The New York Review of Books

So Near and Yet So Far

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October 20, 1994 issue

Reviewed:

The Neandertals: Changing the Image of Mankind
by Erik Trinkaus and Pat Shipman
Knopf, 452 pp., $30.00

In Search of the Neanderthals: Solving the Puzzle of Human Origins
by Christopher Stringer and Clive Gamble
Thames and Hudson, 247 pp., $29.95

1.

Lady Psyche, Professor of Humanities at Castle Adamant, the Women's University of Gilbert and Sullivan's *Princess Ida*, sings a lesson about the depravity of man (and she does mean "male persons," though I will generalize):

> *Darwinian Man, though well- behaved,*
> *At best is only a monkey shaved!*

I wonder if William Straus and A.J.E. Cave (a lovely name for a student of Neandertals) had this image in mind when they wrote, in 1957, their famous defense for the "basically just like us" theory of Neandertal anatomy and ability:

> If he could be reincarnated and placed in a New York subway—provided that he were bathed, shaved, and dressed in modern clothing—it is doubtful whether he would attract any more attention than some of its other denizens.

Combined with an earlier 1939 drawing by Carleton Coon, showing a Neandertal in a coat, hat, and tie, this image became one extreme in a spectrum of interpretations for the human populations that inhabited Europe just before the influx of those sophisticated people, our own ancestors, who painted the caves at Lascaux and Altamira, carved the Venus figurines of Willendorf, and, under the name of Cro-Magnon, became the very model of modernity. We all know the other extreme—the primitive Neandertal who couldn't be more brutish and different, the beetle-browed, knock-kneed, stoop-shouldered lug with a club in one hand and his woman's hair in the other as he drags her toward the communal cave.

All logically conceivable positions about the status and relationships of Neandertal people have been maintained since their discovery in 1856. Passionate debate has pervaded everything that could possibly

be contended, even something so trivial as spelling. (*Tal* is German for valley; a twentieth-century orthographic reform dropped the silent "h" of the original name, but both versions persist; hidebound Brits tend to prefer the older Neanderthal and a pronunciation, always false to German ears, with the sounded English "h"; American pragmatists go with the modern Neandertal, which sounds closer to what Germans always said—hence the differences in the two titles here reviewed.)

Post-Renaissance scholars often adopted the affectation of recasting their names in classical form. Sometimes the change only Latinized a few letters at the end—as Karl von Linné, for example, became Carolus Linnaeus. But some alterations really soared, as when the prosaic Georg Bauer, the great sixteenth-century German mineralogist, became Georgius Agricola, which means the same thing—farmer. In this tradition, Joachim Neumann, the seventeenth-century organist of Düsseldorf, signed his compositions, Neander, or "newman." Neumann's countrymen named a local valley for him, the Neandertal. Has any designation ever proven more appropriate, since the first human fossils emerged from Neumann's valley?

But being first doesn't guarantee such perceived importance and passionate debate. Why are Neandertals so central to discussions of human evolution? The answer involves two understandable parochialisms: (1) our tendency to place a microscope over the most recent events in our history, and to worry every detail to the outer limits of resolution (since Neandertals lived from about 220,000 to about 30,000 years ago, and were directly succeeded by the people who became us); (2) the Eurocentric tendencies of Western scholarship (since Neandertals were the people of Europe, the only known people of Europe during the period just preceding the arrival of fully modern humans, though they lived in western Asia as well).

For all the nuances of various positions maintained by scientists for more than a century, the debate about Neandertals has always centered on two obvious alternatives, since all theories embody some version of those two positions: Did Neandertals evolve into us? Are they, in other words, our direct (and, in almost all versions, primitive) ancestors? Or do they represent a separate evolutionary line, an ultimate dead end replaced by our own people (through a process of warfare, assimilation, simple displacement, or a forest of other proposals, for the possibilities are nearly endless)? This question has proven so riveting that a substantial literary tradition has even arisen for novels about the first encounter of Neandertal with Cro-Magnon—from William Golding's *The Inheritors*; to Jean Auel's trilogy about Ayla, the young Cro-Magnon girl raised by Neandertals, *Clan of the Cave Bear*; to Björn Kurtén's *Dance of the Tiger*.

By well-considered and deeply engrained habit, New Yorkers don't stare at strangers while riding the A train, so a Neandertal might just pass, but not because he blended in with modern human diversity.

Neandertals may be immediate ancestors or closest cousins, but they lie outside the anatomical range of contemporary *Homo sapiens*. Neandertals departed most strongly from us in their robust and stocky physique. They did not look like an obese or large-boned *Homo sapiens*, but had a pervasively different muscularity. Their heads were as large or larger than ours, but differently shaped (with brains at least equal in volume, and perhaps exceeding on average those of modern humans). The head bore an enormous, projecting nose, with cheekbones swept back behind. The large front teeth were probably used as a clamp in toolmaking and processing of animal skins (as studies of wear marks indicate). A pronounced brow ridge stood out above the eyes (a standard feature in our prejudicial icon of primitiveness, but surely no sign of bestiality or want of braininess). Skulls were long, low, and very broad. The short, stocky bodies of males probably averaged about 5 feet 6 inches in height, with a weight of some 155 pounds; the females were about 5 feet 2 inches on average, with a weight of about 120 pounds.

The standard theory coordinating all these features holds that Neandertals were primarily hunters and scavengers adapted to the periodically cold environments of Europe during the ice ages (modern Eskimo peoples are among the shortest and sturdiest of contemporary humans). This idea also explains the striking geographic variability noted among Neandertals—with (ironically for racist notions about Aryan lands) the sturdiest and stockiest populations living in northwestern Europe (most "brutish" in traditional iconography), and the more lightly built populations living both in southern and eastern Europe and in western Asia (superficially more similar to us, but not genealogically closer). These two populations have been called "classical" and "progressive" Neandertals respectively. This distribution of variation makes sense on the climatic theory, since classical Neandertals of northwestern Europe lived in colder regions nearer the ice sheets.

2.

The centrality of "the Neandertal problem" in resolving the source of our recent origin as *Homo sapiens* becomes clear when we take a broader view of the hominid family tree. By measurement of genetic distances between modern apes and humans (not yet by direct evidence from fossils), the human lineage split off from our closest cousins (chimpanzees and gorillas) some 6 to 8 million years ago. The first human fossils, found in Ethiopian strata dating between 3.0 and 3.9 million years old, all belong to the single species *Australopithecus afarensis* (popularly known as Lucy, the "field name" originally and irreverently applied to the best specimen, and chosen to honor the heroine of the Beatles' song). This species shows remarkable anatomical stability during the million years of its recorded existence.

(An even earlier species, named *Australopithecus ramidus* and anatomically more primitive than Lucy, has just been discovered in Ethiopian rocks 4.4 million years old.)

The next million years in Africa, then the only home of our lineage, featured intense evolutionary activity in a half dozen or so recorded events of speciation within two subgroups, probably in response to an accelerated tempo of climatic change as glacial climates began to cycle at higher latitudes. One subgroup, the erect but small-brained australopithecines, features three to five species of lighter built "gracile" forms like *Australopithecus africanus* (the first found member of this lineage, discovered in South Africa by Raymond Dart in the 1920s), and heavier "robust" forms like *Australopithecus robustus* from South Africa and *A. boisei* discovered by Louis and Mary Leakey in East Africa. (The robust australopithecines are often placed in the separate genus *Paranthropus*.) The australopithecines lived and died entirely in Africa, with one or two species perhaps surviving until about one million years ago.

The other subgroup, manifesting the most celebrated of all trends to larger brain size, includes species of our own genus, *Homo*. The oldest members of *Homo* belong to the species *Homo habilis*, first found by Louis and Mary Leakey in Olduvai Gorge, Tanzania, in the 1960s. Most paleontologists now feel that the remains originally categorized in *Homo habilis* represent at least two separate species (the other usually called *Homo rudolfensis*). The most famous early members of our genus, our immediate ancestor *Homo erectus*, arose a bit later within this subgroup, with the oldest African fossils dated at about 1.8 million years. The finest of all early African specimens, the "Turkana boy" found by Richard Leakey and his field team in 1985, belongs to this species. This most complete of all early human skeletons, dated to 1.6 million years, belonged to a boy who died at about eleven years of age and was already 5 feet 4 inches tall (but destined for an adult height of over 6 feet).

Homo erectus became the first intercontinental traveler of our lineage. Populations of this species walked out of Africa, into parts of Europe, and all the way to eastern China and Indonesia (where, as "Java Man" and "Peking Man" of the old textbooks, their discovery between 1890 and 1920 began the serious study of ancient human fossils). The recent redating of Indonesian specimens to as much as 1.8 million years old indicates that this migration from Africa may have occurred earlier than previously recognized. (The oldest known African specimen is also 1.8 million years old, but the oldest found is almost never the first existing, and *Homo erectus* may well be more than 2 million years old in Africa.)

The stage is now set for the great debate about our own origin from the stock of *Homo erectus*, and the crucial role of the "Neandertal problem" in this controversy. One million years ago, *Homo erectus*

populations lived on the three continents of Africa, Europe, and Asia. Between about half a million and 100,000 years ago, a highly confusing group of specimens, bearing the most unsatisfactory name of "archaic *Homo sapiens*" lived on all three continents, presumably as descendants of *Homo erectus*. These diverse specimens are in some respects intermediate between *Homo erectus* and modern humans, and in some respects unique unto themselves. (They have been found in such famous sites as Petralona, Heidelberg, Steinheim, and Swanscombe in Europe, and Bodo and Broken Hill in Africa). In this context, the essence and status of Neandertal can be quickly stated. The Neandertal people are the unique descendants in Europe (and immediately adjacent western Asia) from this evolving complex of *Homo erectus* through archaic *Homo sapiens*.

All subsequent discussion must occur in light of the debate that has pervaded anthropology and received so much deserved attention in the popular press during the past decade—the distinction between the multi-regional (also known as the candelabra or menorah) view, and the "out of Africa" theory (also known as "Noah's ark"). Like all dichotomies, this clean division is a bit oversimplified and caricatured (while the cute names given to the two positions often hinder understanding as much as they help definition). But the distinction is real and clean—and of highest theoretical significance both for evolutionary science in general and in our eternal quest to define the essence of our physical and mental being as the unique historical species, *Homo sapiens*.

In the multi-regionalist view, first well articulated by Franz Weidenreich in the 1940s, *Homo erectus* populations on all three continents evolved in parallel (with sufficient gene flow by migration among populations to prevent differentiation into fully separate lineages) via stages involving increased brain size and decreased jaws and teeth, through archaic *Homo sapiens* to modern humans. In this view, Neandertal must represent the European version of a late stage in this global trend. In other words, Neandertals must be the major ancestral stock of modern Europeans—hence their particular importance in our lamentably Eurocentric traditions of interest and argument.

In the "out of Africa" view, the admittedly ancestral status of *Homo erectus* does not imply that modern humans arose from *all* populations of *Homo erectus* throughout its extensive old world range. Most new species arise as a small population geographically isolated from a parental form in one area, usually a periphery, of the ancestral geographic range. Thus, modern *Homo sapiens* arose in one isolated region of the full range of *Homo erectus*—and then spread out from there following a successful and geologically rapid establishment (hence the phrase "Noah's ark" to honor the idea of global repopulation from a single source). For various reasons, including the presence of the best and oldest remains of fully modern humans

(100,000 to 125,000 years old) in Africa and the discovery of greatest genetic diversity among contemporary African peoples (indicating longer habitation of this continent by modern humans), Africa seems the strongest candidate for our pinpoint source under the Noah's ark theory.

Under Noah's ark thinking, Neandertal represents one among several non-African descendants of *Homo erectus* that did not transform to modern humans, and that died essentially without issue (though some minor genetic contribution to modern humans through hybridization with invading populations from Africa is not precluded). Neandertal, in this view, is a close cousin and not an ancestor—a creature who, like most other evolutionary experiments in geological time, simply became extinct without leaving descendants.

Honored ancestor or extinguished cousin? The adjectives are unfair and represent our incorrect equation of survivorship with some form of "worth" (a false view because extinction is the common and eventual fate of all evolutionary lineages). Still, the emotional punch of these adjectives defines much of our fascination with Neandertals. But so many other, and more legitimate, issues are engaged by the same dichotomy. What is the proper taxonomy and evolutionary status of Neandertals—a stage in a transforming plexus according to the theory of multi-regionalism (and designated as a subspecies of our lineage, *Homo sapiens neandertalensis*); or a geographically and geologically defined entity according to the theory of Noah's ark (recognized in the separate species *Homo neandertalensis*)? If Neandertal is a stage in a plexus leading to us, then we are more likely to seek their similarities with modern humans, and to attribute differences to less advanced or complex versions of our own tendencies. But if Neandertal is a separate entity, we shall devote more of our attention to defining differences, and to viewing them as expressions of genuine divergences rather than sequential stages of a single trajectory. The footprints of theory stamp all our observations, as they must and should. Objectivity in science is the willingness (even the eagerness in truly honorable practitioners) to abandon a favored notion when testable evidence disconfirms key expectations, not the naive and chimerical hope that nature might be seen *wie es eigentlich gewesen* ("as it really was," to cite von Ranke's famous dictum about the task of historians).

3.

The two books under review, by two leading experts on Neandertals and on the rise of modern humans, take opposite sides of this controversy. Chris Stringer of the British Museum is the most prominent paleoanthropologist working in support of the Noah's ark approach; his book, written with Paleolithic archaeologist Clive Gamble, vigorously promotes this view, while organizing its chapters

in a conventional scientific manner by subject: the geographic and anatomical background of human evolution, Neandertal morphology, geography, archaeology, and interaction (or non-interaction) with moderns. Erik Trinkaus, a paleoanthropologist at the University of New Mexico, is the world's leading expert on Neandertal anatomy; his book, written with a fellow paleontologist and writer, Pat Shipman of Johns Hopkins, takes no "official" position in the great controversy and strives for balance but clearly leans toward the multi-regional approach; its organization is entirely historical and chronological (in following the changing views of scientists since the first discovery in 1856, not by tracing the life and times of Neandertals).

People may wonder how two experts can see a common world so differently, but I do not find this situation at all discouraging or anomalous and offer three expressions of hope or explanation in response. First, the subject of modern human origins is particularly hard for a variety of reasons: scientists must work with distinctions on a very fine scale during slices of geological time so short that resolving key questions becomes difficult; many of these issues depend crucially upon inferences about the very aspects of human life (particularly behavior and language) that cannot be directly observed in the fossil record; finally, explanations can rarely be validated by the conventional scientific style of prediction and deduction from known laws of nature, but must be formulated in the narrative mode as contingent sequences of events, each crucially dependent upon the full range of antecedent states. (This narrative mode is not intrinsically more difficult or less secure than others, provided that the historical evidence be so rich and full that antecedent sequences may be verified. But the fossil record is so spotty and incomplete that we rarely have adequate information for confidence about narrative sequences.)

Second, we really do have a wealth of rigorous data on accessible subjects of anatomy and geography and have, as a result, reached substantial agreement on an enormous range of issues about Neandertals that once excited much passion and controversy (most strikingly, of course, the old view of brutish, stoop-shouldered, bowlegged Neandertals has been conclusively disproven by subsequent discoveries and anatomical analysis). Moreover, the detail of information often obtainable (sometimes by stunningly ingenious forms of inference) fully justifies the exhilaration often felt by scientists. For example, we are fairly confident that righthandedness predominated in Neandertals, as in modern humans, because scratch marks on incisor teeth indicate that Neandertals held objects (perhaps animal skins) in their mouths while working them with tools; the dominant direction of these scratches indicates that tools were generally held and manipulated by the right hand.

Third, we are storytelling creatures and should have been named *Homo narrator* (or perhaps *Homo mendax* to acknowledge the misleading side of tale telling) rather than the often inappropriate

Homo sapiens. The narrative mode comes naturally to us as a style for organizing thoughts and ideas. We should not be depressed that the hypotheses of multi-regionalism and Noah's ark tell such radically different stories, for a large amount of agreement about ascertainable issues of anatomy and geography underlies the ordering of information into these contrary tales; and the tales themselves, like all fruitful theories, have served as marvelous devices for suggesting questions and avenues of future research. Good theories are, above all, useful.

The radically different organization of the two books, another aspect of storytelling quite independent of their divergent theoretical views on the status of Neandertals, also illustrates the centrality of narrative style in any human discourse (though scientists like to deny the importance of such rhetorical devices—while using them all the time—and prefer to believe that persuasion depends upon fact and logic alone). While appreciating the density of information well presented in both books, I greatly preferred the more conventional technique of Stringer and Gamble in this case—organization by subject rather than chronology of discovery.

With Neandertals, unlike most issues in human paleontology, we are more frequently overwhelmed with a plethora of information than left clutching at a few facts to form the basis of speculation. Narrative style therefore becomes central, primarily as a vehicle for making so much information comprehensible. For me, organization by chronology just doesn't work for such voluminous fine-scale detail because time, with all its capricious contingencies of changing views and fashions, is such a poor ordering principle compared with fitting the facts into a reasonable theoretical frame. When the scientific players are grand household names, and events are the great shapers of human life, then chronology works well and should be preferred, for the items treated in sequence become the essence of history. But many of the researchers who participated in the Neandertal story have been forgotten, even by professional paleontologists, and most did not contribute arresting or enduring ideas.

I was disturbed by two other features of Trinkaus and Shipman's approach. First, in trying to be so comprehensive, by including almost every person even marginally relevant to the Neandertal story (from all major founders of evolutionary theory, long before the discovery of Neandertals, to minor figures of minimal engagement with Neandertal specimens) they must often limit coverage of a scientist and his ideas to a single paragraph. I have no quarrel with epitome as a device, but the summaries must be based on study, not (as so often done here) on reproducing standard material, replete with all the usual errors, from secondary sources. Good popular writing by

scientists must arise from the depths of personal expertise; it should not just be fluent prose based on unfiltered information accessible to anybody, for this is only reporting.

I was bothered by the density of error that can be introduced by this method. As in any form of proper collecting, you don't have to record every last item (the attempt to do so may result only in superficiality); it is far, far better to select a few of the most interesting and representative examples as carriers of a coherent story, and then to discuss them in depth, thus providing all the fascination of revealing detail accurately presented. I would cite only three examples of how Trinkaus and Shipman use disproven canonical caricatures to epitomize central figures and ideas. First, they present the old canard about Darwin as a dull plodder, a notion that has been conclusively rejected by scholars since the publication of Darwin's notebooks (around the time of the centennial celebrations for the *Origin of Species* in 1959) set off the modern "Darwin industry." Trinkaus and Shipman write: "Often lionized as a great thinker, Darwin plodded along...like an uncertain little man who has gotten hold of an idea too big for him."

They then present the standard mischaracterization of Lamarck, evolution's other major founder, as a vitalist advocating the idea that transmutation occurs by an organism's will. In fact Lamarck was a materialist with an interesting (if wrong) theory for the mechanism by which organisms became more complex—as modern scholarship, particularly that of E. Mayr, R. Burkhardt, and P. Corsi in particular, has clearly shown. Trinkaus and Shipman write: "What seems astonishing now is that Lamarck believed this transformation was accomplished through an effort of will or an unconscious longing for destiny."

Finally, in the most important reconceptualizing in the history of geology during the past thirty years, Charles Lyell's old caricature of catastrophism as Biblical idolatry has been replaced, thanks to the work of many scholars, notably M.J.S. Rudwick and R. Porter, with an understanding of this early nineteenth-century theory as a scientific account based on good evidence and a credible (if wrong) theory of physical causation. But Trinkaus and Shipman just present the discredited Lyellian caricature: "In its purest form, catastrophism was little more than an intellectual ploy to reconcile geological evidence with belief in the Biblical account of Creation."

The authors also fail to avoid the other major pitfall of popular writing by mistaking a supposed jauntiness or "liveliness" of prose for the genuine clarity and vital engagement that lay audiences expect and require. Interest and passion arise from the excitement of ideas, the clarity of their organization, the integrity of their presentation, and the expansiveness of their scope, not from overwriting in an almost frantic attempt to engage the reader, for this

strategy only demeans the audience. The metaphors and similes begin to pale when Trinkaus and Shipman write of "the journey toward knowledge, with its El Dorado of new understanding"; or of thoughts that "resonated like a gong with truth." When they want to say that discussion of race became unpopular following Nazi abuses of the issue, they write: "Like a pagan oracle in the nineteenth century, or a terrorist organization in the twentieth, race went underground." They characterize my colleagues with such phrases as: "Brace galloped straight at these ideas like Don Quixote, lance at the ready."

But the worst overwriting occurs in their physical descriptions of scientists, for they adopt the formula of introducing each character with a sentence or two about his face, almost always concentrating on the eyes. If, as in John Aubrey's celebrated sendups of his seventeenth-century Oxford colleagues, such descriptions are based on personal knowledge or at least current gossip about eyes (also Aubrey's favorite subject), then we may have wit and passion, or at least entertaining malevolence. But I'm sure that Trinkaus and Shipman worked from photographs—and I'd rather just have the snapshots so I can make my own inferences. On Dubois: "His pride and perhaps touchiness are evident in his forthright gaze." On Keith: "Photos of him...[show] a tense [man], with anxious eyes that seem to worry what others are thinking or doing." On Teilhard de Chardin: "A tall, elegant man with an aquiline nose, kindly eyes, and prominent wrinkles, from smiling, at the sides of his mouth." On Hrdlicka: "He had obviously inherited his father's intensity and ambition and his mother's emotionality [talk of gender stereo-types!], along with a head of thick, dark hair, piercing eyes, and a sensitive, full-lipped face." On Raymond Dart: "A bright boy with eager eyes." His fellow South African Robert Broom "sported a silver crewcut and wore round, metal-rimmed spectacles that could not hide a perpetual twinkle."

As a kind of ultimate strain on the formula, but staying true to it to the end, Trinkaus then describes himself in the third person, but (for once) omitting the eyes: "Trinkaus was a tall, lanky, fair-haired youth from Connecticut...Trinkaus speaks quickly, with an occasional mild stammer and a delight in word play." (He goes on to characterize himself: "Trinkaus worked until 1983 before publishing a monograph, *The Shanidar Neandertals*, which overflowed with factual data supporting a plethora of genuinely new and provocative hypotheses.")

4.

In the changing fashions of science, subjects become interesting either because innovative theories include them or as a consequence of new discoveries, often a result of novel technologies (for example concern with recent human history owes much to DNA sequencing and the consequent possibility of building evolutionary trees by measuring genetic distances among modern peoples). Throughout the 1960s and

1970s, interest in human paleontology centered upon the earliest stages of our lineage, stimulated by the discoveries of Richard Leakey and his team in Kenya, and by Donald Johanson and his colleagues in Ethiopia. Neandertals and other humans from a mere geological yesterday passed through a period of relative neglect as too much like us to inspire much interest. But the emergence of modern humans has been the hottest subject of the 1980s and 1990s—for reasons of both fact and theory cited above—and Neandertals have rightly reemerged to prominence as a crucial piece in any potential solution of this puzzle.

The distinction between multi-regionalism and Noah's ark, the main theoretical context of awakened interest, rests upon an issue that could not be more important to our understanding of our own history and biological status. I like to refer to these two ideas as, respectively, "tendency" and "entity" theories of human evolution. According to multi-regionalism, all populations of *Homo erectus* on three continents evolved in parallel toward the traditional *summum bonum* of bigger brains, and a somewhat larger but lither body better suited to the spoils and consequences of increased intelligence. The distinctive features of modern humans therefore represent a global *tendency*, the end result of a pervasive process. We evolved our big brains because big brains are so good to have, and natural selection must have favored them in all environments of our diverse geographical spread.

Tendency theories embrace a variety of notions from the annals of human hubris, and from the tradition that views science as discovering a predictable sequence of events. If all our separate ancestral populations (interacting through limited migration and gene flow) evolved in lockstep toward big brains and resulting consciousness, then our mentality is predictable on Darwinian principles as pervasively advantageous, and perhaps even interpretable as some kind of broader evolutionary inevitability.

Under the Noah's ark hypothesis, however, *Homo sapiens* is a limited, self-contained item of history (for discrete and bounded populations are evolutionary individuals), an *entity* that evolved in one small place during one restricted interval in time, and whose global spread may be a consequence of remarkable mental adaptations but not an inevitable development arising on a planetary scale. Entity thinking embodies a range of uncomfortable ideas that we have been loath to apply to our own history—fortuity, contingency, chanciness, nonpredictability, unlikelihood of repetition in any *Gedanken* experiment for replaying the tape of life or for regrowing the human evolutionary tree from its initial seed six to eight million years ago. Wipe out a small African population that had separated from *Homo erectus* and originally lived in a limited area with restricted prospects for success, and we never emerge as *Homo sapiens*—whereas, in tendency theories, a certain inevitability accompanies our origin, for all ancestral populations are moving toward us, and if one fails to cross the threshold, another will.

I do not have the requisite professional expertise to declare a preference on factual grounds between the two views (as a paleontologist, I am a specialist in fossil snails). But as an evolutionary theorist and historian of science, I can comment on a decidedly peculiar feature of the debate as presented in the popular press. Journalists have written with clarity and understanding about the two views, but they consistently present the tendency theory of multi-regionalism as a standard or orthodox view, while describing the entity theory of Noah's ark as iconoclastic and surprising. (In this context, we have of late preferred the "pretty much like us" or "couldn't spot them on the subway" view of Neandertals as the penultimate stage of our own evolution in Europe.)

But this assessment of orthodoxy and iconoclasm is entirely backward in the light of conventional evolutionary theory. Noah's ark embodies the standard view for the origin of most new species; multi-regionalism is a decided oddity, though not an impossibility. Species are biological populations; they arise by branching from a parental population when a subset of that population becomes geographically isolated, usually at the periphery of the parental range. Each species originates as an entity in a coherent place and, if successful, may then spread out over much wider geographic areas. Multi-regionalism, by contrast, is awfully hard to fathom. Why should populations throughout the world, presumably living in different environments under varying regimes of natural selection, all be moving on the same evolutionary pathway? Besides, most large, successful, and widespread species are stable for most of their history, and do not change in any substantial directional sense at all.

For nonhuman species, we never interpret global distribution as entailing preference for a multi-regional view of origins. We have no multi-regional theory for the origin of rats or pigeons, two species that match our success and geographical spread. No one envisions proto-rats on all continents evolving together toward improved ratitude. Rather, we assume that *Rattus rattus* and *Columba livia* initially arose in a single place, as an entity or isolated population, and then spread out, eventually to cover the globe. Why, uniquely for humans, do we develop a multi-regional theory and then even declare it orthodox, in opposition to all standard views about how evolution occurs?

Some people have argued that we should prefer multi-regionalism for humans on grounds of simplicity, but such an argument misuses Occam's so-called razor. They note, correctly, that everyone admits an initial spread of *Homo erectus* from Africa to all Old World continents (nearly two million years ago if the new Asian dates for the oldest *Homo erectus* are valid). Do we not introduce unnecessary complexity, they then argue, in claiming that most of these *H. erectus* populations died out, while only one splintered into *Homo sapiens* in a single place—thus forcing us to imagine a second migration, out again from Africa (or some other place) to populate the globe. But "simple"

and “complex” are not defined by counting one migration or two. Populations move all the time, throughout the world and in geological instants. We introduce no undue theoretical complexity, and advance no special pleading, in advocating two migrations from Africa—one about two million years ago of *Homo erectus*, and a second about 100,000 years ago of modern *Homo sapiens*, the immediate ancestor of all humans today. Many mammalian lineages feature well-documented and much more elaborate episodes of multiple migrations.

In fact, a second migration from Africa about 100,000 years ago makes elegant sense of our data for timings of modern human arrival in all regions of the globe—thus defining Noah’s ark as a “simple” theory in the important sense of coordinating disparate information. *Homo sapiens* moved first from Africa into adjacent areas of Israel and the Near East, where the oldest non-African moderns have been found in sediments about 100,000 years in age (and where Neandertals persist until much later, thus indicating coexistence, or movement in and out, of two distinct lineages, rather than chronological transformation of Neandertals into moderns). *Homo sapiens* moved east, reaching Australia some 50,000 years ago and crossing the Bering land bridge into the New World somewhere between 25,000 and 10,000 years ago. (The supposedly late arrival of humans in America is no longer anomalous on this view, but becomes a reasonably timed incident in the worldwide spread of *Homo sapiens* from Africa.) *Homo sapiens* also moved west, eventually reaching the peripheral range of classical Neandertals in western Europe and leading to the final disappearance of Neandertal people about 30,000 years ago, for reasons quite unknown.

Given the sensibleness, and the theoretical orthodoxy, of Noah’s ark, I think we have to identify popular preference for multi-regionalism as just another example of our prejudicial desire to view ourselves as the consummation of a predictable tendency rather than the product of a fortuitous entity. Thus, some of the deepest questions we can ask lie behind our quest to determine whether Neandertals are part of our direct ancestry or a separate species (however genealogically close to us) that became extinct when modern people usurped its European space.

If the hypothesis of Noah’s ark, and the origin of modern humans in a second wave out of Africa about 100,000 years ago, turns out to be valid, then Neandertals are interestingly different creatures from us, not unformed and primitive versions of what we would become. Could we possibly define the mental essence of these differences, thus helping us to understand the basis of our uniqueness? Any such effort can only be premature (and perhaps even untenable, given limits on what the fossil record can preserve about crucial issues of behavior and language), but Stringer and Gamble make a fascinating attempt by closing their book with a chapter entitled “Close Kin or Distant Relatives?”

Neandertals were highly intelligent people with complex tools and other features of material culture. Many researchers also view them as practitioners of the more abstract and symbolic behavior generally viewed as essential to the human style of consciousness—particularly in ritual burials of the dead, and in rudiments of art and bodily adornment (though we find nothing like the complexity of Cro-Magnon cave painting and carving). But Stringer and Gamble question all evidence for art and intentional burial with symbolic import (rather than mere disposal), and therefore view Neandertals as cognitively quite different from us.

Evolutionists often make a serious category mistake in attributing evolved differences to overt adaptation for highly particular uses—improved human mentality "for" hunting, or "for" recognition of kin as an aid in the formation of tribal groups, for example. But the advantages of something so broad as our mental differences from Neandertals probably reside in general learning rules vouchsafed to *Homo sapiens*, rather than very specific things that we could do and they couldn't. If we could infer these rules of our uniqueness from differences in the overall patterns of Neandertal and modern life, then we might gain great insight into the biological source of our humanity.

Stringer and Gamble center their discussion upon three themes that strike me as being on the right level of abstraction, in contrast to the overspecificity of most discussions about adaptation. Each theme expresses a symbolic capacity, based on a kind of mental modeling performed either temporally or geometrically, that Moderns possessed and Neandertals may have lacked. Integrate all three, and we begin to sense the new rules of cognitive order that made us a thinking reed.

First, the construction of campsites: Moderns laid out hearths and huts in definite arrangements; Neandertals did not. We should not view this difference primarily as adaptive advantage accruing to Moderns in the survival value of home bases (though such benefits may have existed), but as an indication of order in mental symbolization or abstraction the ability to plan, anticipate, repeat, and blueprint (at least in the mind)—newly evolved in Moderns and perhaps not present in Neandertals.

Second, the use of landscape: Neandertals were reactive; they used local resources exclusively and moved with them. Moderns learned to overcome harsh periods and stay put, primarily by developing social, and especially trade, networks to supply needed materials from distant places. Stringer and Gamble see a crucial difference between a strictly local social organization and the far more complex degrees of fealty and relationship that long-distance trade and transport require. The almost calculational basis of such degrees in obligation implies a new level of mental richness based upon an ability to symbolize.

Third, expansion into new habitats: Neandertals, during their long tenure, spread throughout their European and adjacent Asian realm, but never beyond. Moderns moved out of Africa and didn't stop until they had pervaded the habitable world. Stringer and Gamble suggest a tie between the capacity for such expansion and the ability to think about futures and to plan for events to come. Again, Moderns may have developed a new mental model of the world, expressed as a picture—a view of oneself as a moving dot in time, with a past on one side and a future in front.

Such gains in symbolic generality as the capacity to envision a geometric order in living space, the ability to calculate complex degrees of relationship, and the establishment of a notion of futurity, lie at the right level of abstraction—learning rules rather than their superficial expressions in particular adaptations—for defining the mental alterations that made us such a powerful and dangerous species, but kept Neandertals (in their absence) as competent people constrained to a definite mode of life.

Neandertal, then—the new man of Europe, before the even newer people of Africa moved in to establish our birthright—may not have been our ancestral harbinger, doing a little less of what we would eventually perfect, but a divergent creature separately evolved from *Homo erectus*, a person whose truly different intelligence might, by comparison, grant us crucial clues in the oldest quest imposed by our altered style of mentality—to know ourselves.

Stephen Jay Gould

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