

This book is, first and foremost, just what a fine novel should be—a good story filled with insight into human character and the ways of nature. However, it contains another dimension that may not be detected by readers unfamiliar with the professional literature of anthropology and human paleontology. (But fear not; no one will miss the power and appeal of Kurtén's

book in the absence of such knowledge. I merely argue that even a passing acquaintance with it will enhance enjoyment—hence the rationale for this introduction.) For Kurtén's novel is set in the midst of one of the most momentous and mysterious events of human prehistory, an event that has sparked debate among scientists for a century: the rapid replacement of Neandertal man in Western Europe by humans of modern aspect (often called Cro-Magnon, after the site of first discovery) about 35,000 years ago during a temporary thaw in the great glacial age.

When Darwin published the *Origin of Species* in 1859, he breathed scarcely a word about human evolution, limiting him-

INTRODUCTION

by

Stephen

Jay Gould

self to a simple prediction based upon his theory of natural selection: “light will be thrown on the origin of man and his history” (in subsequent editions, he became a bit more courageous and wrote “much light”). Darwin’s circumspect silence made sense, for in 1859 the fossil record of human evolution was virtually blank. The first decent human fossils had been unearthed in 1856, and the dust hadn’t even settled over this discovery and its meaning when Darwin wrote.

These first fossils were found in a cave of the Neander Valley (*Tal* means “valley” in German) east of Düsseldorf in Germany. Twelve years later, another fossil skull was discovered in the rock shelter of Cro-Magnon in southwestern France. It cannot be distinguished from a modern human skull (in fact its bearer, at five feet, eleven inches, was a bit taller than the average for American males today), and it is classified as belonging to our species, *Homo sapiens*. Neandertals, on the other hand, had heavy brow ridges, a face that jutted farther forward than our own, and generally thicker and heavier bones (hence the squat appearance of Kurtén’s Whites). What, if anything, had Neandertal man to do with our evolution?

This question touched off, and still inspires, one of the great debates about human prehistory. As evidence accumulated, it became clear that the Neandertal peoples had been the sole human inhabitants of Europe from at least 100,000 years ago until about 35,000 years ago. (Pittdown man once posed a challenge, but this curious creature with the human skull and the apish jaw proved to be just that: a fraud concocted from the jaw of an orangutan and the skull of a modern man.) Neandertals manufactured a distinctive kit of tools—the “Mousterian” culture—and practiced ritualized burial of the dead complete with flowers in the grave, as fossil pollen in burial sites at the Shanidar Cave indicates. Then, about 35,000

years ago, the Neandertal peoples disappeared—how rapidly we do not know; indeed, this is the essence of the debate. They surely did not pass by imperceptible stages into modern humans, but they may not have been abruptly dispatched either. In any case, European fossils after this Rubicon belong to our species: Cro-Magnon, or *Homo sapiens*. The Cro-Magnon peoples manufactured different tools, often considered more complex and advanced—the “Aurignacian” culture. They also introduced such artifacts as statuary—the “Venus” figurines—and the sublime and mysterious cave paintings of France and Spain.

What happened? Did Neandertal evolve rapidly into Cro-Magnon on the spot? Did the Cro-Magnons migrate into Europe from elsewhere and simply murder their indigenous competitors? Did the two cooperate and interbreed, with Cro-Magnon traits eventually prevailing by natural selection? Kurtén presents a hypothesis, framed as a mystery of sorts, that combines at least two of these traditional arguments.

Before we can reach any decisions about this troubling issue, we must resolve one fundamental question: who were the Neandertal peoples, and what was their genealogical relationship to us? And here we run into impediments imposed by some traditional prejudices of Western thought, particularly the false image of evolution as a ladder (the *scala naturae* of the ancients) stretching from primitive incompetence to advanced complexity. The conventional image—indeed the caricature—of Neandertal man developed from this notion that anything before us, and replaced by us, must be primitive and inferior.

Marcellin Boule of Paris (1861–1942), the leading human paleontologist of his day, created this caricature with his famous reconstruction of the Neandertal skeleton from La Cha-

pelle-aux-Saintes, discovered in 1908 and by far the finest specimen then available. Boule depicted Neandertal man as a stoop-shouldered brute with a lumbering body and a heavy head slung forward in the style of King Kong. His Neandertal lived in caves and walked on the outer edge of his foot, while his big toe jutted out in the almost prehensile (branch-grasping) posture of his arboreal forebears. In short, Boule's Neandertal quickly passed into folklore as something we all recognize only too well: the "cave man" type of Alley Oop.

This *idée fixe* of Neandertals as brutish and primitive lay behind both contradictory ideas that dominated traditional interpretations of their relationship to us. They might be viewed—as Boule chose to see them—as an irrelevant side branch of surviving relics, only distantly related to us and just as well departed. Or for those truly wedded to the ladder and uncomfortable with the very concept of side branches, Neandertal became a primitive, and thankfully superseded, stage in human progress. From Boule's notion, we have the image of Cro-Magnon victorious, sweeping into Europe and exterminating the brutish aboriginal; from the ladder notion, we derive the idea of a primitive Neandertaloid stage giving way, by gradual evolutionary perfection, to the modern sapient.

But Boule was dead wrong—so wrong that we must attribute his error to an *a priori* conviction rooted in the venerable metaphor of the ladder and its equation: old and replaced equals primitive and incompetent. Boule's specimen had arthritis; hence its slight stoop. Actually, Neandertals walked just like us, erect and full-footed. Their brain exceeded ours slightly in size, probably a correlate of the heavier body it served, not a mark of superior intelligence. Most Neandertal fossils do come from caves, but this is an artifact of preservation: bones from open sites rarely survive. Neandertal man was beetle-

browed and did have a large face, but shall we in our hubris equate a personal aesthetic of appearance with intellectual and moral worth?

In short, most anthropologists now view the Neandertal peoples as members of our species: as a distinctive European variety usually designated as a separate subspecies, *Homo sapiens neandertalensis*, while we are *Homo sapiens sapiens*. Very few experts today—though I can think of one or two—hold that Neandertal simply evolved into modern man in Europe. Most agree that the Cro-Magnon peoples migrated into Europe, ultimately, in all probability, from Africa, where the earliest fossils of *Homo sapiens sapiens* have been found. But they did not arrive as godlike moderns, meeting and quickly dispatching semi-gorillas. The encounter between Neandertal and Cro-Magnon—and this is the key point of my introduction—was a meeting between equals, a confrontation between two groups of *human* beings. And yet it was unlike anything that has happened since, unlike even the most stereotyped and racist image of white explorers meeting backward natives in jungles of the Dark Continent. For all modern human groups are recent and only slightly differentiated products of a common ancestry as *Homo sapiens sapiens*. The Neandertal peoples were human beings, but the gap between them and us (genealogically, at least) was far greater than that separating any two human groups today. We are now all brothers; this is biology, not political rhetoric. Neandertals were human, but different. Herein lies the fascination of that European encounter some 35,000 years ago—and herein the urge to novelize. For a meeting of two truly different human groups is more wonderful than all science fiction.

Dance of the Tiger is set in Scandinavia, as the Cro-Magnon peoples enter Neandertal territory during a thaw in the great

Ice Age. Kurtén's account of this contact transcends mere good storytelling and character development. For this novel, written by one of the world's premier professional paleontologists, is filled with scrupulously accurate science and the kind of intuitive feel for natural history that no commentator or "science reporter" can attain, as it requires a lifetime of devotion and daily doing.

Kurtén has managed to insinuate into his story—in a way so subtle and natural that we can scarcely recognize he is teaching as well as novelizing—every fact and theory that I know (and several, undoubtedly, that I don't) about Neandertals, Cro-Magnons, human evolution during the Ice Age, glacial geology, and ecology and behavior of the great Ice Age mammals, including mammoths and saber-toothed tigers. Many deal with highly theoretical and speculative issues. Kurtén's Neandertals use only two vowels in their speech, in conformity with Philip Liebermann's claim based on a reconstruction of the Neanderthal vocal tract (a hypothesis that I do not myself accept). They also have a strange fascination with and liking for the facial features of their Cro-Magnon invaders. Here Kurtén has joined an anatomical fact to an ethological theory. Cro-Magnons were relatively neotenized with respect to Neandertals, which is jargon for the fact that they retained, as adults, many facial features reminiscent of children. Neanderthal children did not have the beetle brow and projecting face that the adults attained, whereas Cro-Magnon children *and* adults had smooth brows and small faces. Konrad Lorenz has argued that the characteristic features of childhood act as "innate releasing mechanisms" for feelings of affection—an obvious adaptation, since we must nurture our infants. But Lorenz also points out that we can be fooled into liking other creatures that happen to retain juvenile features, not because they are really sweet and

cuddly, but for evolutionary reasons of their own. Human commerce has capitalized on this bit of biology; researchers for the doll industry determine what humans regard as cute, and the Disney artists have made Mickey Mouse progressively more juvenile in appearance to match his transition, during fifty years, from a nasty, rambunctious fellow to the inoffensive creature whose name has become a synonym for insipidity. Did Cro-Magnons “fool” Neandertals in the same way—not by being really “nice,” but by evolving, for other reasons, features that elicited this impression? I don’t think I’m giving away too much in stating that this reasonable speculation provides one piece to the solution of Kurtén’s mystery. But for the height of creative amalgamation of science and story, read Kurtén’s masterful account of the fight between saber-tooth and mammoth. It is virtually a treatise on ethology and anatomy, but you’d never know it while held by the power of his prose.

Let me, as a scientist, make a claim that may seem curious. I believe that Kurtén’s novel is a more appropriate place than the professional literature itself for discussing many of the truly scientific issues that swirl about the Neandertal–Cro-Magnon debate. Evolutionary biology has been severely hampered by a speculative style of argument that records anatomy and ecology and then tries to construct historical or adaptive explanations for why this bone looked like that or why this creature lived here. These speculations have been charitably called “scenarios”; they are often more contemptuously, and rightly, labeled “stories” (or “just-so stories” if they rely on the fallacious assumption that everything exists for a purpose). Scientists know that these tales are stories; unfortunately, they are presented in the professional literature where they are taken too seriously and literally. Then they become “facts” and enter the popular literature, often in such socially dubious form as the

ancestral killer ape who absolves us from responsibility for our current nastiness, or as the “innate” male dominance that justifies cultural sexism as the mark of nature.

Yet these stories have a role in science. They probe the range of alternatives; they channel thought into the construction of testable hypotheses; they serve as tentative frameworks for the ordering of observations. But they are stories. So why not treat them as such, get all the benefits and pleasures, and avoid the wrangles that arise from their usual, inappropriate placement?

Kurtén, for example, probes the results of different social systems by depicting Neandertals as matriarchal and Cro-Magnons as patriarchal. No evidence supports this assignment; each group could have been either or neither. But the speculative exploration of consequences, in this literary setting, is scientifically provocative as well. In another case, I felt enlightened—and embarrassed. Kurtén depicts Neandertals as white-skinned, Cro-Magnons as dark. Until reading this, I had never realized that my unquestioned picture of Neandertals as dark arose from standard reconstructions, Boule’s trap of seeing everything ancient as primitive, and from the racism that sadly afflicts us all and leads white people to associate inferiority and darkness. Kurtén’s reconstruction makes much more sense, since Neandertals lived in glacial environments and light skin may be an adaptation to life in middle to high latitudes. Yet any scientist would be rightly dubbed a fool if he published a professional paper on “the skin color of Neandertal deduced from general evolutionary principles.”

But the greatest appeal of Kurtén’s novel arises from his proper treatment of both Neandertal and Cro-Magnon as people of fully human intelligence and feeling. They, in other words, are we—as we might have been in a world so unfamiliar and so impossible to re-create. Scientists study struc-

ture by examining its behavior at, or beyond, the limits of its usual functioning. We seek odd adaptations—tiny shrews, gigantic whales, swimming seals, flying bats, thinking humans—in order to understand mammalian design (10,000 rats get us nowhere). We study deformed embryos, not from morbid fascination, but because they help us to infer the rules of normal development. May we not hope to understand ourselves better through a literal insertion into prehistory? I know, as abstract intellectual propositions, the theories that Kurtén discusses. But Kurtén has taught me something by giving them a human face. How would it feel to meet an alien being whose speech included beautiful sounds I couldn't make, who could draw the likeness of an animal on a rock? How would I respond to impending extinction, to a world where such pedestrian facts as twinning and poisonous mushrooms became aspects of magic and sources of power?

Björn Kurtén, who taught at the University of Helsinki, was unquestionably Europe's finest evolutionary paleontologist. He is, with George Gaylord Simpson in America, the founding father of an important scientific movement that united Darwinian theory with empirical studies of fossil vertebrates. He is an expert on the mathematics of population structure, demography, and the growth and form of organisms. He is a leading student of fossil bears—amusing, since Björn means “bear” in his native Swedish (no inconsistency: many Finns are ethnic Swedes). He has written several books on mammalian life during the Ice Ages. He has now proved on paper something else I always knew about him, that he is also a man of rare insight and compassion. It is always heartening—and not so rare as some people think—to find such an exemplary combination of human and intellectual qualities in one person.