

Origin and Evolution of the Genus *Homo*

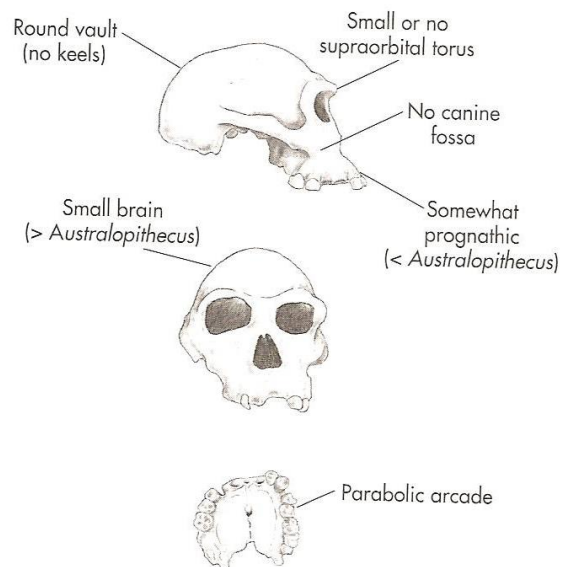
Context

The appearance of fossil remains that begin to depart from the australopithecine condition and represent yet another wave of adaptive radiation occurs around 2.5 million years ago. This radiation coincides with a period of great variability in the fossil record documented by major changes in the occurrence of different species of mammals. Climatic fluctuations during the Pliocene (approximately 5 – 2.5 mya) and Pleistocene exerted new selective pressures on mammalian populations in general, including the hominids. This period also represents an important turning point in human evolutionary history as the first stone tools appear in the archaeological record, documenting a new adaptive strategy by hominids. As anthropologist Ian Tattersall notes,

“The hominid stage was packed with actors, all pushing and shoving for the limelight; and the only thing we can be sure of is that the australopithecids ultimately lost out.” (2012:79)

Defining the Genus *Homo*

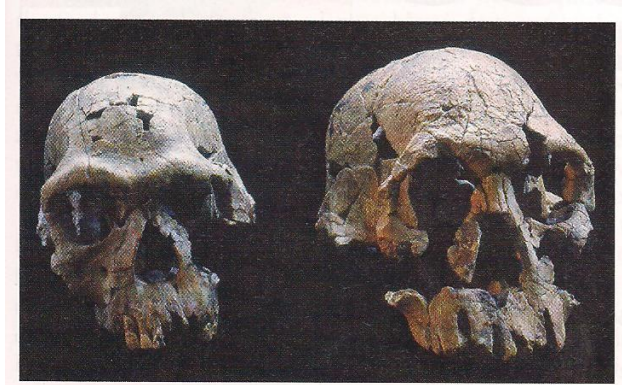
Remember that a taxonomic classification implies a certain adaptive strategy, so the switch in genus names from *Australopithecus* to *Homo* indicates the appearance of a whole suite of adaptive differences between species in the two genera. In general, genus *Homo* differs from australopithecines by having a larger braincase; a smaller, less projecting face; smaller teeth; and eventually a larger body and more efficient striding bipedalism. These features are most likely related to the adoption of a more animal-based diet, greater ranging, and greater food processing through tool use. However, early members of the genus *Homo* differ less strongly from australopithecines than do later members and therefore are harder to distinguish from them.



There is much taxonomic debate over the classification of species belonging to the earliest members of our genus. This is partly due to the fragmentary nature of the fossil evidence, but also to the increasingly apparent factor of an intriguing diversity within the fossil remains currently known. Many scholars think that differences between the largest and smallest early *Homo* crania are too great to be encompassed by the variation of a single species (see Table below). The smallest has a brain almost one-third smaller (only 510 cc) than the largest specimens, smaller teeth, and a differently proportioned face. In addition, the smaller postcranial remains exhibit slightly longer upper limbs (a primitive trait) than do the other larger specimens. Sorting out species structure and assigning species designations to bits and pieces of ancient skeletal and cranial remains is one of the most basic yet most difficult tasks of the paleoanthropologist.

Cranial Differences between Key Early *Homo* Fossils

Fossil ID	KNM-ER 1813	KNM-ER 1470
Cranial Capacity	510 cc	775 cc
Browridges	Moderate to small	None
Face	Small	Large/flat
Posterior (back) Tooth Size	Small	Large



EARLY *HOMO* SKULLS

KNM-ER 1813 on the left and KNM-ER 1470 on the right. The crania, and especially the faces differ enough that some scientists argue that they represent two different species.

Behavioral Adaptations

Early members of the genus *Homo* have been found in both East Africa and South Africa. They range in time from 2.4 to 1.4 million years ago. The earliest known member of our genus was discovered by Louis and Mary Leakey in Olduvai Gorge, Tanzania in East Africa. Named *Homo habilis*, or “**Handy man**,” the Leakeys firmly believed that this hominid was the maker of the stone tools they had found in association with the remains. The tools fashioned by *H. habilis* were called **Oldowan** style tools (named for their first discovery in Olduvai Gorge in Tanzania). We refer to stone tools made in a particular way or tradition as a **tool industry**. Oldowan tools consisted of a multi-purpose “smasher-basher” core tool, and a razor sharp flake tool used to slice & scrape meat from bones. These tools were produced by striking a hammerstone rock against a large cobblestone, which would chip off a flake and produce a jagged edged core---two tools from one action.

The introduction of stone tools was revolutionary for it allowed hominids to exploit a new food resource more safely, efficiently, and with more regularity: meat and bone marrow. These high-energy, calorie packed foods are just what is needed for a growing brain and a more active lifestyle. This also led to changes in dentition, as now hominids can rely on tools they manufacture rather than their teeth for food processing.

Homo habilis, with its small size, still faced formidable challenges from big predators. It is therefore unlikely that *habilis* was hunting prey any bigger than itself. Rather, the archaeological record overwhelmingly supports a **scavenging** way of life, which demands a keen sense of animal activity patterns and the environment. Leg bones, usually the leftovers from a leopard’s or a lion’s meal since they contain the least amount of meat, have been found with cut marks made by stone tools in association with *H. habilis* remains. The bones have been smashed open, and the marrow extracted----something no carnivore could accomplish with teeth alone.

Homo erectus and descendants

Around 2 mya, the hominids underwent a major adaptive shift in body size and in cultural innovations. Closely following early populations of *Homo habilis*, a new type of hominid appears. This species is known as *Homo erectus*, or “Upright walking man.” The age range for *Homo erectus* is **2 my to as recent as 250,000 years ago**. Unlike the short, australopithecine sized *habilis*, *H. erectus* was very tall and much more muscled and robust than modern humans. Brain size again increased dramatically with a cranial capacity of 850-1100 cc. The crania belonging to this species of Homo have some very distinct features which are reviewed below in the illustration.

Behaviorally, *Homo erectus* is also distinct from other hominids. For one, some members of this group were presumably the first to leave the African continent. *Homo erectus* sites/remains have been uncovered in Asia, Southeast Asia, North, East and South Africa, and in some parts of Europe, making it the widest ranging hominid besides modern humans. Changing climates, growing populations, and pressure on resources probably led some segments of erectus populations to search for food, shelter and water in other places. It has also been suggested that *Homo erectus* may have been following the movements of migratory animals, which archaeological evidence shows they were now **hunting** with some regularity. In addition, they were the first hominid known to control (not make) fire; again, suggesting increased intelligence and a keen sense of the environment. Cooking food, especially meat, makes it easier to chew and digest. Less and less pressure for the teeth to be used as food processing tools is reflected in the very modern human-like appearance of *H. erectus* dentition.

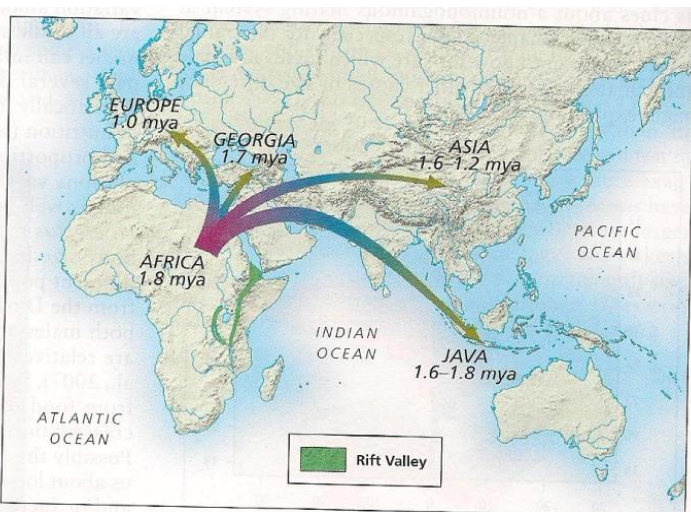
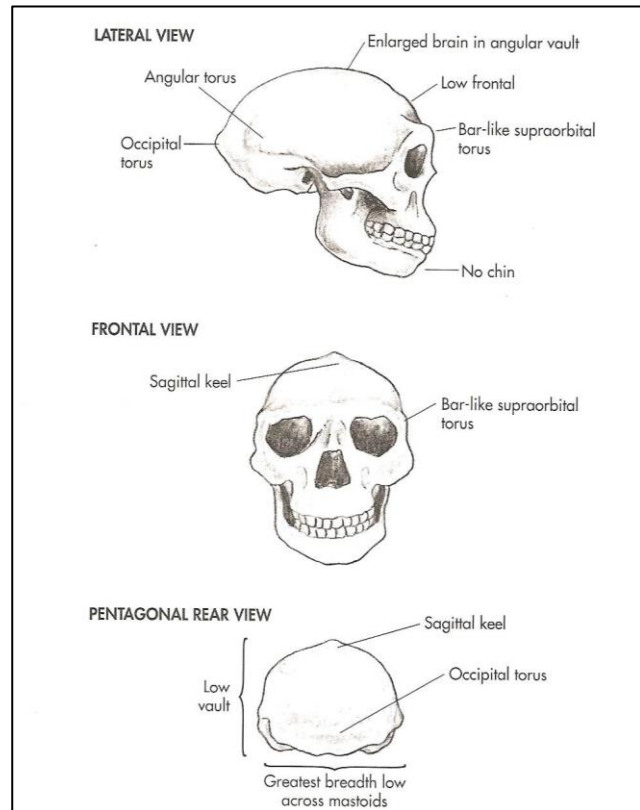


FIGURE 12.27 *H. erectus* migrated out of Africa beginning about 1.8 million years ago and is first known from Georgia and Java.

Finally, the stone tools made by *Homo erectus* were more developed than the *Oldowan* style tools made by *Homo habilis* and represented more manipulation and control over the size and shape of the tools. The tool tradition or style associated with *H. erectus* is known as the **Achuelean**. A typical Achuelean tool is a large, bifaced, often tear-drop shaped tool called the **hand axe**. Hand axes are found in Africa and Europe but NOT in eastern Asia. Experiments show that this tool was probably used on meat, bone, wood, and hides and has been referred to as the “Swiss Army knife of the Lower Paleolithic.”