

Table 2-1

Journeys in Deep Time

In order to gain some perspective on the enormity of geological time imagine the following scenario: A scientist has invented a time-machine which can travel backward in time at the fixed rate of one hundred years for every second experienced by the time-traveler. The table below illustrates how long it will take the scientist time-traveler to reach certain destinations in the past. (BP = before present)

Subjective Time	Real Time	Associated Events
0.98seconds	1903 AD (98 BP)	First flight of heavier-air-craft (airplane)
2.25 seconds	1776 AD (225 BP)	Birth of the United States of America
4.79 seconds	1522 AD (479 BP)	First recorded circumnavigation of the globe
5.46 seconds	1455 AD (546 BP)	Invention of the printing press
7.86 seconds	1215 AD (786 BP)	Magna Carta is signed; Genghis Khan captures Beijing
10.00 seconds	c. 1000 AD (1000 BP)	Vikings colonize North America
15.00 seconds	c. 500 AD (1500 BP)	Birth of Muhammad
16.97 seconds	304 AD (1697 BP)	Huns invade China
20.07 seconds	6 BC (2007 BP)	Birth of Christ
22.05 seconds	204 BC (2205 BP)	The Great Wall of China is completed
23.85 seconds	384 BC (2385 BP)	Birth of Aristotle
25.64 seconds	563 BC (2564 BP)	Birth of Buddha
32.00 seconds	c. 1200 BC (3200 BP)	Olmec pyramids erected in Mexico
46.00 seconds	c. 2600 BC (4600 BP)	The Great Pyramid of Giza is built
50.00 seconds	c. 3000 BC (5000 BP)	Stonehenge is constructed, Sumerians invent writing
55.00 seconds	c. 3500 BC (5500 BP)	The wheel is invented by Sumerians
1 minute, 17 sec.	c. 7,700 BP	Corn is cultivated in Mexico
1minute, 28 sec.	c. 8,800 BP	The earliest known city, Catal Huyuk, rises in Asia Minor

1 minute, 30 sec.	c. 10,300BP	The ice age ends
1 minute, 47 sec.	c. 10,700 BP	Goats and sheep are domesticated in the Middle East
2 minutes	c. 12,000 BP	The domestic dog is bred from the wolf
3 minutes	c. 18,000 BP	Cold peak of latest ice-age; wheat and barley are cultivated in Egypt; gazelles and goats are herded in the Middle East
3 minutes, 20 sec.	c. 20,000BP	The bow and arrow is invented in north Africa
4 minutes, 20 sec.	c. 28,000 BP	The Neanderthals become extinct
5 minutes	c. 30,000 BP	The Cosquer cave paintings are created
6 minutes, 40 sec.	c. 40,000 BP	Modern humans colonize Australia
7 minutes, 50 sec.	c. 40,000 BP	Neanderthals erect a shrine comprised of cave bear skulls in France
10 minutes	c. 60,000 BP	Neanderthals bury their dead with flowers from medicinal plants in Iraq
12 minutes	c. 72,000 BP	Beginning of the most recent ice age
16 minutes, 40 sec.	c. 100,000 BP	Anatomically modern humans inhabit South Africa
33 minutes, 33 sec.	c. 200,000 BP	An archaic <i>Homo sapiens</i> crafts a hand ax from a stone so that a fossil sea urchin embedded in it is displayed, showing a concern with aesthetics
50 minutes	c. 300,000 BP	Hand axes are made more symmetrically than previously, suggesting improved cognitive abilities
1 hour	c. 6000,000 BP	The first archaic <i>Homo sapiens</i> appears
2 hours, 46 minutes	c. 1 million BP	<i>Homo erectus</i> migrates out of Africa
3 hours, 53 minutes	c. 1.4 million BP	<i>Homo erectus</i> masters the use of fire
5 hours	c. 1.8 million BP	<i>Homo erectus</i> appears
6 hours, 40 minutes	c. 2.4 million BP	<i>Homo habilis</i> emerges about the same

10 hours	c. 3.6 million BP	time as early stone tools Bipedal hominids leave footprints in Laetoli ash
19 hours, 27 minutes	c. 7 million BP	The common ancestor of modern humans and chimpanzees inhabits Africa
1 day, 16 hours	c. 15 million BP	The ancestor of orangutans diverges from the ape/human lineage
4 days, 1 hour	c. 35 million BP	The ancestors of new world primates reach South America from Africa
7 days, 12 hours	c. 65 million BP	The earth collides with a large cosmic body resulting in cataclysmic extinctions, including dinosaurs
11 days	c. 95 million BP	The first primates evolve
13 days, 5 hours	c. 114 million BP	Placental mammals evolve
20 days, 6 hours	c. 175 million BP	Jurassic reptiles flourish, including sauropod dinosaurs that are the largest terrestrial mammals to ever appear on earth
28 days, 9 hours	c. 245 million BP	The Permian Age ends with the greatest mass extinction event in Earth's history; 90% of all species become extinct
36 days, 6 hours	c. 313 million BP	The first reptiles evolve
49 days, 5 hours	c. 425 million BP	The first jawed, bony fishes appear
77 days, 13 hours	c. 670 million BP	Jellyfish and flatworms appear
150 days, 11 hours	c. 1300 million BP	The earliest plants, in the form of micro-seaweed, evolve
185 days, 5 hours	c. 1600 million BP	Blue-green algae (e.g., photosynthetic bacteria) appear
208 days, 8 hours	c. 1800 million BP	The symbiotic precursors of modern mitochondria take up residence in the

		cell bodies of the ancestors of eukaryotic cells
1 year, 86 days, 10 hrs.	c. 3900 million BP	Photosynthetic bacteria evolve
1 year, 98 days	c. 4000 million BP	Life begins on earth
1 year, 161 days, 15 hrs.	c. 4550 million BP	The solar system forms
1 year, 173 days, 5 hrs.	c. 4650 million BP	The supernova that will produce the building blocks of our solar system occurs
3 years, 352 days	c. 12,500 million BP	The first star systems in the universe form
4 years, 102 days, 12 hrs.	c. 13,500 million BP	The “big bang”, or birth of the universe