modified monkeys and modified dirt (as with evolution) or merely modified dirt (as with biblical creation). We can ask the same sort of question about an archeological artifact. For instance, is an engraved metal bowl the result of reworking an existing bowl or was it made from scratch by casting liquid metal in a mold?

There may be good reasons for thinking that humans are redesigned monkeys (shared error arguments described in chapter 5 provide one line of evidence). Even so, a design-theoretic perspective does not require that novel designs must invariably result from modifying existing designs—some designs could just be built from scratch. Hence, there may also be good reasons for thinking that a redesign process didn't produce humans and that, instead, humans were built from the ground up (for instance, what appear to be shared errors might not be errors at all).

Design theorists have not reached a consensus about just how humans emerged. Nevertheless, they have reached a consensus about the indispensability of intelligence in human origins, regardless of the process by which humans emerged. Thus, in particular, they argue that an evolutionary process unguided by intelligence cannot adequately account for the remarkable intellectual gifts of a William James Sidis or the remarkable moral goodness of a Mother Teresa.

1.9 DISCUSSION QUESTIONS

1. Briefly summarize the fossil evidence for human evolution. Are there any nonhuman fossils (e.g., the Australopithecines) that have been conclusively shown to be ancestral to modern humans? If not, on what grounds can the fossil record be taken as supporting human evolution? Is further independent evidence required? Assuming that the fossil record supports evolution, does it also reveal the mechanism by which evolution operates?

2. What does it mean to say that humans and chimpanzees share 98 percent of their genes? Does this mean that humans and chimpanzees are 98-percent similar? Does the genetic similarity between humans and chimpanzees indicate that they are descended from a common evolutionary ancestor? Support your answer.

3. List some ways in which humans and chimpanzees differ at the level of gross morphology (anatomy and physiology). How can such differences be squared with the genetic similarity between humans and chimpanzees? Are there differences between humans and chimpanzees that are surprising given their genetic similarity?

4. How is the brain size of organisms related to their intelligence? Is there a strong correlation or are there examples of smaller brains that exhibit remarkable cognitive abilities? What is the significance of the case study by John Lorber in which he describes a young man with a high IQ who "has virtually no brain"? Does appealing to redundancy in the brain, as Lorber does, adequately explain such anomalies? Why or why not?

5. Are our cognitive abilities simply a product of brain function? Or, are those abilities not reducible to brain function? Together, these two questions summarize the famous mind-body problem. What light, if any, does the relation between brain size and intelligence throw on the mind-body problem?

6. Is human language unique among animal communication systems? How so? Summarize Noam Chomsky's view that human language ability is fundamentally different from the communication systems of other animals. Is Chomsky's view widely accepted among evolutionary anthropologists such as Barbara King? What is Barbara King's view? Which view about the nature of human language and animal communication systems do you find more compelling? Why?

7. What are the three main evolutionary hypotheses for explaining the emergence of higher cognitive abilities such as mathematics in humans? How, for instance, do Darwinists employ these hypotheses to explain human mathematical ability? What, if any, evidence is there to support these hypotheses? [See general notes to section 1.6.]

8. Define morality and altruism. From a Darwinian perspective, can there be anything like a truly selfless act? Why are reciprocal altruism and kin selection, as developed within evolutionary theory, incompatible with altruism in its ordinary sense of selfless acts of kindness? Who were the holocaust rescuers? Who was Mother Teresa? How does Darwinism explain the altruistic acts of people like holocaust rescuers and Mother Teresa?

9. What does E. O. Wilson mean when he describes morality as an "illusion fobbed off on us by our genes"? Can this view of morality be squared with the facts of our moral life? Comment on the following remark from section 1.7: "Within traditional morality, the main difficulty is to come to terms with the problem of evil. For evolutionary ethics, by contrast, the main difficulty is to come to terms with the problem of good."

10. Comment on T. H. Huxley's famous claim that "it is as respectable to be modified monkey as modified dirt." Did humans evolve from monkeys? Are there compelling reasons for thinking that humans did evolve from monkeys? Are there compelling reasons for thinking that they did not? Which of these positions is compatible with intelligent design? Are both compatible? Support your answer.