Who, Why, and How

Don't you think it's right to rake up the past?
I don't feel that I know what you mean by raking it up.
How can we get at it unless we dig a little? The present
has such a rough way of treading it down.

Henry James, "The Aspern Papers"[1]

Only the past is present…

W. H. Auden, "At The Grave of Henry James"[2]

We humans are impressed with our superiority: the author of the eighth psalm ranks us "but a little lower than the angels." And so we are shocked to learn that we share about 98.5 percent of

[1] *The Great Short Novels of Henry James*, ed. Philip Rahv (New York: Dial Press, 1944), 528.
[2] W. H. Auden, *Selected Poems*, ed. Edward Mendelson (New York: Vintage Books, 1979), 120.

our DNA with chimpanzees.[3] That other percent and a half must be quite something because chimps exist in only remnant populations while there are six billion of us. We venture nearly everywhere, including under the sea and in orbit around our planet. We dispatch rockets to explore the solar system and beyond. And we plan to visit Mars. I doubt that any dog, even if its IQ were multiplied by a thousand, would want to do anything as pointless in terms of creature comforts as that.

To deal with the mystery of our success we need to trace the trajectory of our species and family in its full length. As writers and readers we are merely 5,000 years old. The first heroes of the written medium, Gilgamesh, Abraham, and so on, are like early movie stars – Douglas Fairbanks and Errol Flynn, for instance – that is, they are latter-day celebrities. As a species we are at the very least twenty times older than the first cuneiform tablets. As a genus, the taxonomic unit that includes ours and closely related species (of which there were many in the past and none now), we are enormously older than that.

It is disconcerting to think of Egypt's pyramids as recent, like the hippies' long hair, but any accurate timeline of hominid or even *Homo sapiens* history would cram both together at the extreme near end. To understand ourselves we must begin to think not in terms of centuries or even millennia but of megablocks of millennia. We are Stone Age creatures, lately arrived in a world that is, ironically, both alien and of our making.

An investigation of a history that includes the full stretch of our separate lineage will oblige us to accept as evidence bones, flints, and inferences based on relic features and propensities of

[3] Jared Diamond, *The Third Chimpanzee: The Evolution and Future of the Human Animal* (New York: HarperCollins, 1993), 23.

our present-day bodies and mentalities. Opportunities for mistakes proliferate, but refusal to try would leave us locked in the narrow confines of recorded history like an amnesiac railroad traveler trying to find out who he is, where he has been, and where he is going by scanning the newspaper left on the seat beside him. That is a good place to start, but he should also examine the contents of his pockets and go to the rear car and look back down the track.

If we want to know about human beings, we have to begin by defining them. What is distinctive and what is unique about being human? We are highly intelligent, but perhaps that is not as definitively important as we are inclined to think it is. Otherwise, why has that trait only appeared once in all of evolution? Flying, one of natural selection's tours de force, has appeared at least three times. Anyway, intelligence was not what got us our start: the brains of the Australopithecines, the earliest hominids, were only a third as big as ours.[4]

Of our several identifying characteristics – our infinitively expressive speech, our system of sexual intercourse by choice rather than by glandularly dictated rutting season,[5] our devotion to tool making, and so on – I have picked only three. I will begin with a brief survey of bipedalism, necessary because bipedalism evolved very early among our ancestors and may have been the most decisive of all our evolutionary changes as we veered off to become a genetic category all by ourselves. Explanation of what makes our genus what it was and is must include what the literati might call *explication de pied*.

[4] *The Cambridge Encyclopedia of Human Evolution,* eds. Steve Jones, Robert Martin, and David Philbeam (Cambridge: Cambridge University Press, 1992), 116–17.

[5] Diamond, *Third Chimpanzee,* 77.

Second, let us investigate what may be the least publicized of our distinctive capabilities: we are the planet's best throwers. All of us, male and female, from eight year olds to dodderers, can throw further and more accurately than members of any other species. Today this capability is of vanishing significance for our survival, but remains an obsession anyway, continuing on in our most popular games, most of which are ballistic. These include both world and American football, basketball, baseball, cricket, golf, hockey, tennis, Ping-Pong, jai alai, and in our species-wide effort to hit the wastebasket across the room from the desk with crumbled paper balls. It lives on in our efforts to blast in cans off fences and to fire rockets at Mars. We are unique in our delight in effecting change at distances, at three yards, at a hundred million miles.

Third, we must consider our manipulation of fire. We are unique among all creatures in routinely utilizing fire. Many animals communicate by oral signals, which might, at a very long stretch, be called speech. Chimpanzees and several other species are clever enough to use simple tools. Apes throw after a fashion. But only we habitually make fire, which we have been doing for so long that one might speculate that it may have a genetic component by now. We put candles on birthday cakes and altars, we ignite fireworks to celebrate – we love fire.

The description of *Homo sapiens* as consisting of two-legged throwers who start fires is as impeccably precise and exclusive as a definition of our species as the one that today detonates hydrogen bombs and dispatches telescopes into orbit.

Evidence pertaining to the evolution of bipedalism and the other traits to be considered is hard to come by. The most reliable kind is the actual stuff – bones, flints, bits of charcoal, and their locations vis-à-vis each other and surroundings – that has survived from the deep past of our lineage, but there is not

a lot of it per 100,000 years, so to speak. Paleoarcheologists spend much of their careers in remote regions, chancing malaria and bandit attacks, to collect the stuff, then years in front of computer screens to interpret these materials. There they perform prodigies of insightful analysis (and sometimes remind even friends that blood squeezed from a stone is usually that of the squeezer).

Another useful kind of material evidence is our own selves, our bodies and minds, which are the estate and effects bequeathed to us by our ancestors. We are mostly what we are in physique, physiology, and mentalité because of what they were and experienced. To cite obvious examples, our brains are big because they were useful to our ancestors and our little toes are little because they were not. To cite a less obvious case, consider the location of our larynx, low in our throats as compared to other animals', which has the disadvantage of making it possible for us "to swallow the wrong way." The compensatory advantage is that the larynx in that position plays an essential role in speaking. Ipso facto, speech has been worth the risk of choking to death, that is, it has been very important for many generations to *Homo sapiens* survival.[6]

Lastly, we can, albeit very gingerly, turn to analogy: that is, if recent humans acted in such-and-such a way, then ancient hominids may have done the same. If, for instance, the likes of Captain Ahab and Queequeg killed whales, huge and immensely dangerous, with spears propelled by hand, then it is plausible to think that humans may have done the same with mammoths many thousands of years ago.

[6] Philip Lieberman, *The Biology and Evolution of Language* (Cambridge: Harvard University Press, 1984), 271–328.

Physicists and chemists can offer laboratory proofs. Paleoanthropologists and historians, like geologists, can only try for plausibility. We who are students of deep time must turn cartwheels on top of the parapet and yell defiance at the sharpshooting critics. This is useful because if either the acrobat proves to be right or the snipers to be accurate, we learn something.

ONE

The Pliocene: Something New Is Afoot

> That's one small step for a man, one giant leap for mankind.
>
> Neil Armstrong (1969)

We start with the Australopithecines,[1] the earliest hominids, that is, the earliest creatures clearly our relatives and not shared with chimpanzees. If we inquire into what was most like us about them, millions of years ago, we may discover what is most ancient in hominid heritage and perhaps what is the true essence of humanity. Were they bright – like us? (a question best asked while preening before a computer screen). No, their brains were only about a third the size of ours.

We make tools – spoons, forks, internal combustion engines, atomic energy plants – and expect our ancestors to have made

[1] I should point out that I will eschew whenever possible numerical dates, even those that allow for pluses and minuses of hundreds of thousands of years, and, with few exceptions, I will omit hominid species names as well. I don't want to pose as a paleoanthropologist nor do I want to become the innocent bystander so often injured in the combat of experts. I am interested in the chronological sequence of our ancestors and in their physical and mental capabilities, not dates or geneologies per se. I have my own fish to fry.

tools. Did Australopithecines make anything we recognize as even the crudest of tools, for instance, a chipped cobble with sharpish edges?[2] No, they didn't. They no doubt made use of rocks and branches at hand, which they may have modified slightly for the purpose, for instance, stripping bark from twigs to extract termites from logs. Chimps do that sort of thing, but have never elaborated on such behavior. Australopithecines or the species in hominid evolution that followed obviously did, but not to begin with.[3]

There is one feature of the Australopithecine skeleton that even a weekend paleontologist can spot immediately as prefiguring his or her own skeleton. It is the foot, which Dr. Frederic Wood, author of the classic *Structure and Function as Seen in the Foot,* celebrates as conferring "upon Man his only real distinction and provide his only valid claim to human status."[4]

The foot began as a hand, and its twenty-six bones – seven tarsals, five metatarsals, fourteen phalanges – are obviously versions of the bones of the hand: the thumb as the big toe, the four fingers as the other toes, the heel of the hand as the heel of the foot. The palm has lengthened into an arch, the toes have undergone abbreviation. The big toe has swiveled into line with the other toes and lost its vaunted opposability, and can no more reach the little toe than the stars.

The foot began as a hand, an organ of many capabilities, an organ for manipulation (a word derived from the Latin for hand). Making a foot of it would seem to be a case of making a sow's ear

[2] Bernard Wood, "The Oldest Whodunnit in the World," *Nature,* Vol. 385 (January 23, 1997), 292; Shanti Menon, "Hominid Hardware," *Discover,* Vol. 33 (May 1997), 34.

[3] Readers who want to sample the debates about who was and who was not ancestral to *Homo sapiens* should read David S. Strait, Frederick E. Grine, and Marc A, Moniz, "A Reappraisal of Early Hominid Phylogeny," *Journal of Human Evolution,* Vol. 32 (January 1997), 17–82.

[4] Frederic Wood, *Structure and Function as Seen in the Foot* (London: Bailliere, Tindall and Co., 1944), 2.

out of a silk purse. The sacrifice of function involved proclaims that the advantages in becoming bipedal (for that is what we are dealing with here) must have been immense.

The foot's job is to bear our weight and to get us around in this world. What a deflation, you may think, of its raison d'etre since its glory days as a hand. That, however, is like saying that a hammer is inferior to a Swiss Army knife because the former has one talent and the latter many. But the hammer can do one important thing much, much better than the Helvetian multipurpose jackknife. It can hammer.

The foot's function of bearing weight requires stability, but it must not be so solid as to transfer every shock with the ground to the delicate structure of the body above. The foot's function of providing locomotion involves thrusting down and back, that is, elasticity, but of course it must not be so elastic as to entail instability.

Take your choice: the foot is either a brilliant compromise fulfilling these contradictory requirements or a jerry-built improvisation put together with the parts available.

The outside of the foot, the part in contact with the ground that runs from the ball of the foot around to the heel, is a static supportive organ. But we do not stump through the world: the toes and the arch from the ball behind the big toe back to the heel are elastic, mobile, and dynamic and provide propulsion. The longitudinal arch and the less obvious transverse arch between the inside to outside of the foot absorb the shocks that flesh (certainly the foot) is heir to.[5]

The foot is only one part of what we need to move about while upright. Above it is the ankle, a joint that experiences the shock of the foot's contact with the ground and must be supple enough to swivel forward and back, left and right, in order to accommodate to variations in that surface and the shifts, to and fro, side to side, of the weight above it. The knees likewise suffer pounding and also

[5] Wood, *Structure,* 247, 259, 261.

swivel forward and back (but not otherwise, if all is well). The hip joints also get pounded and must allow for rotation of the leg as well as its swing forward and back. In between the hip and the knee the thigh bone, the femur, tilts inward from the former joint to the latter. We are all skeletally knock-kneed. Otherwise we would waddle. Try walking with your feet exactly under the hip joint. Awkward. Widen the placement of your feet only a bit more and you will have the gait of a movie monster.

There are also our shoulders and arms, swiveling and swinging in opposition to the movement of our legs. They supplement our knock-kneed femurs in damping the sway from side to side. There is our back, arranged not in an arch, the architecturally sturdy form favored by other quadrupeds, including apes, but in an S-curve, the bottom half curving in and the top half out. We thus have managed to retain a central column with which to brace a torso and also to stand up straight (if you won't quibble about calling S a straight line) and to twist and sway whichever way is needed from moment to moment. Backaches and displaced disks are the price.

And, on top of the flexible neck, which is on top of everything else, is the head, that boulder whose misdirected mass can send the whole assemblage veering off in unexpected directions.

Myriad bundles of muscles connect and surround the hard bones. The exquisitely sequenced and coordinated contractions and relaxations of these soft tissues enable us to move like good animals rather than bad machines. Imagine the human body as a stick figure with each major flexible boney connection – two ankles, knees, hips, shoulders, elbows, one back, one neck – capable of only five positions each. How many positions is this simplified version of ourselves capable of assuming? That would be five times five eleven times over. The final total is 488,281,125. The total if calculated on the full range of the body's possible postures would be – literally – beyond calculation.

It is the functions of our muscles (and the nerves that direct them and transmit their return messages) that we find so difficult