EasyTimeLine

Illustrated *Before* Human Era
BHE Timeline
of
Human Achievements, Advancements, Innovations, and Understanding in Science using EMILIANI's HE Calendar Reform Idea

RUTHIE S. PREMACK
Author / Compiler

PAUL PREMACK
Technical Advisor

BHE Edition v3
12023 HE

- I dedicate this book -

To the wonderful man who is my science thinking husband PAUL PREMACK, our adult children who grew up to both achieve college science degrees TIFFANY PREMACK and BENJAMIN PREMACK for their love, brains, attention to detail, laughter, and thoughtfulness.

To CESARE EMILIANI, who first had the idea for the Human Era (**HE)** calendar.

To any human who can open their mind to seeing the (HE) flow of human accomplishment; to being enchanted, shocked, disappointed, or amazed by the wonders and realities of science, recognizing that ThenWasThen and NowIsNow.

Before the Human Era: The Big Bang to the Stone Age

Circa 13,700,000,000 BHE: The universe began.[1] [2] [3] Note: as of May **12019 HE** there is data to indicate the expansion of the Universe may be faster than previously measured. If so, the age of the Universe may be as young as 13 billion years, making the

[1] NASA WMAP (Wilkinson Microwave Anisotropy Probe) SCIENCE TEAM
[2] ALAN GUTH, The Inflationary Universe: The Quest for a New Theory of Cosmic Origins
[3] MAX TEGMARK, ***Our Mathematical Universe*** and Royal Institution YouTube videos

Universe slightly younger than was previously thought. The scientific journey on this issue continues![4]

Circa 13,400,000,000 BHE: The universe cooled to the point where the plasma became transparent to light. The cooling plasma formed the Star-stuff element Hydrogen from protons and electrons.[5] Star-stuff elements Helium and Lithium were also formed.[6] [7]

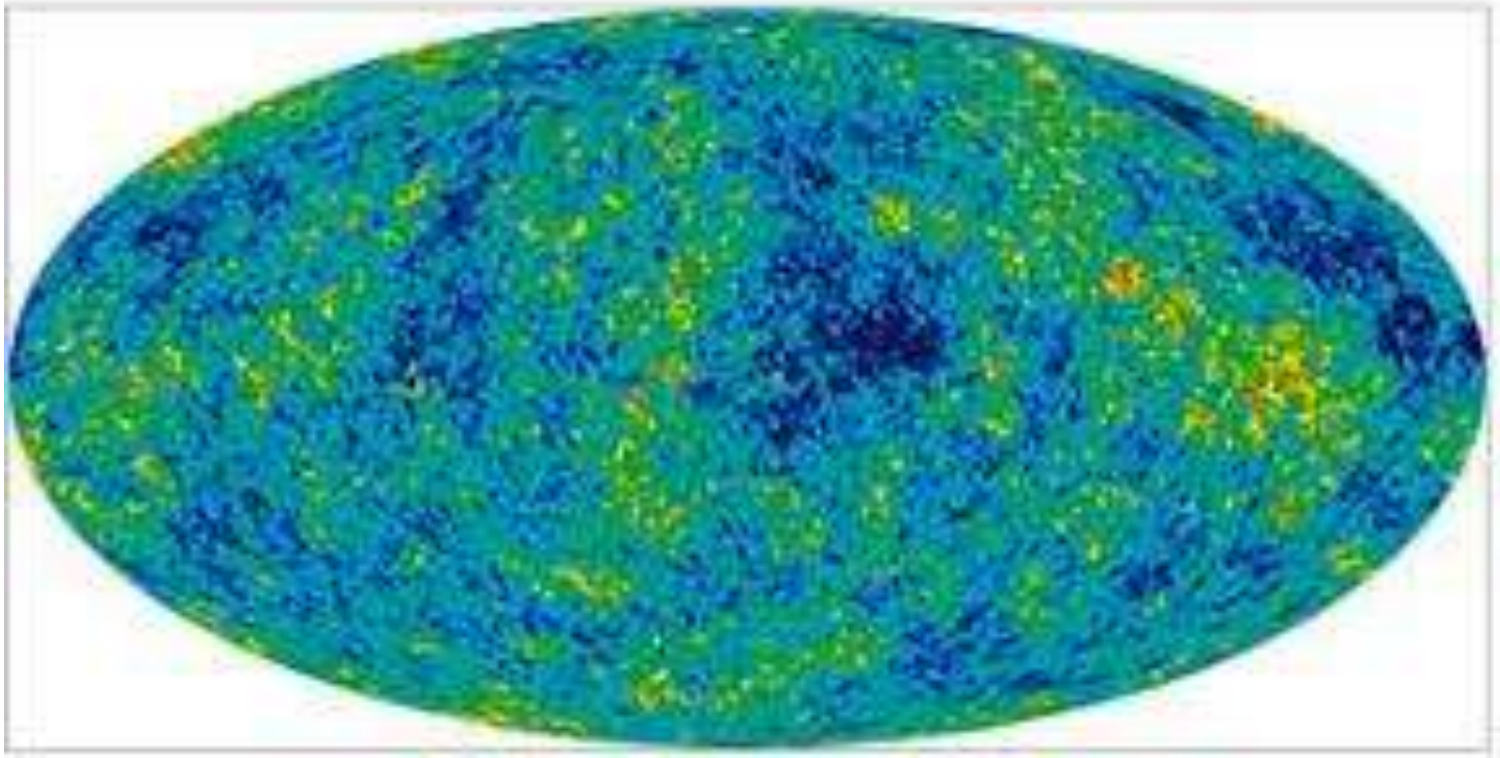
⇨ The amount of time from the previous entry to this entry is circa 300,000 years which is approximately 25 times longer than the entire Human Era.

---

[4] http://www.astronomy.com/magazine/news/2019/04/cosmic-conundrum-just-how-fast-is-the-universe-expanding
[5] LAWRENCE M. KRAUSE ***A Universe from Nothing***, page 43
[6] https://en.wikipedia.org/wiki/Big_Bang_nucleosynthesis
[7] https://en.wikipedia.org/wiki/Chemical_element

⇨ The Cosmic Microwave Background (CMB) is the remnant of the big bang's energy and is direct evidence of the Big Bang.[8]

[8] LAWRENCE M. KRAUSE ***A Universe from Nothing***, page 42



⇨ Nine Year Microwave Sky Survey of the CMB.[9]

[9] https://map.gsfc.nasa.gov/media/121238/index.html

- ⇨ CARL SAGAN said: “We are made of Star Stuff” in his TV series ***Cosmos***: ***A Personal Voyage***[10]. Throughout the Human Era Timeline, the term “Star Stuff” is inserted by Author / Compiler to reflect CARL SAGAN’s comment. We are made of what is in our universe and the universe is made of us. Many elements are further described with the scientist and at the HE time each was isolated.

Circa 13,300,000,000 BHE: Large volumes of matter are coaxed by gravity into forming trillions of stars in billions of galaxies. The first stars, called Population III stars, start the process of turning the light “Star Stuff” element Hydrogen into the heavier “Star Stuff” elements. Population II stars are formed early on in this

[10] https://en.wikipedia.org/wiki/Carl_Sagan

process and continue today. Population I stars formed later and continue today.[11]

⇨ Partial **12018 HE** updated lyrics from the **11982 HE** Monty Python "GALAXY SONG" sung by Eric Idle (which he says was accurate at the time – but of course science has moved forward, and more accurate information exists in **12018 HE):** "Our galaxy itself contains 300 billion stars, It's 100,000 light years side to side. It bulges in the middle 16000 light years thick, but out by us it's just 3 thousand light years wide. We're 30,000 light years from galactic central point; We go round every 200 million years; And our galaxy is only one of millions and billions, in this amazing and expanding Universe."[12]

---

[11] https://en.wikipedia.org/wiki/Chronology_of_the_universe

[12] Eric Idle song updated with help from Professor BRIAN COX http://www.comedy-songs.com/news.php?ID=38

Circa 13,200,000,000 BHE: The Milky Way Galaxy formed.[13]

⇨ Artist's concept of the Milky Way Galaxy, Credit JPL.[14]

---

[13] https://en.wikipedia.org/wiki/Milky_Way
[14] https://www.nasa.gov/mission_pages/GLAST/science/milky_way_galaxy.html

Circa 13,200,000,000 BHE: Many Population III stars have lived their lifetimes, resulting in Hypernova stellar explosions which are energetic enough to form heavier "Star Stuff" elements: Beryllium, Boron, Carbon, Nitrogen, Oxygen, Fluorine, Neon, Sodium, Magnesium, Aluminum, Silicon, Phosphorus, Sulphur, Chlorine, Argon, Potassium, Calcium, Scandium, Titanium, Vanadium, Chromium, Manganese, and Iron.[15] [16] [17]

⇨ Second and third generation super novae produce heavier elements beyond iron because very massive stars live fast and die young in cataclysmic supernova explosions. In our galaxy, such stars go supernova about once a century. These explosions are far hotter than the core of our sun, hot enough to transform elements like Iron into all the heavier ones and spew them into

---

[15] https://en.wikipedia.org/wiki/Chemical_element
[16] https://en.wikipedia.org/wiki/Stellar_nucleosynthesis
[17] https://en.wikipedia.org/wiki/B2FH_paper

space.[18] These next heavier "Star Stuff" elements are: Cobalt, Nickel, Copper, Zinc, Gallium, Germanium, Arsenic, Selenium, Bromine, Krypton, Rubidium, Strontium, Yttrium, Zirconium, Niobium, Molybdenum, Technetium, Ruthenium (atomic number 44, author really likes this element one because it relates my name to science), Rhodium, Palladium, Silver, Cadmium, Indium, Tin, Antimony, Tellurium, Iodine, Xenon, Cerium, Praseodymium, Neodymium, Promethium, Samarium, Europium, Gadolinium, Terbium, Dysprosium, Holmium, Erbium, Thulium, Ytterbium, Lutetium, Hafnium, Tantalum, Tungsten, Rhenium, Osmium, Iridium, Platinum, Gold, Mercury, Thallium, Lead, Bismuth, Polonium, Astatine, Radon,

[18] COSMOS, A Space Time Odyssey, by Ann Druyan Episode 6

Francium, Actinium, Thorium, Protactinium, Uranium, through Element with atomic number 93, Neptunium.[19] [20] [21] [22]

⇨ ***The B2FH Paper*** (See **11957 HE**[23]) comprehensively outlined and analyzed several key processes that are responsible for the nucleosynthesis of the elements heavier than iron and their relative abundance by the capture within stars of free neutrons.[24] [25] [26] [27]

---

[19] https://en.wikipedia.org/wiki/Stellar_nucleosynthesis
[20] https://en.wikipedia.org/wiki/Periodic_table
[21] https://en.wikipedia.org/wiki/B2FH_paper
[22] VERITASIUM DEREK MULLER https://www.youtube.com/watch?v=EAyk2OsKvtU
[23] https://en.wikipedia.org/wiki/B2FH_paper
[24] https://en.wikipedia.org/wiki/Stellar_nucleosynthesis
[25] https://en.wikipedia.org/wiki/Periodic_table
[26] https://en.wikipedia.org/wiki/B2FH_paper
[27] VERITASIUM DEREK MULLER https://www.youtube.com/watch?v=EAyk2OsKvtU

Circa 4,600,000,000 BHE: Our sun was formed from the elements and material expelled by second and third generations of exploding stars.[28] [29] Despite the lore from Superman comics, our sun is not a yellow sun, it is a white sun.[30]

⇨ 

Photo of our white sun.[31]

---

[28] "Sun Fact Sheet". NASA Goddard Space Flight Center.

[29] Bonanno, A.; Schlattl, H.; Paternò, L. (2008). "The age of the Sun and the relativistic corrections in the EOS". Astronomy and Astrophysics. 390(3): 1115–1118. arXiv:astro-ph/0204331. Bibcode:2002A&A...390.1115B.doi:10.1051/0004-6361:20020749.

[30]Neil deGrasse Tyson explains 10 Things You have Heard and Re-told

[31] Photo taken by Paul Premack, in the Southern Caribbean

Circa 4,550,000,000 BHE Gravity congeals the stellar cloud of star stuff elements from which our sun was formed into the beginnings of our solar system, including planet Earth.[32] [33] [34]

⇨ More updated lyrics from Monty Python's "THE GALAXY SONG": "Just remember that you're standing on a planet that's evolving and revolving at 900 miles an hour. That's orbiting at 19 miles a second, so it's reckoned, A sun that is the source of so much power. The sun and you and me and all the stars that we can see, are moving at six million miles a day in an outer spiral

---

[32] https://en.wikipedia.org/wiki/Clair_Cameron_Patterson
[33] JULI PERETO http://www.im.microbios.org/0801/0801023.pdf
[34] BBC Men of Rock 2 of 3 Moving Mountains
https://www.youtube.com/watch?v=w1wH3cGQLjE

arm, 200,000 miles an hour, Of the galaxy we call the Milky Way.[35]

Circa 4,100,000,000 BHE to 3,700,000,000 BHE: Abiogenesis: the first basic life forms evolved on Earth.[36] [37]

Circa 400,000,000,000 BHE – circa 360,000,000 BHE existing to current times: The beginning of another kingdom of life: Fungi. A land-based fungi called Prototaxites sometimes grew to over two stories tall like living spires.[38]

---

[35] Eric Idle song updated with help from Professor BRIAN COX http://www.comedy-songs.com/news.php?ID=38

[36] JULI PERETO http://www.im.microbios.org/0801/0801023.pdf

[37] https://en.wikipedia.org/wiki/Abiogenesis

[38] MERLIN SHELDRAKE ***Entangled Life***

Over the millions of years since ancient 2 story tall Prototaxites, fungi have evolved so that Hyphae and Mycelium Fungi now live mostly underground as the "Wood Wide Web" supporting the plant life which supports all other life on earth. Fungi also live inside you, on you, and around you. Unlike the limitations of Moss and of art, you *can* interact with **Fungi and its fruiting body Mushrooms with care and attention**[39]. **Do not eat Fungi and mushrooms until educated and trained** like you would not eat a Lion or Fire or The Mona Lisa.[40]

ROB NELSON (StoneAgeMan) quoted mushroom hunter ROBERT ROGERS, "There are bold mushroom hunters and there are old mushroom hunters, but there are no old bold mushroom hunters."[41]

---

[39] MERLIN SHELDRAKE ***Entangled Life***

[40] Author/compiler Ruthie Premack

[41] ROBERT ROGERS, StoneAgeMan Video: https://www.youtube.com/watch?v=_mbP_YrgWnw

Circa 3,000,000,000 BHE: It was at this point that blue-green algae started to develop in the waters of Earth. Photosynthesis is the process by which plants use light to produce complex carbohydrates and release oxygen as a waste product. These changes in oxygen levels triggered the move toward biodiversity on Earth.[42]

Circa 3,000,000,000 BHE to Circa 2,000,000,000 BHE: Most of the extra oxygen produced by blue-green algae went into the oxidation of iron.[43] The Earth rusted.[44]

Circa 2,000,000,000 BHE: Eukaryotes arose when a single-celled organism engulfed a bacterium, which continued to live symbiotically

---

[42] PAUL PARSONS & GAIL DIXON, ***The Periodic Table***
[43] PAUL PARSONS & GAIL DIXON, ***The Periodic Table***
[44] Paul Premack

inside it (endosymbiosis). Mitochondria were and are the descendants of that coming together.[45]

Mitochondria have many influences in a host organism[46]. Many Mitochondria make ATP.[47] Additionally, Mitochondria influences reproduction of the species host in which it lives (including contributing to human overpopulation[48]). Mitochondria pass through the mother.[49]

Researchers have speculated that the evolution of Mitochondria was the first step in the evolution of eukaryotes (the "mito-early hypothesis"), and that the acquisition of Mitochondria provided the energy production

---

[45] RICHARD DAWKINS ***The Extended Phenotype*** and MERLIN SHELDRAKE ***Entangled Life***
[46] STEVEN H. GUNDRY, MD ***The Energy Paradox*** and ***122022 GundryMD Podcasts***
[47] By: William F. Martin, Ph.D. (Institute for Botany, University of Dusseldorf) & Marek Mentel, Ph.D. (Dept. of Biochemistry, University of Bratislava) © 12010 Nature Education
Citation: Martin, W. & Mentel, M. (12010) The Origin of Mitochondria. Nature Education 3(9):58
[48] Author Compiler interpretation
[49] RICHARD DAWKINS ***The Extended Phenotype***

capacity to drive cells to encode more genes, synthesize more proteins, and make bigger cells overall.[50]

Molecular biologists have discovered how ancient bacteria gradually evolved into Mitochondria in eukaryotic cells. Those eukaryotic cells ultimately gave rise to all complex life forms, such as plants and animals.[51]

Researchers identified two key changes in the protein synthesis and surveillance machineries of the eukaryotic cells that resulted in the successful transition from bacteria to Mitochondria.[52] Of the 1,000 proteins identified in Mitochondria, 40% are of bacterial origin. To trace back Mitochondria's origin, the scientists did experiments with

---

[50] https://www.nature.com/articles/d44151-022-00006-8
[51] https://www.nature.com/articles/d44151-022-00006-8
[52] https://www.physicsforums.com/insights/when-did-mitochondria-evolve/

Jakobida, the earliest known, tiny free-living organisms that retain a bacteria-like Mitochondrial genome.

Amino acids come in two different forms – L and D. L-amino acids are predominantly used to make proteins in cells. From bacteria to mammals, cells use D-aminoacyl-tRNA deacylase (DTD), a proofreading enzyme that only allows L-amino acids, to prevent D-amino acids being incorporated into proteins.

The research team, led by RAJAN SANKARANARAYANAN at the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad, found that the bacterial DTD had undergone a change that was compatible for use in eukaryotic cells. They also found a change in the discriminator element for Mitochondrial transfer RNA (tRNA) that shuttles glycine, an essential amino acid for making a protein.

The team detected the intermediate state of the tRNA discriminator-code transition in the Mitochondrial genome of Jakobida. The researchers believe this probably happened during the Bacteria-to-Mitochondria transition. The researchers say their findings will help to increase understanding of the complex evolutionary history of Mitochondria.[53]

Circa 1,450,000,000 BHE: **– Current Times HE: "**Lichens (pronounced LY- ken) are remarkable examples of innovation emerging from partnership – the partnership of fungi and algae or fungi and bacteria."[54] It took until **circa 11967 HE** for the work of LYNN MARGULIS, American biologist[55] to be widely accepted. MARGULIS argued that some of the most significant life changing moments had

---

[53] https://www.physicsforums.com/insights/when-did-mitochondria-evolve/
[54] LYNN MARGULIS quoted in MERLIN SHELDRAKE's ***Entangled Life***
[55] RICHARD DAWKINS ***Unweaving The Rainbow*** and MERLIN SHELDRAKE ***Entangled Life***

resulted from the coming together – and staying together – of different organisms (like Lichens) in what we now call endosymbiosis.[56]

To this day, new ecosystems on land are still currently founded by descendants of these ancient Lichens. When volcanic islands are made or glaciers retreat to reveal bare rock, lichens– which are a union of fungi and algae or bacteria – are the first organisms to establish themselves.[57] and to make the soils in which plants subsequently take root. That soil, in well-developed ecosystems, would be rapidly sluiced off by rain were it not for the dense mesh of fungal tissue that holds it together.[58]

Lichens mine minerals from rocks in a twofold process known as "weathering". First, they physically break up surfaces by the force of

---

[56] RICHARD DAWKINS ***Unweaving The Rainbow*** and MERLIN SHELDRAKE ***Entangled Life***
[57] MERLIN SHELDRAKE ***Entangled Life***
[58] MERLIN SHELDRAKE ***Entangled Life***

their growth. Second, they deploy an arsenal of powerful acids and mineral-binding compounds to dissolve and digest the rock. When Lichens die and decompose, they give rise to the first soils in new ecosystems. Lichens are the go-betweens that inhabit the boundary dividing life and nonlife.[59]

There are few pockets of the globe where fungi and lichens can't be found. They exist in deep sediments on the seafloor, on the surface of deserts, at the edges of waterlines along the coast, on tombstones in a graveyard, in frozen valleys in Antarctica, in our guts and orifices, and in BIOMEX (short for Biology and Mars Experiment - the international consortium currently researching lichens in space. JOSHUA LEDERBERG, biologist, who around **12001 HE** coined the word *"microbiome*" holds concerns of humans being able to spread earthy organisms to space and in contrast humans bringing back to Earth from

---

[59] MERLIN SHELDRAKE ***Entangled Life***

space alien organisms that could cause ecological disruption or disease.[60]

Circa 1,450,000,000 BHE – current times: In plants: Chloroplasts were and are the descendants of photosynthetic bacteria being engulfed by early eukaryotic cells. All complex life that followed, human life included, is part of this long-lasting story of the "Intimacy of Strangers".[61]

Circa 500,000,000 BHE: As blue-green algae continued to evolve in the ocean, plants began to grow on land, in tide pools, and near

[60] MERLIN SHELDRAKE ***Entangled Life***
[61] RICHARD DAWKINS ***Unweaving The Rainbow*** and MERLIN SHELDRAKE ***Entangled Life***

shorelines.[62] Atmospheric oxygen reached the level of around 21%, where it has remained ever since.[63]

Circa 500,000,000 BHE – Current Times HE: Mosses are the smallest of visible plant life. They are very fragile, non-transplantable, tiny elaborate forests.[64] Mosses survive until current times mostly because they are largely undisturbed by "a current keystone species HE humans [65]". Mosses, mostly ignored by modern HE humans, support entire tiny elaborate ecosystems

---

[62] https://www.britannica.com › science › blue-green-algae
[63] PAUL PARSONS & GAIL DIXON, ***The Periodic Table***
[64] Ologies Podcast, Alie Ward with DR. ROBIN WALL KIMMERER at https://www.alieward.com/ologies/bryology?rq=bryology
[65] https://www.srs.fs.usda.gov/pubs/49882; LYLA JUNE ***3000-year-old Solutions to Modern Problems.*** TEDxKC

including Tardigrades, insects, invertebrates, and other important tiny lifeforms.[66]

Like you might do with any great art, you can look at Moss and what is in it with your own eyes. Even use a magnifying loop. Do not touch or disrupt Moss until educated and trained much as you would not touch a Lion or Fire or The Mona Lisa without being educated or trained.[67]

---

[66] Ologies Podcast, Alie Ward with DR. ROBIN WALL KIMMERER at https://www.alieward.com/ologies/bryology?rq=bryology

[67] Author/compiler Ruthie Premack

Circa 450,000,000 BHE: The beginning of Amphibia.[68] This means the beginning of amphibian life on Earth started circa 3.65 billion years after the first basic life forms began evolving on Earth.[69]

Circa 300,000,000 BHE: The land-based egg.[70]

Circa 300,000,000 BHE: The beginning of reptiles.[71]

Circa 300,000,000 BHE: The beginning of dinosaurs.[72]

Circa 220,000,000 BHE: The beginning of placental mammals.[73]

---

[68] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[69] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[70] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[71] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[72]ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[73] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***

Circa 100,000,000 BHE: The beginning of primates.[74]

Circa 100,000,000 BHE: Plants covered the surface of the earth for 100's of millions of years before they grew their first flower--- just before the extinctions of the dinosaurs.[75]

Circa 65,000,000 BHE: The end of large land dinosaurs.[76]

Circa 40,000,000 BHE: The beginning of monkeys.[77]

Circa 30,000,000 BHE: The beginning of apes.[78]

---

[74] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[75] COSMOS, A Space Time Odyssey, by Ann Druyan Episode 6
[76] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[77] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[78] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***

Circa 5,000,000 BHE: The beginning of hominids, the fossil ancestor of humans.[79] Wait about 4.7 million years for humans (See **circa 300000 BHE**).

Circa 3,980,000 BHE: Bipedal species emerged, *Australopithecines* Genus *Homo*.[80]

[79] https://en.wikipedia.org/wiki/Human_evolution#First_fossils
[80] ISAAC ASIMOV: ASIMOV'S ***Chronology of Science and Discovery***

⇨ 

Australopithecus Africanus reconstruction, San Diego Museum of Man, photographer unknown.[81]

- Author / Compiler note: Science has determined it took individuals in those bipedal species circa 580,000 years to start making tools and to launch the Stone Age.

Circa 3,400,000 BHE: During **12010 HE**, fossilized animal bones bearing marks from stone tools were found in the Lower Awash

[81] https://en.wikipedia.org/wiki/San_Diego_Museum_of_Man

Valley in Ethiopia. Discovered by an international team led by SHANNON MCPHERRON.[82]

Circa 3,300,000 BHE: Kenya: Archaeological discoveries in Kenya in **12015 HE**, identifying possibly evidence of hominin use of tools, have indicated that Kenyanthropus platyops (an early hominin species) were the earliest known tool users[83].

[82] https://en.wikipedia.org/wiki/History_of_Ethiopia#Prehistory
[83] https://en.wikipedia.org/wiki/Kenyanthropus

⇨ Pliocene Kenyanthropus platyops skull, photographer and location unknown[84]

[84] https://en.wikipedia.org/wiki/Kenyanthropus

Circa 3,200,000 BHE: Ethiopia, "Lucy," Bipedal walking.[85]

Lucy skeleton reconstruction at the Cleveland Museum of Natural History.[86]

[85] https://en.wikipedia.org/wiki/Lucy_(Australopithecus)
[86] https://en.wikipedia.org/wiki/Lucy_(Australopithecus)

⇨ Discovered by DONALD JOHANSON, MAURICE TAIEB, YVES COPPENS AND TOM GRAY.[87]

Circa 2,900,000 BHE to 2,700,000 BHE: Ethiopia: the species who made the Pliocene tools remains unknown. Fragments of *Australopithecus garhi*, *Australopithecus aethiopicus* and *Homo*, possibly *Homo habilis* have been found in sites near the age of the Gona tools. Stone tools had been found several sites at Gona, Ethiopia, on the sediments of the paleo-Awash River, which serve to date them. All the tools come from the Busidama Formation, which lies above a disconformity, or missing layer, which would have been from 2.9 to 2.7 million years ago.[88]

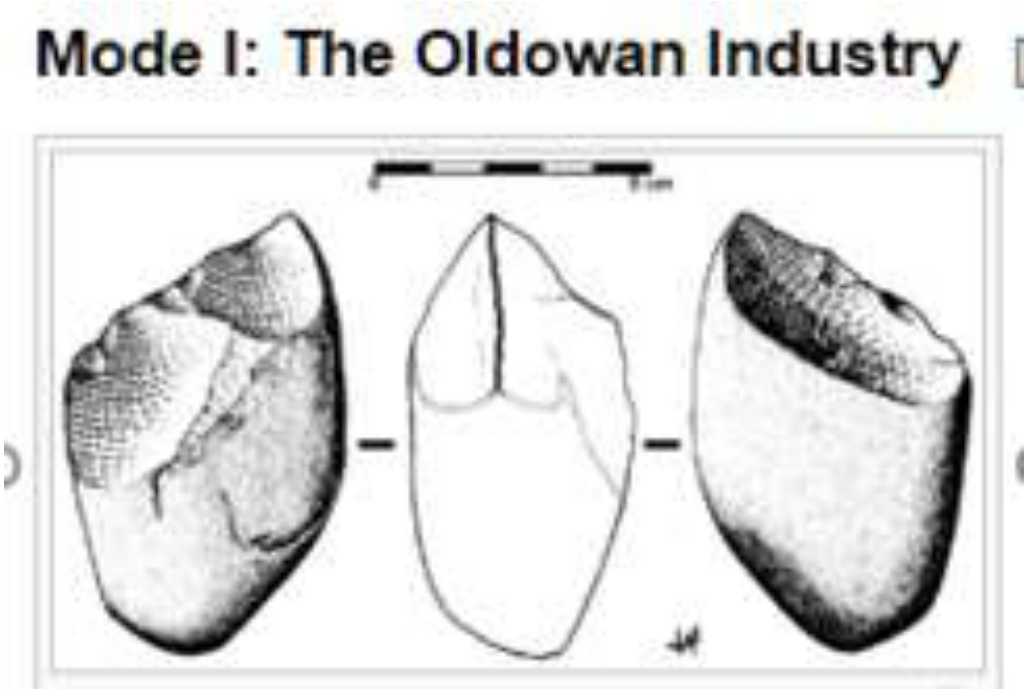
---

[87] https://en.wikipedia.org/wiki/Lucy_(Australopithecus)
[88] https://en.wikipedia.org/wiki/Stone_Age

⇨ Gona tools, photographer and location unknown.[89]

[89] www.dailymail.co.uk

⇨ Oldowan tradition chopper, photographer and location unknown.[90]



⇨ A typical Oldowan simple chopping tool. This example is from the Duero Valley, Valladolid, artist unknown.[91]

Circa 2,600,000 BHE: The old sites containing tools are dated to 2.6–2.55 million years ago. One of the most striking circumstances

---

[90] https://en.wikipedia.org/wiki/Oldowan
[91] https://en.wikipedia.org/wiki/Oldowan

about these sites is that they are from the Late Pliocene, where previous to their discovery tools were thought to have evolved only in the Pleistocene. ROGERS and SEMAW, excavators at the locality, point out that:"...the earliest stone tool makers were skilled flintknappers .... The possible reasons behind this seeming abrupt transition from the absence of stone tools to the presence thereof include ... gaps in the geological record.[92]

[92] https://en.wikipedia.org/wiki/Stone_Age

⇨ 

Obsidian projectile point, photographer and location unknown.[93]

Circa 2,580,000 BHE: *Homo erectus*; Homo erectus may be divided into:

[93] https://en.wikipedia.org/wiki/Oldowan

- Homo erectus sensu stricto, African origins[94] and Homo erectus sensu lato, Asian origins.[95]

- Reconstruction of a *Home erectus* specimen from Tautavel, France, photographer unknown.[96]

---

[94] https://en.wikipedia.org/wiki/Homo_erectus
[95] https://en.wikipedia.org/wiki/Homo_erectus
[96] https://en.wikipedia.org/wiki/Homo_erectus

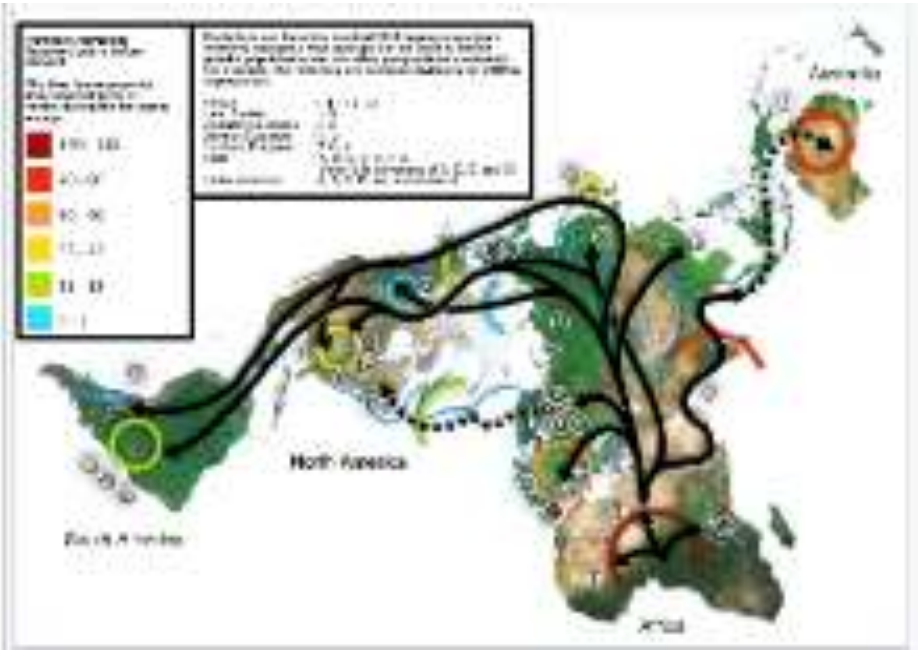
⇨ Skull of *Homo erectus*, Indian Museum, photographer unknown.[97]

[97] https://en.wikipedia.org/wiki/Homo_erectus

⇨ Dmanisi skull 3, Fossils skull D2700 and D2735 jaw, two of several found in Dmanisi in the Georgian Caucasus, photographer and location unknown.[98]

[98] https://en.wikipedia.org/wiki/Homo_erectus

Circa 1,989,999 BHE: Early migrations and expansions across continents began with the migration out of Africa of *Homo erectus*.[99]



⇨ Map of POSSIBLE early human migrations, according to

[99] https://en.wikipedia.org/wiki/Early_human_migrations

mitochondrial population genetics, passed only through a female human. Numbers are millennia before the present.[100]

Circa 1,000,000 BHE: End of *Australopithecines*.[101]

Circa 499000 BHE: Primates first tamed and used fire.[102]

Circa 300000 BHE: At Jebel Irhoud, a site near Marrakesh that was first discovered by barite miners in the **11960s HE**, holds fossils which are the earliest known remains of *Homo Sapiens.* These

---

[100] https://en.wikipedia.org/wiki/Prehistory
[101] ISAAC ASIMOV: ASIMOV'S ***Chronology of Science and Discovery***
[102] ISAAC ASIMOV: ASIMOV'S ***Chronology of Science and Discovery***

fossils suggest our species may have emerged more than 100,000 years earlier than previously thought.[103]

⇨ 

12017 HE: DR. JEAN-JACQUES HUBLIN seeing the finds at Jebel Irhoud (Morocco), is pointing to the human skull (Irhoud

[103] https://www.history.com/news/how-homo-sapiens-fossils-found-in-morocco-may-rewrite-the-human-story

10) whose orbits are visible just beyond his fingertip. (Credit: SHANNON MCPHERRON, MPI EVA Leipzig, License: CC-BY-SA 2.0).[104]

Circa 200000 BHE – Circa 144000 BHE: Africa, time of "Mitochondrial Eve" and "Y-chromosomal Adam" *homo sapiens* in Africa.[105]

Circa 190000 BHE: Homo Sapiens Neanderthalensis emerged in Europe.[106]

Circa 183000 BHE: Ethiopia: Rare *homo sapiens* fossils, from Kibish, Ethiopia.[107]

---

[104] https://www.history.com/news/how-homo-sapiens-fossils-found-in-morocco-may-rewrite-the-human-story
[105] https://en.wikipedia.org/wiki/Mitochondrial_Eve
[106] ISAAC ASIMOV: ASIMOV'S ***Chronology of Science and Discovery***
[107] https://www.sciencedaily.com/releases/2005/02/050223122209.htm

⇨ The bones of an early member of our species *Homo Sapiens*, known as "Omo 1" were excavated from Ethiopia's Kibish rock formation, photographer and location unknown.[108]

[108] https://www.sciencedaily.com/releases/2005/02/050223122209.htm

- Pushing the emergence of *Homo Sapiens* from about 160,000 years ago back to about 300,000 years ago "is significant because the cultural aspects of humanity in most cases appear much later in the record – only 50,000 years ago. Which would mean [many thousands of] years of *Homo Sapiens* without evidence of cultural stuff, such as evidence of eating fish, of harpoons, anything to do with music (flutes and that sort of thing), needles, even tools. This stuff – evidence- all comes in very late, except for stone knife blades, which appeared between 50,000 and 200,000 years ago."[109]

[109] https://www.sciencedaily.com/releases/2005/02/050223122209.htm

⇨ A selection of prehistoric stone tools, photographer and location unknown.[110]

[110] https://en.wikipedia.org/wiki/Stone_tool

Circa 170000 BHE: *Homo Sapiens* first start to wear clothing.[111]

Circa 120000 BHE: The island of Crete is an early center of development.[112]

⇨ Stone tools indicating ocean exploration capabilities of early humans. Photographer and location unknown.[113]

---

[111] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[112] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[113] http://www.nytimes.com/2010/02/16/science/16archeo.html

Circa 100000 BHE: India: The Bhimbetka rock shelters are an archaeological site of the Paleolithic exhibiting the earliest traces of human life on the Indian sub-continent.[114]

⇨ 

Current entrance to the Bhimbetka rock shelters, photographer unknown.[115]

---

[114] https://en.wikipedia.org/wiki/Bhimbetka_rock_shelters
[115] https://en.wikipedia.org/wiki/Bhimbetka_rock_shelters

Circa 100000 BHE – circa 78000 BHE, to circa 61000 BHE: South Africa: Blombos Cave is an archaeological site located in Blombosfontein Nature Reserve, about 300 km east of Cape Town on the Southern Cape coastline, South Africa.[116]

⇨ Bifacial silcrete point from M1 phase (**61,000 BHE)** layer of Blombos Cave, South Africa.[117]

---

[116] https://en.wikipedia.org/wiki/Blombos_Cave
[117] https://en.wikipedia.org/wiki/Blombos_Cave

- 

  Tool from Toolkits at Blombos Cave, photographer and location unknown.[118]

- Engraved ochre Tool from Toolkits at Blombos Cave, photographer and location unknown.[119]

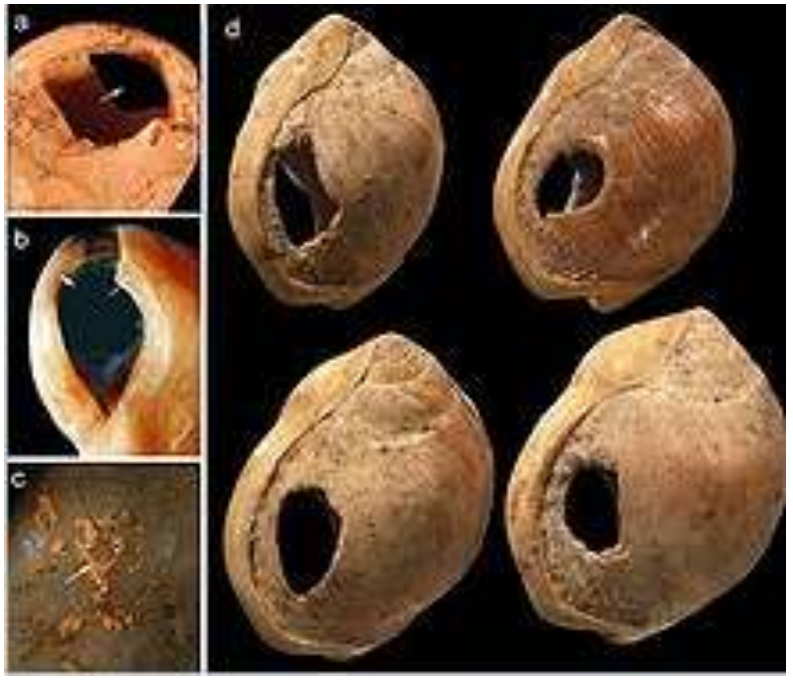
[118] https://en.wikipedia.org/wiki/Blombos_Cave
[119] https://en.wikipedia.org/wiki/Blombos_Cave

- Tool from Toolkits at Blombos Cave, photographer and location unknown.[120]

[120] https://en.wikipedia.org/wiki/Blombos_Cave

- Snail Shells Tool from Toolkits at Blombos Cave, photographer and location unknown.[121]

[121] https://en.wikipedia.org/wiki/Blombos_Cave

- 
  Blombos Cave shell beads, photographer and location unknown.[122]

Circa 78000 BHE: Besides Blombos Cave, there are a number of African and Middle Eastern sites that all have yielded strong evidence for the early use of personal ornaments: Skul and Qafzeh,

[122] https://en.wikipedia.org/wiki/Blombos_Cave

Israel;[123] Oued Djebbana, Algeria; [124] Grotte des Pigeons, Rhafas, Ifri n'Ammar and Contrebandiers, Morocco.[125] [126]

Circa 82000 BHE: Prehistoric religions emerge. Prehistoric humans explained natural phenomena by attributing causation to active agents, which they treated as their "gods".[127] However, their

---

[123] BAR-YOSEF MAYER, DANIELLA E. VANDERMEERSCH, BERNARD AND BAR-YOSEF, OFER (12009HE) ***Shells and ochre in Middle Paleolithic Skhul and Qafzeh, Israel: indications for modern behavior***. Journal of Human Evolution; VANHAEREN, MARIAN, et al. (12006HE) Middle Paleolithic Shell Beads in Israel and Algeria. Science

[124] VANHAEREN, MARIAN, et al. (12006 HE) Middle Paleolithic Shell Beads in Israel and Algeria. Science

[125] BOUZOUGGAR, A., et al. (12007 HE) 82,000-year-old shell beads from North Africa and implications for the origins of modern human behavior. Proceedings of the National Academy of Sciences of the United States of America, 104, 9964-9. d'ERRICO, FRANCESCO, et al. (12009 HE) ***Out of Africa: modern human origins special feature: additional evidence on the use of personal ornaments in the Middle Paleolithic of North Africa. Proceedings of the National Academy of Sciences of the United States of America***,

[126] https://en.wikipedia.org/wiki/Blombos_Cave

[127] https://en.wikipedia.org/wiki/Prehistoric_religion

curiosity and desire to seek explanations eventually will lead to scientific inquiry and illustrates the need to continue to move beyond superstition.

Circa 78000 BHE, France: The location where current day scientist BRUCE HARDY and his colleagues have found slender 0.7-millimeter-long plant fibers that are twisted together near some stone artefacts at a site in south-east France that was occupied by Neanderthals 90,000 years ago. Such fibers are not twisted together in nature, says the team, suggesting that the Neanderthals were responsible.[128]

[128] Quaternary Science Reviews, doi.org/pzx

Circa 72000 BHE: Morocco, Taforalt in Morocco; small perforated seashell beads are evidence of personal adornment found anywhere in the world.[129]

⇨ The Bead Evidence: The shells belong to the species *N.*

[129] http://www.pnas.org/content/104/24/9964.long

gibbosulus living today only in the eastern Mediterranean. The few known Pleistocene specimens are bigger than the modern representatives and show a thicker parietal shield size distribution of the Taforalt specimens is significantly different ($P < 0.0001$) from that of a modern biocoenosis, photographer and location unknown.[130]

Circa 50000 BHE: Outdated beginning of "modern humans."[131] (See **Circa 300000 BHE** for current evidence.)

Circa 40000 BHE: Sydney, Australia - Aboriginal stone tools.[132]

---

[130] http://www.pnas.org/content/104/24/9964.long
[131] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[132] https://strathbogierangesnatureview.files.wordpress.com

⇨ Possible examples of these Aboriginal tools, photographer and location unknown.[133]

[133] https://strathbogierangesnatureview.files.wordpress.com/2012/07/dscf0534.jpg

Circa 39000 BHE: "Counting" in prehistory was first assisted by using body parts, primarily fingers; roughly coinciding with the appearance of behavioral modernity and before the development of agriculture.[134]

Circa 39000 BHE: In hunter-gatherer, pre-agricultural times, the human life expectancy was about 20-30 years.[135] (Note: the next major increase in human life expectancy is not for another circa 50,870 years – until **11870 HE** when science and medical advancements started to benefit people and helped average age expectancy reach about 40 years.)[136]

---

[134] https://en.wikipedia.org/wiki/History_of_ancient_numeral_systems
[135] CARL SAGAN, The Demon-Haunted World; Science as a Candle in the Dark p.10
[136] CARL SAGAN, The Demon-Haunted World; Science as a Candle in the Dark p.10

Circa 35000 BHE: Cro-Magnon colonization of Europe.[137]

⇨ The "Old man of Cro-Magnon", Musée de l'Homme, Paris.[138]

---

[137] https://en.wikipedia.org/wiki/Cro-Magnon
[138] https://en.wikipedia.org/wiki/Cro-Magnon

⇨ 

Tool from Cro-Magnon – Louis Lartet Collection.[139]

Circa 33000 BHE: The finds in the Grotta del Cavallo, Apulia, Italy, and Kents Cavern, Devon, have been confirmed as some of the earliest known remains of *Homo Sapiens* in Europe.[140]

Circa 33000 BHE: Europe's Neanderthals may have begun making a relatively sophisticated bone tool called a "lissoir", possibly to

---

[139] https://en.wikipedia.org/wiki/Cro-Magnon
[140] http://www.bbc.com/news/science-environment-15540464

prepare animal skins, it is similar to those produced by our species.[141]

⇨ Four views of the most complete lissoir found during excavations at the Neanderthal site of Abri Peyrony in France, artist and photographer unknown.[142] [143]

[141] https://www.theguardian.com/science/2013/aug/12/neanderthals-invented-tool-leather-lissoir
[142] Photograph: Abri Peyrony/Pech-de-l'Azé I Projects
[143] https://www.theguardian.com/science/2013/aug/12/neanderthals-invented-tool-leather-lissoir

Circa 33000 BHE: Western Australia, Carpenters Gap Rock Shelter.[144]

⇨ Ground edge tiny hard stone Axe Flake, photographer and location unknown.[145]

---

[144] http://www.abc.net.au/news/2016-05-11/world's-oldest-known-ground-edge-stone-axe-fragments-found/7401728

[145] http://www.abc.net.au/news/2016-05-11/world's-oldest-known-ground-edge-stone-axe-fragments-found/7401728
https://www.bing.com/images/search?q=susan+o%27connor+axe+flake&view=detailv2&&id=A55A98EABB84E3489B132BA55C2A870D9E9CEDA5&selectedIndex=3&ccid=e4hyO58%2b&simid=608026744578574860&thid=OIP.M7b88723b9f3e6e1ce05f0fbfae4dc11do0&ajaxhist=0

Circa 32000 BHE: Germany, Paleolithic flute.[146]

⇨ 

Aurignacian flute made from animal bone, Geissenklösterle (Swabia).[147]

Circa 31000 BHE: Altai Mountains, Siberia: Denisova hominin lived. Denisova hominins or Denisovans are Paleolithic members of the Homo genus that may belong to a previously unknown species of human. The Denisovans occupied a vast realm stretching from the chill expanse of Siberia to the steamy tropical forests of Indonesia

---

[146] https://en.wikipedia.org/wiki/Paleolithic_flutes
[147] https://en.wikipedia.org/wiki/Paleolithic_flutes

- suggesting the third human of the Pleistocene displayed a level of adaptability previously thought to be unique to modern humans.[148]

⇨ 

149

Circa 30000 BHE: Spain, Altamira Cave, El Castillo,[150]

---

[148] http://www.bradshawfoundation.com/origins/denisova_hominin.php
[149] http://www.bradshawfoundation.com/origins/denisova_hominin.php
[150] http://whc.unesco.org/en/list/310

⇨ Altamira Cave, Oldest known cave paintings, photographer unknown.[151]

[151] http://whc.unesco.org/en/list/310

Circa 30000 BHE – 20000 BHE: Australia: First human settlement of Aboriginal Australians in the areas which are now known as Sydney, Perth, and Melbourne.[152]

⇨ 

Bradshaw rock paintings found in the north-west Kimberly Region of Western Australia.[153]

---

[152] http://www.australiaforeveryone.com.au/wa/bradshaw-art.htm
[153] http://www.australiaforeveryone.com.au/wa/bradshaw-art.htm

Circa 30000 BHE – Circa 1 HE: Australia: Kakadu National Park is a protected area in the Northern Territory of Australia, 171 km southeast of Darwin. The site was added to the Australian National Heritage List in **12007 HE**. There are more than 5000 recorded art sites illustrating Ubirr Aboriginal culture over thousands of years. The archaeological sites demonstrate Aboriginal occupation for at least 20,000 and possibly up to 40,000 years.[154]

[154] https://en.wikipedia.org/wiki/Kakadu_National_Park

⇨ The Ubirr Aboriginal rock art site, photographer unknown.[155]

⇨ Rock art painting at Ubirr, photographer unknown.[156]

[155] https://en.wikipedia.org/wiki/Kakadu_National_Park
[156] https://en.wikipedia.org/wiki/Kakadu_National_Park

Circa 30000 BHE – Current times HE: Africa, San People inhabit the Kalahari Desert.[157]

⇨ Rock paintings in the Cederberg, Western Cape, photographer unknown.[158]

---

[157] https://en.wikipedia.org/wiki/San_people
[158] https://en.wikipedia.org/wiki/San_people

⇨ San paintings near Murewa, Zimbabwe, photographer unknown.[159]

[159] https://en.wikipedia.org/wiki/San_people

⇨ San paintings near Murewa, photographer unknown.[160]

[160] https://en.wikipedia.org/wiki/San_people

Circa 29000 BHE: Remains of humans found to have lived in Australia; named Mungo Man, Mungo Lady; oldest known ritual cremation, the Mungo Lady, in Lake Mungo, Australia.[161]

⇨ Image of bones of Mungo Man, photographer unknown.[162]

[161] https://upload.wikimedia.org/wikipedia/commons/f/fc/Mungo_Man.jpg
[162] https://upload.wikimedia.org/wikipedia/commons/f/fc/Mungo_Man.jpg

⇨ Image of Mungo Lake where remains of Mungo Man and Mungo Lady were discovered.[163] Photographer unknown.

Circa 28000 BHE: New Guinea: some of the first farmers came to New Guinea from the South-East Asian Peninsula.[164]

---

[163] http://www.donsmaps.com/images17/mungophotob.jpg
[164] https://en.wikipedia.org/wiki/List_of_countries_and_islands_by_first_human_settlement

Circa 28000 BHE – 23000 BHE: Germany: oldest known figurative art; the artifact currently is displayed in the Ulm Museum, Germany.[165]

⇨ 

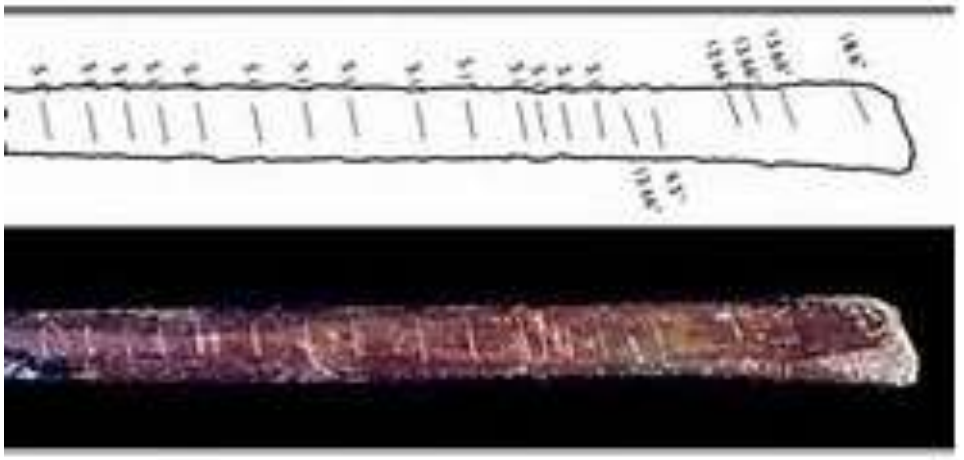
Löwenmensch, a lion-headed figurine found in Germany, dating to circa 35,000 to 40,000 years ago, photographer unknown.[166]

---

[165] https://en.wikipedia.org/wiki/Lion-man
[166] http://www.loewenmensch.de/lion_man.html

Circa 25000 BHE: discovered in the Lebombo Mountains located between South Africa and Swaziland, *The Lebombo bone*: is the oldest mathematical fossil. It has tally marks, counting aids other than body parts, in the form of notched bone.[167]

[167] http://www.math.buffalo.edu/mad/Ancient-Africa/lebombo.html



⇨ Image and drawing of *Lebombo Bone*; artist, photographer, location unknown.[168]

Circa 25000 BHE: It is thought that human beings developed language circa **25000 HE** as evidenced by cave paintings from the period of the Cro-Magnon Man (**c. 40000 BHE- c. 20000 BHE**) which appear to express concepts concerning daily life. These images suggest a language because, in some instances, they seem to tell a

[168] https://trueddotorg.files.wordpress.com/2014/04/lebembo.png

story (say, of a hunting expedition in which specific events occurred) rather than being simply pictures of animals and people.[169]

[169] https://www.ancient.eu/writing/

Circa 23000 BHE: France: one of the oldest carved figurative art of a human figure.

⇨ Photo of *Venus of Laussel* in Musée d'Aquitaine in Bordeaux, France.[170]

[170] https://en.wikipedia.org/wiki/Venus_of_Laussel

Circa 23000 BHE: Hohle Fels is a cave in Schelklingen, Germany, *"Venus of Hohle Fels"* figurine of a woman hewn from the ivory of a mammoth tusk.[171]

⇨ Photo of Discovered in **12008 HE** by a team from the University

[171] https://en.wikipedia.org/wiki/Venus_of_Hohle_Fels

of Tübingen, led by archaeologist NICHOLAS CONARD.[172] Two views of the *Venus of Hohle Fels* 35000-year-old figurine (height 6 cm (2.4 in)), which may have been worn as an amulet and is the one of the earliest known depictions of a human being in prehistoric art.[173]

Circa 23000 BHE: France, The Chauvet-Pont-d'Arc Cave in the Ardèche department of southern France is a cave that contains some of the best-preserved figurative cave paintings in the world as well as other evidence of Upper Paleolithic life. It is located near the commune of Vallon-Pont-d'Arc on a limestone cliff above the former bed of the Ardèche River, in the Gorges de l'Ardèche.[174]

---

[172] https://en.wikipedia.org/wiki/Hohle_Fels
[173] https://en.wikipedia.org/wiki/Venus_of_Hohle_Fels
[174] https://en.wikipedia.org/wiki/Chauvet_Cave

⇨ Closed to the public, this photo is a replica of Paintings in the Chauvet Cave.[175]

[175] https://en.wikipedia.org/wiki/Chauvet_Cave

Circa 23000 BHE: Japan, fragments from ground edge axes appear.[176] [177]

Circa 22000 BHE: Republic of Georgia: twisted rope; team of archaeologists and paleo biologists discovered flax fibers that are more than 34000 years old, which were made by early humans. The fibers were discovered during systematic excavations.[178]

---

[176] Professor SUSAN O'CONNOR, from the Australian National University School of Culture, History and Language, http://esciencenews.com/articles/2016/05/10/archaeologists.find.worlds.oldest.axe.australia

[177] Jomon Era Japan: http://www.microsofttranslator.com/bv.aspx?ref=SERP&br=ro&mkt=en-US&dl=en&lp=JA_EN&a=http%3a%2f%2fjomon-japan.jp%2fkids%2fsee%2foutline%2f

[178] http://news.harvard.edu/gazette/story/2009/09/oldest-known-fibers-discovered/

Clay bearing a textile imprint together with a cast.[179]

One photo from the collection on the website.[180]

[179] http://news.bbc.co.uk/2/hi/science/nature/790569.stm
[180] https://news.harvard.edu/gazette/story/2009/09/oldest-known-fibers-discovered/

- ⇨ “This was a critical invention for early humans. They might have used this fiber to create parts of clothing, ropes, or baskets — for items that were mainly used for domestic activities,” says BAR-YOSEF. The items created with these fibers increased early humans’ chances of survival and mobility in the harsh conditions of this hilly region. The flax fibers could have been used to sew hides together for clothing and shoes, to create the warmth necessary to endure cold weather. They might have also been used to make packs for carrying essentials, which would have increased and eased mobility, offering a great advantage to a hunter-gatherer society.[181]

[181] https://news.harvard.edu/gazette/story/2009/09/oldest-known-fibers-discovered/

Circa 21000 BHE: Siberia: domestication of dogs. A 33000-year-old domesticated dog skull bone was found in a Siberian mountain cave in the Atlai Mountains.[182]

⇨ Photo of the 33000-year-old dog skull; Photographer: Greg Hodgins, location unknown.[183]

---

[182] https://www.sciencedaily.com/releases/2012/01/120123152528.htm
[183] https://www.sciencedaily.com/releases/2012/01/120123152528.htm

- ⇨ The dog skull presents some of the oldest known evidence of dog domestication and, together with an equally ancient find in a cave in Belgium, indicates that modern dogs may be descended from multiple ancestors.[184] [185] Dogs accompanied humans while hunting and gathering,[186] and have remained companions to humans until modern times.

Circa 20000 BHE: Japan, Okinawa, Yamashita-cho cave, Naha city, Human Bone artifacts in a layer of ash.[187]

Circa 20000 BHE: *Homo Sapiens* became dominant.[188]

---

[184] https://www.sciencedaily.com/releases/2012/01/120123152528.htm
[185] http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0057754
[186] http://en.wikipedia.org/wiki/Origin_of_the_domestic_dog
[187] https://en.wikipedia.org/wiki/List_of_countries_and_islands_by_first_human_settlement
[188] ISAAC ASIMOV: ASIMOV'S ***Chronology of Science and Discovery***

Circa 18000 BHE: India: Author / Compiler note: this entry is 80,000 years after the first Bhimbetka Rock Shelter BHE entry in this HE timeline because scientists have dated the rock paintings tradition which began in Bhimbetka rock shelters in India to this time in the HE.[189]

[189] https://en.wikipedia.org/wiki/Bhimbetka_rock_shelters

⇨ Entrance of Bhimbetka, photographer and date unknown.[190]

[190] https://en.wikipedia.org/wiki/Bhimbetka_rock_shelters

⇨ More photos of The Bhimbetka rock shelter and art, photographer and date unknown.[191]

Circa 18000 BHE: Russia, Sungir: first human burial site in Russia.[192]

Circa 16000 BHE to circa 12000 BHE: Fired Clay; Czech Republic; or between Southern Russia and Spain.[193] The earliest ceramics made by humans were pottery objects (i.e., pots or vessels) or figurines made from clay, either by itself or mixed with other

---

[191] https://en.wikipedia.org/wiki/Bhimbetka_rock_shelters
[192] https://en.wikipedia.org/wiki/List_of_countries_and_islands_by_first_human_settlement
[193] http://news.bbc.co.uk/2/hi/science/nature/790569.stm

materials like silica, hardened, sintered, in fire.[194] *The Venus of Dolni Vestonice* figurine and a few others from locations nearby are the oldest known ceramic articles in the world.[195]

⇨ Multiple views of the rarely displayed, ceramic Venus figurine *Dolní Věstonice*.[196]

[194] https://en.wikipedia.org/wiki/Ceramic
[195] https://en.wikipedia.org/wiki/Venus_of_Doln%C3%AD_V%C4%9Bstonice
[196] https://en.wikipedia.org/wiki/Venus_of_Doln%C3%AD_V%C4%9Bstonice

⇨ When the *Venus of Dolni Vestonice* has to be moved, elaborate precautions are taken. Here is a photo of Venus arriving under armed escort at the Vienna Natural History Museum for the exibit in the summer of **12008 HE**. It was a very rare display of the *Venus of Dolni Vestonice*, photographer unknown.[197]

[197] https://www.youtube.com/watch?v=zAtmX5m12Jc

Circa 13000 BHE: Art, lamps.[198]

Circa 13000 BHE: Africa: *The Ishango Bone* (discovered in the Democratic Republic of Congo) portrays what are believed to be a series of Prime numbers, and a lunar phase calendar.[199]

[198] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[199] https://en.wikipedia.org/wiki/Ishango_bone

⇨ 

Ishango Bone on exhibition at the Royal Belgian Institute of Natural Sciences.[200]

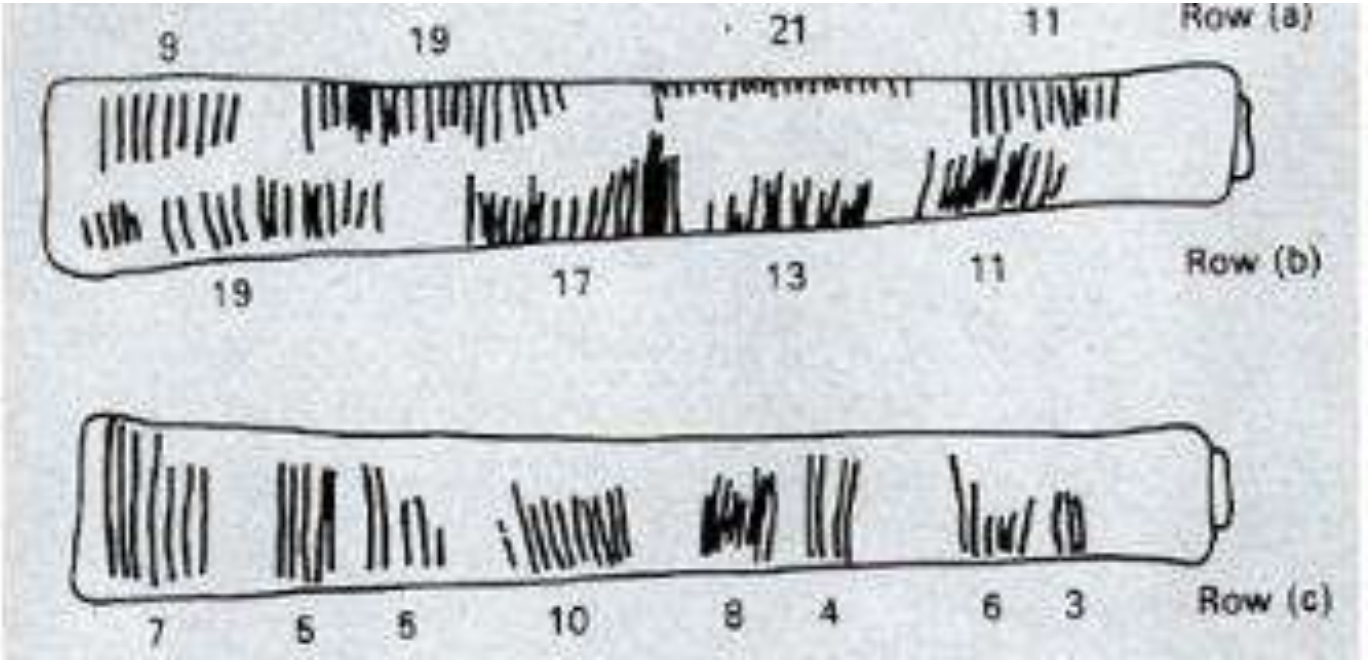
[200] https://en.wikipedia.org/wiki/Ishango_bone

⇨ Other photos of *the Ishango Bone*, circa 12000 years younger than *the Lebombo bone*, it is the second oldest mathematical object.[201]

⇨ Some say that *the Ishango Bone* is the oldest table of prime numbers. MARSHACK later concluded, on the basis of his

[201] http://www.math.buffalo.edu/mad/Ancient-Africa/ishango.html

microscopic examination, that it represented a six-month lunar calendar or prime numbers or a menstrual calendar.[202]



⇨ Recent studies with microscopes illustrate more markings and it is now understood the bone is also a lunar phase counter. Who

[202] http://www.math.buffalo.edu/mad/Ancient-Africa/ishango.html

but a woman keeping track of her cycles would need a lunar calendar? Were women our first mathematicians?[203]

Circa 11000 BHE - 4000 BHE: Jerimalai cave site in East Timor. Earliest evidence of advanced deep-sea fishing technology at the site demonstrates high-level maritime skills and, by implication, the technology needed to make ocean crossings to reach Australia and other islands, as they were catching and consuming large numbers of deep-sea fish such as tuna.[204]

---

[203] http://www.math.buffalo.edu/mad/Ancient-Africa/ishango.html
[204] http://archive.archaeology.org/1203/trenches/jerimalai_cave_east_timor_fish_hooks.html

⇨ “Reeling in Evidence of Early Fishing.” SUE O'CONNOR, an archaeologist at Australian National University, coauthored a study on the finds.[205]

Circa 10000 BHE: Humans had roamed the world by land. The men, women, and children took advantage of access to Australia from South Eastern Asia and to North America from Northeastern Asia.

---

[205] http://archive.archaeology.org/1203/trenches/jerimalai_cave_east_timor_fish_hooks.html

They found their way to Japan. They found their way to South America.[206]

Circa 8000 BHE: Oil Lamp invented; Bow and Arrow used.[207]

Circa 8000 BHE: Italy, Sicily: Human cranium dated by gamma-ray spectrometry.[208]

Circa 8000 BHE: Pennsylvania, USA: evidence of colonization of North America, Meadowcroft Rockshelter.[209]

⇨ The remarkably complete archaeological site located near the Ohio River, 27 miles west-southwest of Pittsburgh shows the

---

[206] ISAAC ASIMOV: ASIMOV'S ***Chronology of Science and Discovery*** page 8
[207] ISAAC ASIMOV: ASIMOV'S ***Chronology of Science and Discovery***
[208] https://en.wikipedia.org/wiki/List_of_countries_and_islands_by_first_human_settlement
[209] https://en.wikipedia.org/wiki/Meadowcroft_Rockshelter

earliest known evidence of human presence and the longest sequence of continuous human occupation in the New World.[210]

⇨ Outside view of Meadowcroft Rockshelter, PA, United States. [211]

[210] https://en.wikipedia.org/wiki/Meadowcroft_Rockshelter
[211] Donsmaps.com

⇨ Photo of Meadowcroft Rockshelter by heinzhistorycenter.org.[212]

Circa 8000 BHE – to circa 11870 HE: Native American Tribes.[213]

⇨ This is a list of all known Native American Tribes and languages:

- Abenaki (Abnaki, Abanaki, Abenaqui), Acatec, Achi, Achumawi (Achomawi), Acoma, Adai, Ahtna (Atna), Ais, Akimel O'odham, Alabama-Coushatta, Aleut, Alsea, Alutiiq, Algonquians (Algonkians), Algonquin (Algonkin), Alsea, Andoke, Anishinaabe (Anishinabemowin, Anishnabay), Antoniaño, Apache, Apalachee, Apalachicola, Applegate, Arabela, Arapaho (Arapahoe), Arara, Arawak, Arikara, Arua, Ashaninka, Assiniboine, Atakapa, Atikamekw, Atsina, Atsugewi (Atsuke), Araucano (Araucanian), Avoyel (Avoyelles), Aymara, Aztec

[213] http://www.native-languages.org

- Babine, Bannock, Bare, Bari, Baure, Beaver, Bella Bella, Bella Coola, Beothuks, Bidai, Biloxi, Black Carib, Blackfoot (Blackfeet), Blood Indians, Bora
- Caddo (Caddoe), Cahita, Cahto, Cahuilla, Calusa (Caloosa), Carib, Carquin, Carrier, Caska, Catawba, Cathlamet, Cayuga, Cayuse, Celilo, Central Pomo, Chahta, Chalaque, Chappaquiddick (Chappaquiddic, Chappiquidic), Chatot, Chawchilla, Chehalis, Chelan, Chemehuevi, Cheraw, Cheroenhaka, Cherokee, Chetco, Cheyenne (Cheyanne), Chiaha, Chickasaw, Chilcotin, Chimariko, Chinook, Chinook Jargon, Chipewyan, Chippewa, Chitimacha (Chitamacha), Choctaw, Cholon, Chontal de Tabasco, Chukchansi, Chumash, Clackamas (Clackama), Clallam, Clatskanie, Clatsop, Cmique, Cochimi, Cochiti, Cocopa (Cocopah), Coeur d'Alene, Cofan, Columbia (Columbian), Colville, Comanche, Comcaac, Comox, Conestoga, Coos (Coosan), Copalis, Coquille, Cora, Coree, Coso, Costanoan, Coushatta,

Cowichan, Cowlitz, Cree, Creek, Croatan (Croatoan), Crow, Cuna, Cucupa (Cucapa), Cupa, Cupik (Cuit),

- Dakelh, Dakota, Dawson, Deg Xinag (Deg Hit'an), Delaware, Deline, Dena'ina, Dene, Dene Tha, Diegueno, Dine (Dineh), Dogrib, Dumna, Dunne-za,
- Eastern Inland Cree, Eastern Pomo, Eel River Athabascan, Eeyou, Endeve, Eno, Entiat, Erie, Eskimo, Esselen, Etchemin, Euchee, Excelen, Eyak,
- Flathead Salish, Fox,
- Gabrielino, Gae, Galibi, Galice, Garifuna, Gitxsan (Gitksan), Gosiute (Goshute), Grand Ronde, Grigra, Gros Ventre, Guarani, Guarijio, Gulf, Gwich'in (Gwichin, Gwitchin),
- Haida, Haisla, Halkomelem, Hän, Hanis, Hare, Hatteras, Haudenosaunee, Havasupai, Hawaiian, Heiltsuk, Heve, Hiaki, Hichiti (Hitchiti), Hidatsa, Hocak (Ho-Chunk, Hochunk), Hoh, Holikachuk, Hoopa, Hopi, Hualapai, Huichol, Huichun, Humptulips, Hupa, Huron,

- Illini (Illiniwek, Illinois), Inca, Ingalik, Innoko, Innu, Inuktitut (Inupiat, Inupiaq, Inupiatun), Iowa-Oto (Ioway), Iroquois Confederacy, Ishak, Isleño, Isleta, Itza Maya, Iynu,
- Jaqaru, James Bay Cree, Jemez, Juaneno (Juaneño), Jumano,
- Kainai (Kainaiwa), Kalapuya (Kalapuyan), Kalina, Kallawaya, Kanien'kehaka (Kanienkehaka), Kalispel, Kansa (Kanza, Kanze), Karankawa, Karkin, Karok (Karuk), Kashaya, Kaska, Kaskaskia, Kathlamet, Kato, Kaw, Kawki, Keres (Keresan), Kickapoo (Kikapu), Kiliwa (Kiliwi), Kiowa, Kiowa Apache, Kitanemuk, Kitsai, Klallam, Klamath-Modoc, Klickitat, Koasati, Konkow, Kootenai (Ktunaxa, Kutenai), Koso, Koyukon, Kulanapan, Kumeyaay (Kumiai), Kuna, Kupa, Kusn, Kuskokwim, Kutchin, Kwakiutl (Kwakwala), Kwantlen,
- Laguna, Lake Indians, Lakhota (Lakota), Lassik, Laurentian (Lawrencian), Lenape (Lenni Lenape), Lillooet, Lipan Apache, Listiguj (Listuguj), Lnuk (Lnu), Lokono, Loup,

Lower Umpqua, Luckiamute, Luiseño, Lumbee, Lummi, Lushootseed,

- Mahican, Maidu, Maina (Mayna), Makah, Makushi, Maliseet (Maliceet), Mandan, Mapuche (Mapudungun), Maricopa, Mattole, Matlatzinca, Mayan, Mayo, Meherrin, Mengwe, Menominee (Menomini), Meskwaki (Mesquakie), Methow, Miami-Illinois, Mical, Miccosukee, Michif, Micmac (Mi'gmaq), Mikasuki, Mi'kmaq, Mingo, Minqua, Minsi, Minto, Miskito (Mosquito), Missouria, Miwok (Miwuk), Mixe, Mixtec (Mixteco, Mixteca), Mobile, Mobilian Jargon, Mococo, Modoc, Mohave, Mohawk, Mohegan, Mohican, Mojave, Molale (Molalla, Molala), Monacan, Monache (Mono), Montagnais, Montauk, Multnomah, Munsee (Munsie, Muncey, Muncie), Muskogee (Muscogee, Mvskoke), Musqueam, Mutsun,
- Nabesna, Nahane (Nahani), Nahuat, Nahuatl, Nakoda (Nakota), Nambe, Nanaimo, Nanticoke, Nantucket,

Narragansett, Naskapi, Natchez, Natchitoches, Natick, Naugutuck, Nauset, Navajo (Navaho), Nawat, Nespelem, Neutral, Nez Perce, Niantic, Nipmuc, Nisenan, Nisga'a (Nisgaa), Nlaka'pamux (Nlakapamux), Nooksack (Nooksak), Nootka (Nutka), Nottoway, Nuuchahnulth, Nuxalk,

- Ocuilteco, Oconee, Odawa, Ofo, Ohlone, Ojibwa (Ojibway, Ojibwe, Ojibwemowin), Okanagan (Okanogan), Okmulgee, Omaha-Ponca, Oneida, Onondaga, O'odham (Oodham), Opata, Osage, Otchipwe, Otoe, Ottawa, Ozette,
- Pai, Paipai, Paiute, Palouse, Pamlico, Panamint, Papago-Pima, Pascua Yaqui, Passamaquoddy, Patuxet, Patwin, Paugussett (Paugusset), Pawnee, Pecos, Pee Dee, Peigan, Pend D'Oreille, Pennacook, Penobscot (Pentagoet), Pensacola, Peoria, Pequot, Petun, Picuris, Piegan (Piikani), Pima, Pima Bajo, Pipil, Piscataway, Pit River, Plains Indian Sign Language, Pojoaque, Pomo (Pomoan), Ponca,

Poospatuck (Poosepatuck), Popoluca (Popoloca), Potawatomi (Pottawatomie, Potawatomie), Powhatan, Pueblo, Puquina,

- Quapaw (Quapa), Qualicum, Quechan, Quechua, Queets, Quilcene, Quileute, Quinault, Quinnipiac,
- Raramuri, Red Indians, Restigouche, Rumsen, Runasimi,
- Saanich, Sac, Saliba, Salinan, Salish, Samish, Sanpoil, Santee, Santiam, Santo Domingo, Saponi, Sarcee (Sarsi), Sasta, Satsop, Savannah, Sauk, Saulteaux, Sechelt, Sekani, Seminoles, Seneca, Seri, Serrano, Shakori, Shanel, Shasta, Shawnee (Shawano), Shinnecock, Shoshone (Shoshoni), Shuar, Shuswap, Siksika, Siletz, Sinkyone, Sioux, Siuslaw, Skagit, Skin, S'Klallam, Skokomish, Slavey (Slave, Slavi), Sm'algyax, Snohomish, Sooke, Southern Paiute, Spokane (Spokan), Squamish, Steilacoom, Stockbridge, Sto:lo, Stoney, Suquamish, Suruwaha, Susquehannock, Swampy Cree, Swinomish,

- Tachi (Tache), Tagish, Tahltan, Taino, Takelma, Takla, Tanacross, Tanaina, Tanana, Tangipahoa, Tano, Taos, Taposa, Tarahumara, Tataviam, Tehachapi, Ten'a, Tenino, Tepehuano, Tequesta, Tesuque, Tewa, Thompson, Tigua, Tillamook, Timbisha, Timucua, Tinde, Tiwa, Tiwanaku, Tjekan, Tlahuica, Tlingit, Tohome, Tohono O'odham, Tolowa, Tongva, Tonkawa, Towa, Tsalagi (Tsa-la-gi), Tsilhqot'in, Tsimshian, Tsuu T'ina, Tualatin, Tubar (Tubare), Tulalip, Tunica, Tupi, Tuscarora, Tutchone, Tutelo, Tututni, Twana, Twatwa, Tygh,
- Uchi (Uche), Ukiah (Uki, Ukia), Umatilla, Unami, Unkechaug, Uru, Ute,
- Virginia Algonquian,
- Waco, Wahkiakum, Wailaki, Walapai, Walla Walla, Wampanoag, Wanapam, Wanki, Wappinger, Wappo, Warm Springs, Wasco-Wishram, Washo (Washoe), Wateree, Waxhaw, Wea, Wenatchee, Wendat, Weott, Wichita

(Witchita), Willapa, Winnebago, Wintu (Wintun), Wishram, Wiyot, Wyandot (Wyandotte), Wynoochee,

- Yakama (Yakima), Yamasee, Yamel, Yanesha, Yaquina, Yavapai, Yaqui, Yellowknife, Yokuts (Yokut), Yoncalla, Yucatec Maya (Yucateco, Yucatan), Yuchi, Yuki, Yuma, Yupik (Yuit), Yurok,
- Zapotec, Zia, Zoque, Zuni.[214]

[214] http://www.native-languages.org/languages.htm

Circa 5300 BHE: Lascaux, France: cave painting of the Magdalenian Culture (**Circa 4981 BHE – Circa 1 HE**). Currently only 5 people a day / 5 days a week are allowed in the actual cave. Visitors are directed to the replica Lascaux II.[215]

⇨ It has been suggested that the complexity of the later cave art represents an attempt by Magdalenian man using "sympathetic magic" to cause the animals, they had hunted to almost extinction to once more become abundant.[216]

---

[215] http://www.ancient-wisdom.com/francelascaux.htm
[216] https://www.britannica.com/topic/Magdalenian-culture

⇨ Photo of **11940 HE** entrance to Lascaux Cave, France.[217]

[217] http://www.ancient-wisdom.com/francelascaux.htm

⇨ “The Main Hall, photographer unknown.”[218]

[218] http://www.ancient-wisdom.com/francelascaux.htm

⇨ “The Hall of Bulls”, photographer unknown.”[219]

[219] http://www.ancient-wisdom.com/francelascaux.htm

Circa 4981 BHE – Circa 1 HE: Magdalenian Culture in France and later Magdalenian sites have been found from Portugal in the west to Poland in the east.

⇨ The Magdalenian epoch was a long one, represented by numerous stations, whose contents show progress in the arts and general culture. It was characterized by a cold and dry climate, the existence of humans in association with the reindeer, and the extinction of the mammoth. The use of bone and ivory for various implements, already begun in the preceding Solutrean epoch, was much increased, and the period is essentially a bone period. The bone instruments are quite varied: spear-points, harpoon-heads, borers, hooks, and needles.[220]

[220] https://en.wikipedia.org/wiki/Magdalenian

Circa 4500 BHE – 9700 HE: Japan Jōmon period Japan was inhabited by a hunter-gatherer culture, which reached a considerable degree of cultural complexity.[221]

⇨ 

Photo of example of *Earliest Incipient Jomon Pottery* Tokyo National Museum, Japan, photographer unknown.[222]

---

[221] https://en.wikipedia.org/wiki/Jomon_period
[222] https://en.wikipedia.org/wiki/Jomon_period

Circa 3000 BHE: Ancient Cyprus.[223]

Circa 2000 BHE: Herding.[224]

Circa 500 BHE – to current: Native North American Tribes.[225]

[223] Author / Compiler's daughter Tiffany Premack introduced knowledge of Ancient Cyprus
[224] ISAAC ASIMOV: ASIMOV'S ***Chronology of the World***
[225] http://www.native-languages.org

⇨ Per Native Tech: Map of Culture Areas and the Locations of 32 Native American Tribes: NORTHEAST: 1. Virginia

Algonquian; 2. North Carolina Algonquian; 3. Delaware; 4. Pequot; 5. Eastern Niantic; 6. Narragansett; 7. Wampanoag; 8. Eastern Abenaki; 9. Penobscott; 11. Huron; 10. Iroquois (Seneca, Mohawk, Onondoga); LAKES: 12. Fox; 13. Sauk; 14. Menomini; 15. Winnebago; 16. Kickapoo; 17. Ottawa; 18. Chippewa; SOUTHEAST; 19. Cherokee; 20. Creek; 21. Seminole; 22. Choctaw; PRAIRIE: 23. Shawnee: 24. Miami; 25. Illinois; 26. Arikara; PLAINS: 27. Arapaho; 28. Lakota; 29. Crow; 30. Blackfeet; PLATEAU: 31. Flathead; BASIN: 32. Paiute.[226]

[226] Tara Prindle **11994 HE**: http://www.nativetech.org/clothing/regions/regions.html

Circa 500 BHE: Cyprus, Aetokremnos:[227] evidence of humans using fire – burned bones of megafauna including pygmy elephants and the Cyprus Dwarf Hippopotamus.[228]

Circa 400 BHE: Columbia, El Abra: Stone, bone and charcoal artifacts.[229]

Continue with the ***Human Era Timeline PDF*** to see how using CESARE EMILIANI'S calendar reform idea continues to put the accomplishments of humanity in a functional flow of time! …

---

[227] https://en.wikipedia.org/wiki/Aetokremnos
[228] Tiffany Premack, and https://en.wikipedia.org/wiki/List_of_countries_and_islands_by_first_human_settlement
[229] https://en.wikipedia.org/wiki/List_of_countries_and_islands_by_first_human_settlement

About the Author / Compiler

Wife, Mom, Law Office Business Manager, **11990 HE** White House Honoree, Artist, Freedoms Foundation of Valley Forge Honoree, homeowner, EV driver, Recycling enthusiast, Starry Skies / Dark Skies enthusiast, Certified Laughter Yoga Leader, Ballroom dancer, Struggling author, friend to a few, acquaintance to a few more, SA Life Sunday Woman Honoree, sewing enthusiast, retired teacher for Junior Achievement – Favorite classes taught: "Enterprise in Action" and "Personal Economics", and more!.....