

**FIFTH  
EDITION**

**HUMAN  
EVOLUTION: AN  
ILLUSTRATED  
INTRODUCTION**

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# **HUMAN EVOLUTION IN PERSPECTIVE**

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## OUR PLACE IN NATURE

*The Darwinian revolution forced people to face the fact that humans are part of nature, not above nature. Nevertheless, anthropologists struggled with explaining the special features of Homo sapiens, such as our great intelligence, our sense of right and wrong, our esthetic sensibilities. Only since the latter part of the twentieth century have anthropologists fully embraced naturalistic explanations of our special qualities.*

In 1863 Charles Darwin's friend and champion, Thomas Henry Huxley, published a landmark book, titled *Evidences as to Man's Place in Nature*. The book, which appeared a little more than three years after Darwin's *Origin of Species*, was based principally on evidence from comparative anatomy and embryology among apes and humans. (There was essentially no fossil evidence of early humans available at that time, apart from the early Neanderthal finds, which were not yet accepted as early humans by most anthropologists; see unit 27.) Huxley's conclusion—that humans share a close evolutionary relationship with the great apes, particularly the African apes—was a key element in a revolution in the history of Western philosophy: humans were to be seen as being a *part of nature*, no longer as *apart from nature*.

Although Huxley was committed to the idea of the evolution of *Homo sapiens* from some type of ancestral ape, he nevertheless considered humans to be a very special kind of animal. "No one is more strongly convinced than I am of the vastness of the gulf between . . . man and the brutes," wrote Huxley, "for, he alone possesses the marvellous endowment of intelligible and rational speech [and] . . . stands raised upon it as on a mountain top, far above the level of his humble fellows, and transfigured from his grosser nature by reflecting, here and there, a ray from the infinite source of truth."

### EXPLAINING THE "GAP" BETWEEN HUMANS AND ANIMALS

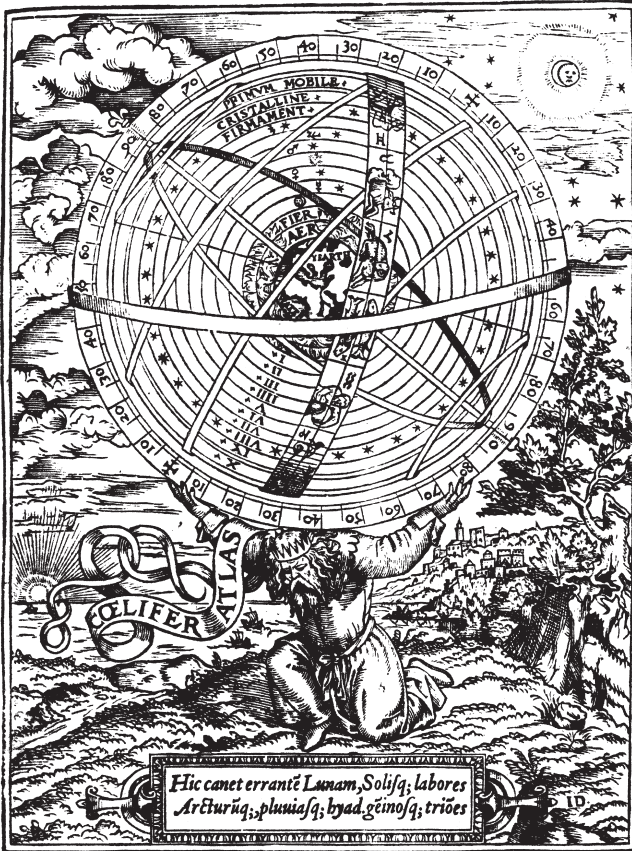
The explanation of this "gap" between humans and the rest of animate nature has always exercised the minds of Western

intellectuals, in both pre- and post-evolutionary eras. One difference between the two eras was that, after Darwin, naturalistic explanations had to account not only for the human physical form but also for humans' exceptional intellectual, spiritual, and moral qualities. Previously, these qualities had been regarded as God-given.

As a result, said the late archeologist Glynn Isaac, "Understanding the literature on human evolution calls for the recognition of special problems that confront scientists who report on this topic." He made the remark at the 1982 centenary celebration of Darwin's death. "Regardless of how scientists present them, accounts of human origins are read as replacement materials for Genesis. They . . . do more than cope with curiosity, they have allegorical content, and they convey values, ethics and attitudes." In other words, in addition to reconstructing phylogenies—or evolutionary family trees—paleoanthropological research also addresses "Man's place in nature" in more than just the physical sense. As we shall see, that "place" has long been regarded as being special in some sense.

The revolution wrought by Darwin's work was, in fact, the second of two such intellectual upheavals within the history of Western philosophy. The first revolution occurred three centuries earlier, when Nicholaus Copernicus replaced the geocentric model of the universe (see figure 1.1) with a heliocentric model. Although the Copernican revolution deposed humans from being the cosmic center of all of God's creation and transformed humans into the occupants of a small planet cycling in a vast universe, humans nevertheless remained the pinnacle of God's works. From the sixteenth through the mid-nineteenth centuries, those who studied humans and nature as a whole were coming close to the wonder of those works.

This pursuit—known as **natural philosophy**—positioned science and religion in close harmony, with the remarkable design so clearly manifested in creatures great and small being seen as evidence of God's hand. In addition to design, a second feature of God's created world was natural hierarchy, from the lowest to the highest, with humans being near the



**FIGURE 1.1 Ptolemy's universe:** Before the Copernican revolution in the sixteenth century, scholars' views of the universe were based on ideas of Aristotle. The Earth was seen as the center of the universe, with the Sun, Moon, stars, and planets fixed in concentric crystalline spheres circling it.

very top, just a little lower than the angels. This continuum—known as the **Chain of Being**—was not a statement of evolutionary relationships between organisms, reflecting historical connections and evolutionary derivations. Instead, noted the late Stephen Jay Gould, “The chain is a static ordering of unchanging, created entities, a set of creatures placed by God in fixed positions of an ascending hierarchy.”

Powerful though it was, the theory faced problems—specifically, some unexplained gaps. One such discontinuity appeared between the world of plants and the world of animals. Another separated humans and apes.

Knowing that the gap between apes and humans should be filled, eighteenth- and early-nineteenth-century scientists tended to exaggerate the humanness of the apes while overstating the simianness of some of the so-called “lower” races. For instance, some apes were “known” to walk upright, to carry off humans for slaves, and even to produce offspring after mating with humans. By the same token, some humans



**FIGURE 1.2 The anthropomorphs of Linnaeus:** In the mid-eighteenth century, when Linnaeus compiled his *Systema Naturae*, Western scientific knowledge about the apes of Asia and Africa was sketchy at best. Based on tales of sea captains and other transient visitors, fanciful images of these creatures were created. Here, produced from a dissertation of Linnaeus' student Hoppius, are four supposed “manlike apes,” some of which became species of *Homo* in Linnaeus' *Systema Naturae*. From left to right: *Troglodyta bontii*, or *Homo troglodytes*, in Linnaeus; *Lucifer aldrovandii*, or *Homo caudatus*; *Satyrys tulpii*, a chimpanzee; and *Pygmaeus edwardi*, an orangutan.

were “known” to be brutal savages, equipped with neither culture nor language.

This perception of the natural world inevitably became encompassed within the formal classification system, which was developed by Carolus Linnaeus in the mid-eighteenth century. In his *Systema Naturae*, published first in 1736 with a tenth edition in 1758, Linnaeus included not only *Homo sapiens*—the species to which we all belong—but also the little-known *Homo troglodytes*, which was said to be active only at night and to speak in hisses, and the even rarer *Homo caudatus*, which was known to possess a tail. (See figure 1.2.) “Linnaeus worked with a theory that anticipated such creatures,” noted Gould; “since they should exist anyway, imperfect evidence becomes acceptable.” This concept did not represent scientific finagling, but rather proved that honest scientists saw what they expected to see. This human weakness has always operated in science—in all sciences—and always will.

## CATASTROPHISM GIVES WAY TO UNIFORMITARIANISM

The notion of evolution—the transmutation of species—had been in the air for a long time when, in 1859, the power of data and argument in the *Origin of Species* proved decisive. Geological ideas had been changing as well. In 1808 Baron Georges Cuvier, a zoologist and paleontologist at the Paris Natural History Museum, suggested that there had been a series of great deluges throughout Earth history, each of

which wiped out all existing species. Following each catastrophe, the Earth was repopulated in a wave of creation. This theory, which came to be known as **Catastrophism**, was warmly embraced by intellectuals in Europe, as it accepted scientific observation while maintaining much of the biblical account, including the Noachim flood. (See also unit 6.)

The theory of Catastrophism soon found itself in competition with a new hypothesis: **Uniformitarianism**, which views the major geological features of the Earth as the outcome of everyday, gradual processes, not occasional violent events. James Hutton, a Scotsman, seeded the ideas of Uniformitarianism, but it was Charles Lyell, another Scotsman, who solidified the ideas, effectively becoming the founder of modern geology. Both men were impressed by the power of erosion they observed in their studies, and reasoned that with sufficient time major geological features could be fashioned by such forces.

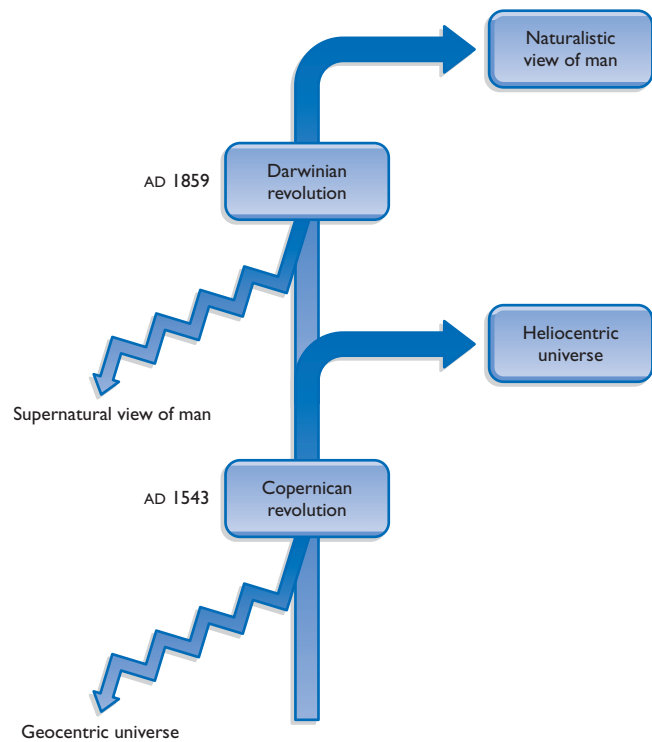
Lyell published his work in three volumes, *The Principles of Geology*, the first of which appeared in 1830. One of the conclusions of Uniformitarianism was that the Earth is unimaginably old, not the 6000 years that was commonly believed at that time. This was important for Charles Darwin's development of the theory of natural selection, which is based on the accumulation of small changes over long periods of time.

### SAME OBSERVATION, DIFFERENT EXPLANATION

The impact of, first, the Copernican revolution, and, second, the Darwinian revolution, was to place humans in a naturalistic context. (See figure 1.3.) Interestingly, although the advent of the evolutionary era brought an enormous shift in intellectual perceptions of the *origin* of humankind, many elements concerning the *nature* of mankind remained unassailed. For instance, humans were still regarded as being “above” other animals and endowed with special qualities—those of intelligence, spirituality, and moral judgment. And the gradation from the so-called “lower” races to “higher” races that had been part of the Chain of Being was now explained by the process of evolution.

“The progress of the different races was unequal,” noted Roy Chapman Andrews, a researcher at the American Museum of Natural History in the 1920s and 1930s. “Some developed into masters of the world at an incredible speed. But the Tasmanians . . . and the existing Australian aborigines lagged far behind, not much advanced beyond the stages of Neanderthal man.” Such overtly racist comments were echoed frequently in literature of the time and were reflected in the evolutionary trees published then. (See, for example, figure 1.4.)

In other words, inequality of races—with blacks on the bottom and whites on the top—was explained away as the natural order of things: before 1859 as the product of God's creation, and after 1859 as the product of natural selection.

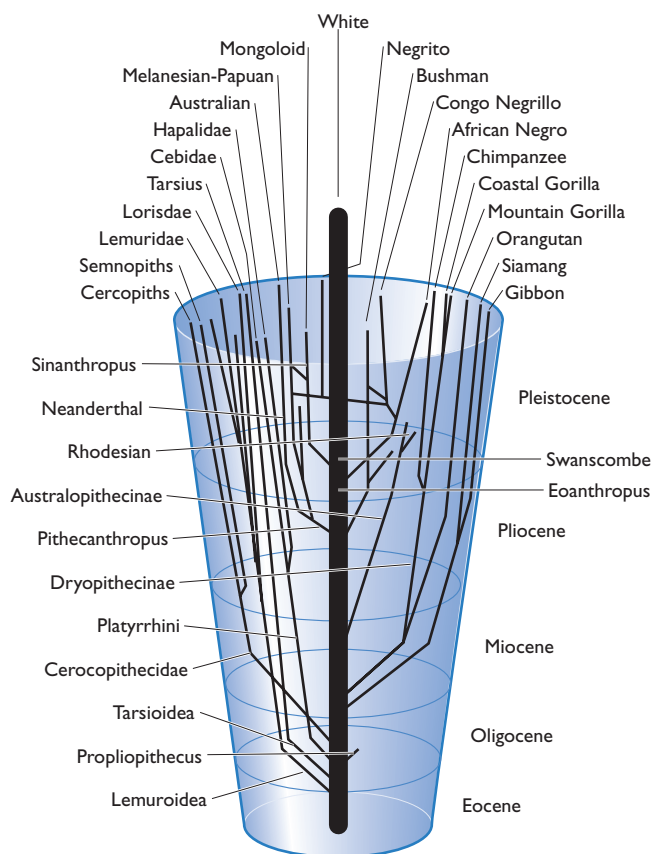


**FIGURE 1.3 Two great intellectual revolutions:** In the mid-sixteenth century the Polish mathematician Nicolaus Copernicus proposed a heliocentric rather than a geocentric view of the universe. “The Earth was not the center of all things celestial,” he said, “but instead was one of several planets circling a sun, which was one of many suns in the universe.” Three centuries later, in 1859, Charles Darwin further changed Man’s view of himself, arguing that humans were a part of nature, not apart from nature.

In the same vein, nineteenth-century discussions of human evolution incorporated the notion of progress, and specifically the inevitability of *Homo sapiens* as the ultimate aim of evolutionary trends. “Much of evolution looks as if it had been planned to result in man, and in other animals and plants to make the world a suitable place for him to dwell in,” observed Robert Broom in 1933. (Broom, a Scottish paleontologist, was responsible for some of the more important early human fossil finds in South Africa during the 1930s and 1940s.)

### EVOLUTION AS PROGRESS

Evolution as progress—the inexorable improvement to more complex, more intelligent life—has always been a seductive notion. “Progress—or what is the same thing, Evolution—is [Nature’s] religion,” wrote Britain’s Sir Arthur Keith in 1927. The notion of progress as a driving ethos of nature—and society—has been a characteristic of Western philosophy,



**FIGURE 1.4 Racism in anthropology:** In the early decades of the twentieth century, racism was an implicit part of anthropology, with “white” races considered to be superior to “black” races, through greater effort and struggle in the evolutionary race. Here, the supposed ascendancy of the “white” races is shown explicitly, in Earnest Hooton’s *Up from the Ape* (2nd ed., 1946).

but not of all intellectual thought. “The myth of progress” is how Niles Eldredge and Ian Tattersall characterize this idea. “Once evolved, species with their own peculiar adaptations, behaviors, and genetic systems are remarkably conservative, often remaining unchanged for several million years. In this light it is wrong to see evolution, or for that matter human history, as a constant progression, slow or otherwise.”

Some species later in evolutionary time are clearly more complex in certain ways than many found earlier in time. This development can, however, be explained simply as the ratchet effect—the fact that evolution builds on what existed before. For the most part, the world has not become a strikingly more complex place biologically as a whole. Although most organisms remain simple, we remain blinded by the exceptions, particularly the one with which we are most familiar.

Even this brief historical sketch clearly illustrates the **anthropocentric** spectacles through which paleoanthro-

pologists have viewed the natural world in which we evolved. Such a perception is probably inescapable to some degree, as Glynn Isaac’s earlier remark implied. In 1958, for instance, Julian Huxley, grandson of Thomas Henry, suggested that mankind’s special intellectual and social qualities should be recognized formally by assigning *Homo sapiens* to a new grade, the Psychozoan. “The new grade is of very large extent, at least equal in magnitude to all the rest of the animal Kingdom,” he wrote, “though I prefer to regard it as covering an entirely new sector of the evolutionary process, the psychosocial, as against the entire non-human biological sector.”

The ultimate issue is “the long-held view that humans are unique, a totally new type of organism,” as Cambridge University’s Robert Foley points out. This type of thinking leads to the notion that human origin therefore “requires a special type of explanation, different from that used in understanding the rest of the biological world.” That, of course, is untrue, but it has been only since the latter part of the twentieth century that paleoanthropology has become fully committed to finding purely biological explanations for the origin of the undoubtedly special features possessed by *Homo sapiens*. But, as the following unit shows, the nature of the science and its quest makes complete objectivity difficult.

## KEY QUESTIONS

- Did the intellectual framework provided by the great Chain of Being lead naturally to the idea of the evolution of species?
- Why did the perception of Man’s place in nature not change much in some ways between pre- and post-Darwinian eras?
- Why has the notion of progress become such an integral part of evolutionary thinking within Western philosophy, particularly in relation to human evolution?
- Does the evolution of qualitatively novel characteristics require qualitatively novel explanations?

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