

Table 4: Degree of extinctionⁱ (%) in the five major mass extinctions in the fossil records

Mass extinction	Families		Genera	
	Observed extinction	Calculated species-level extinction	Observed extinction	Calculated species-level extinction
1. End-Ordovician 439 Ma ⁱⁱ	26	84	60	85
2. End Devonian 367 Ma	22	79	57	83
3. End Permian 243 Ma	51	95	82	95
4. End Triassic (Norian) 208 Ma	22	79	53	80
5. End-Cretaceous 65 Ma	16	70	47	76

SOURCE: Jeffrey S. Levinton, "Extinction, Rates of," *Encyclopedia of Biodiversity* (San Diego, CA: Academic Press, 2001), 2:715–729 [719].

NOTES: (i) Extinctions/standing taxonomic richness $\times 100$.

(ii) Ma = Million years.

Table 5: Milestones in hominid cultural evolution

6 million to 2 million years BCE

- *Aridipithecus ramidus*, the oldest known possibly bipedal ape represented by fossils from sites in Ethiopia. These first chimp-sized pre-humans with an upright posture appearing in the East African Rift Valley are followed approximately 4 million years ago by the better-known *Australopithecus africanus*, a small-brained upright walker from the sites in northern Kenya; and *Australopithecus afarensis*, a big-faced apelike species to which the famous "Lucy" belonged.

2 million years BCE

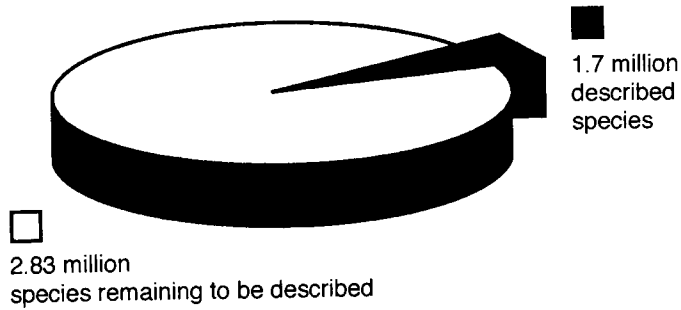
- *Homo erectus* had a brain of 1,100 cc (three-quarters the size of anatomically modern humans), suggesting that having a large brain helped in acquisition of skills like tool using, which is not unique to humans (used by finches, chimps), tool making, and the use of fire, which is unique to humans (making possible artifacts ranging from flint axes to, more recently, computers). 98% of hominid history is defined by hunting/gathering and foraging/scavenging modes of life.

130,000 BCE

- Modern anatomy is first recognized for early *Homo sapiens* (the earliest fossils are documented in Africa with an estimated founding population of c. 10,000 people).

TABLES

Table 1: Species remaining to be described out of an estimated total of 30 million



SOURCES: World Resources Institute, the World Conservation Union, and the United Nations Environment Program, in consultation with the Food and Agriculture Organization and the United Nations Education, Scientific and Cultural Organization, *Global Biodiversity Strategy* (World Resources Institute, Washington, DC, 1992), p. 156.

NOTE: The number of described species in 1992 is 1.4 million. The estimated number of described species in 1997 is 1.7 million. Estimates of total species diversity range between 5 million and 100 million species. Most estimates fall between 30 million and 50 million species.

Table 2: Four categories of the instrumental value of biodiversity

Category	Example
Goods	Food, fuel, fiber, medicine
Services	Pollination, recycling, nitrogen fixation, homeostatic regulation
Information	Genetic engineering, applied biology, pure science
Psycho-spiritual	Aesthetic beauty, religious awe, scientific knowledge

SOURCE: Gary K. Meffe and C. Ronald Carroll et al., "Conservation Values and Ethics," *Principles of Conservation Biology* (Sunderland, MA: Sinauer Associates, Inc. Publishers, 1994), p. 25.