

1 - **A Black Hole.** A black hole is a region of space time where gravity is so strong that nothing—no particles or even electromagnetic radiation such as light—can escape from it. The theory of general relativity predicts that a sufficiently compact mass can deform space time to form a black hole.

2 - **Mars: Hellas Planitia** impact craters, *universe digging*. One of the largest visible impact craters in the Solar System is Hellas Planitia on Mars. The basin floor is about 7,152 m (23,465 ft.) deep, and extends about 2,300 km (1,400 mi) east to west. It is thought to have formed about 3.8 to 4.1 billion years ago.

3 - **Vredefort Crater.** This crater has a diameter of roughly 250-300 km. and makes it the largest known confirmed impact structure on Earth. The age is estimated to be over 2 billion years (2,023 ± 4 million years). The asteroid is one of the largest to ever impact Earth, estimated at over 10 km. wide. What remains of it is in the present-day Free State province of South Africa. It is named after the town of Vredefort, which is near its center.

4 - **Chicxalub Crater** is an ancient impact crater buried underneath the Yucatan Peninsula in Mexico. The crater is more than 180 kilometers in diameter. The impacting bolide that formed the crater was at least 10 km in diameter. The impact associated with the crater is implicated in causing the extinction of the dinosaurs as suggested by the K-T boundary.

5 - **Tool technology Oldowan** is the earliest known stone tools have been discovered at Lomekwi 3 in West Turkana, Kenya. They were made 3.3 million years ago. Current anthropological thinking is that Oldowan tools were made by late Australopithecus and early Homo. Homo habilis (handy man) was named “skillful” because it was considered the earliest tool-using human ancestor. Not the first human tool make. 2.6 million years BP – 1.7 million years BP the Oldowan (or Mode I) was a widespread stone tool archaeological industry style in prehistory. These early tools were simple, usually made with one or a few flakes chipped off with another stone. It is not known for sure which hominin species created and used Oldowan tools. Early Homo erectus appears to inherit Oldowan technology and refines it into the Acheulean industry beginning 1.7 million years ago.

6 - **Monte Poggiolo** is a hill near Forlì, Italy in Emilia Romagna. The hill overlooks the Montone River valley from an elevation of 212 m. At Monte Poggiolo there is a Florentine castle. The fort was designed by Giuliano da Maiano and built in 1471 in the form of a rhombus with four towers. Thousands of Paleolithic-era artifacts have been recovered from the nearby area of Ca' Belvedere and dated to be around 850,000 years before the present, making them the oldest evidence of human habitation in Italy.

7 - **The Panga ya Saidi Site**, Kenya, 78,000 ya. This body was laid in a purposely funereal position. Researchers suggest that humanity's changing attitudes towards death began to include concessions for unique circumstances, such as the death of a child or a death by accident. While most deaths would have been seen by these nomadic people as natural and even unavoidable, the

death of such a young child seemed to have more significance to them. This image is a virtual reconstruction of the child's remains who was named *Mtoto* ('child' in Swahili).

8 - **The Divje Babe flute** is a cave bear femur pierced by spaced holes that was found in 1995 at the Divje Babe archeological park located near Cerkno in northwestern Slovenia. It has been suggested that it was made by Neanderthals as a form of musical instrument, its hole spacing and alignment leading to its being labeled a "Neanderthal flute". Despite alternative hypotheses suggesting it was formed by animals, the artifact remains on prominent public display in the National Museum of Slovenia in Ljubljana as a Neanderthal flute. As such, it is possibly the world's oldest known musical instrument. According to the museum's statements, the presumed flute has been associated with the "end of the middle Pleistocene" and with Neanderthals, about 55,000 years ago.

9 - In the mountains of Turkey lies a series of buried monoliths. It is an archeological site known as **Göbekli Tepe**. At around 12,000 years old, Göbekli Tepe has been said to be the world's oldest temple. It is many millennia older than Stonehenge or Egypt's great pyramids, built in the pre-pottery Neolithic period before writing or the wheel. Archaeologists are fascinated by this artificial mound spread across eight hectares near the present-day city of Sanliurfa, dated between 9600 and 7000 BCE.

10 - **Neolithic shoulder blade shovel** (10,000–3,000 B.C). The shovel has been used in many cultures throughout the history of mankind. Because the shoulder blade resembles the blade of a trowel (a small shovel), the word "scapula" is thought to have come from the Greek "skaptein" meaning "to dig".

11 - **Tantum petroglyphs of the Scandinavian Bronze Age** (roughly 1800 to 500 BCE). There are thousands of images called the Tanum petroglyphs, on about 600 panels, and covers an area of about 51 hectares (126 acres or 0.5 km<sup>2</sup>). While the region was on the coastline when the drawings were made, it is now at an elevation of 25m. Some glyphs depict humans with *shovels*, spears or axes, and others depict hunting scenes.

12 - **Yu the Great** (c. 2123–2025 BCE) was known as 'Yu that controls the flood', was a legendary Emperor in ancient China who was famed for his introduction of flood control, Yu *dug* a system of irrigation canals which relieved floodwater into fields, as well as spending great effort dredging the riverbeds.

13 - A team of archaeologists from the Universities of Cambridge and Ghent, has succeeded in mapping a complete Roman city, *Falerii Novi* in Italy, 50 km north of Rome in the central Italian region of Lazio and first occupied in 241 BC, and survived until around AD 700. Using advanced ground penetrating radar (GPR), this technology has revealed astonishing details without digging, while the city remains deep underground. It relies on the reflection of electromagnetic (radio) waves where the travel times of the reflected waves are measured, resulting in vertical profiles.

Using several parallel profiles, horizontal slices at different depths can be created. The researchers took a measurement every 12.5 centimeters, or about 5 inches. Imagine digging the entire area up with a trowel instead.

14 - **Grime's Graves** is grassland pockmarked with over 430 prehistoric flint mine pits. It is one of the best places in Britain to see the links between geology and archaeology. The earliest pits were *dug* as vertical shafts in late Neolithic times, about 4,600 years ago, to reach rich seams of flint nodules. The mysterious lunar-like landscape of Grime's Graves is the legacy of hundreds of years of activity by Neolithic flint miners, to extract the fine quality, jet-black flint from which they fashioned tools, weapons and ceremonial objects.

15 - ***Ruina montium*** (Latin for "wrecking of mountains"). **Pliny the Elder** or **Gaius Plinius Secundus** (23 AD–79 AD), in his work *Naturalis Historia*, points out that the mining of gold, tin, iron or lead underwent a radical transformation during the period of Romanization. *"What happens is far beyond the work of giants. The mountains are bored with corridors and galleries made by lamplight with a duration that is used to measure the shifts. The cracks made in the entrails of the stone are so dangerous that it would be easier to find pearls at the bottom of the sea than make scars in the rock. How dangerous we have made the Earth!"* Human enterprise and drive started to shape the landscape creating forms analogous to the ones excavated by nature's actions that took much longer periods of time. An example of human satiety; so much, so all at once.

16 - **Skouriotissa spoil heaps**. Skouriotissa, in Cyprus, Greece is the oldest operating mine in the world. Copper mining on Cyprus reached a large, quasi-industrial scale around 2300 BCE and demand did not collapse until around 400 CE, when the decline of the Roman Empire was well under way. In 1200 BCE the forests of Cyprus were chopped down to smelt copper, and mounds of slag piled up around the mines that can still be seen today in the Troodos Geological Park. Archeometallurgical studies can record Cyprus's mining history through archaeological survey of the stratified mounds. It is like a man-made Grand Canyon. The name of the village, Skouriotissa, comes from the word *scoria* for slag separated from molten metal during smelting. Copper was the first metal that humans used to make weapons, tools and jewelry—a development which marked the end of the Stone Age. Cyprus supplied such large quantities to Europe's advanced cultures that the material was named after the island, the Latin 'aes cyprium' meaning 'metal from Cyprus' which was gradually shortened to "cuprum", the root for "copper".

17 - ***Oryctolagus cuniculus***. When the Romans arrived in Spain around 200BCE, they began to farm the native rabbits for their meat and fur. The Romans called this practice 'cuniculture'. the Latin name '***Oryctolagus cuniculus***' means 'hare-like digger of underground tunnels'. The original European wild rabbits evolved about 4,000 years ago in Iberia. The visiting Phoenician merchants referred to part of Iberia as 'I-shephan-im' which means land of the rabbits. This was translated as 'Hispania' or—as we know it—Spain.

18 - **Tita Brongersna** (1650) was a poet of the late 17th century. She gained prominence for

excavating a dolmen at Borger, Netherlands in 1685. Dolmens, or as the Dutch call them *hunebedden*, are megalithic tombs or burial mounds. Large stones lined up in two rows form the foundation and support a larger top stone. They date back to the Neolithic period, about 5.000 years, which means that they are older than the Egyptian pyramids! *Hunebed*, the Dutch word for dolmen, literally means giant bed. In July 1685 she had one of the *hunebedden* excavated and found that the dolmen was a grave site, rather than just a heap of rocks created by giants. She wrote a poem on the topic, "Ode on the hunebed". Brongersma has long been known as a pioneering figure within the archeological field and she initiated and financed this project all by herself.

19 - **Terracotta army**. In March 1974, a group of farmers digging a well in drought-parched Shaanxi province in northwest China unearthed fragments of a clay figure, the first evidence of what would turn out to be one of the greatest archaeological discoveries of modern times. Near the unexcavated tomb of Qin Shi Huangdi **210–209 BCE**, who had proclaimed himself first emperor of China in 221 B.C. lay an extraordinary underground treasure: an entire army of 8,000 life-size terracotta soldiers, 130 chariots with 520 horses, interred for more than 2,000 years. The Chinese historian Sima Qian, wrote that it took 700,000 men to construct the emperor's mausoleum. He calculates that the foundations could have been built by 16,000 men in two years.

20 - **The Hunterian Psalter** is a twelfth century illuminated manuscript, produced in England c. 1170. It is regarded as the greatest treasure of William Hunter's (1718–83) magnificent library of books. This one is *digging* from the month of March.

21 - **The Acheulian Hand Axe** (1790) has become a basic "Horizon Marker" of the Lower Paleolithic cultures studied by archaeologists today. It challenged Archbishop James Ussher's Creationist doctrine made in the early 1600s that pinpointed creation as beginning at 9:00 PM on October 23rd in 4004 B.C. The first published representation of a hand axe was drawn by Antiquarian **John Frere** (1740–1807). Hand axe tools were possibly used to butcher animals; to *dig* for tubers and water; to remove tree bark; to throw at prey; and as a source for flake tools.

22 - **Geoarchaeology** is the subfield of archaeology focused on reconstructing past landscapes, analyzing past human-environment interactions, and examining site formation processes, generally through the application of earth science methods to archaeological questions. Archaeological geology is a term coined by **Werner Kasig** in 1980. One of the major achievements of 19th century archaeology was the development of stratigraphy. The application of stratigraphy to archaeology first took place in the third and fourth decade of the 19th century. Archaeologists like **Jacques Boucher de Perthes** (1788–1868) and **Christian Jürgensen Thomsen** began to put the artifacts they had found in chronological order.

23 - **Bernardino Michele Maria Drovetti** (January 7, 1776 – March 5, 1852) was an Italian antiquities collector. While he contributed significantly to the creation of three of the largest Egyptological collections in Europe, Drovetti is also remembered for his ruthlessness and

unscrupulous conduct towards other collectors and excavators. The Turin Royal Canon, an ancient Egyptian hieratic papyrus thought to date from the reign of Pharaoh Ramesses II, was found by Drovetti in 1820 at Luxor (Thebes), Egypt and was acquired in 1824 by the Egyptian Museum in Turin, Italy. When the box in which it had been transported to Italy was unpacked, it had disintegrated into small fragments. Later in his life, Drovetti lost his mind and was confined to an asylum in Turin.

24 - **Henry David Thoreau** (1817–1862). Among his lasting contributions are his writings on natural history and philosophy, in which he anticipated the methods and findings of ecology and environmental history, two sources of modern-day environmentalism.

“As for your high towers and monuments, there was a crazy fellow in town who undertook to *dig* through to China, and he got so far that, as he said, he heard the Chinese pots and kettles rattle; but I think that I shall not go out of my way to admire the hole which he made.” is from his novel, *Walden*, 1854.

25 - **Alexander Von Humboldt** (September 14, 1769 – May 6, 1859). Humboldt sought to unify diverse branches of scientific knowledge and culture. His important work also motivated a holistic perception of the universe as one interacting entity. He wanted to understand the interconnections among diverse orders of reality, and sought ways to transcend the antipathies between the sciences and the humanities. His succinct graphic representations of landscapes and life-ways are intended to illustrate the importance of aesthetics in understanding the quest for wiser ways of dwelling.

26 - ***The Forty Niners, California Gold Rush*** (1848–1855). When gold was found by James W. Marshall at Sutter’s Mill in Coloma, California, the population of San Francisco increased quickly from 200 in 1846, to 36,000 by 1852. California’s name became indelibly connected with the Gold Rush, and fast success in a new world became known as the California Dream. “The old American Dream ... was the dream of the Puritans, of Benjamin Franklin’s “Poor Richard”... of men and women content to accumulate their modest fortunes a little at a time, year by year by year. The new dream was the dream of instant wealth, won in a twinkling by audacity and good luck. [This] golden dream... became a prominent part of the American psyche only after Sutter’s Mill.” Historian H. W. Brands.

27 - **Jerry Stanley, *Digger: The Tragic Fate of the California Indians from the Missions to the Gold Rush*** (1997). A sobering look at a frequently romanticized American history. The Gold Rush had severe effects on Native Californians. While the Californian population increased, the Native American population dramatically decreased from disease, starvation, land appropriation, decimation of their resources, kidnapping, rape and child separation. They were contemptuously referred to as “Diggers”, for their practice of digging up roots to eat. Thousands of enslaved Native Americans were used as a free source of labor and all this was encouraged, carried out and tolerated by state authorities and militias. The 1925 *Handbook of the Indians of California* estimated that the indigenous population of California decreased from as many as 150,000 in 1848

to 30,000 in 1870 and fell further to 16,000 in 1900.

28 - **Giuseppe Fiorelli** (1823, Naples, Italy). An archaeologist best known for the 'Fiorelli Method' that he developed in the 1860's to make plaster casts of bodies that had decomposed under Vesuvius's volcanic ash of Pompei, in 79 A.D. What Nature entombed in a day man took 1700 years to exhume the fossilized remains. This process gave information about how people had died in the eruption, and what they were doing in their final moments.

29 - **Orra White Hitchcock** (1796–1863) was one of America's earliest women scientific illustrator and artist. Her work is a time-focused chronicle of the scenic, botanically and geologically diverse Connecticut River Valley in western Massachusetts. Her art was integral to the work of her husband, geologist Edward Hitchcock. He considered them "*indispensable aids*" for his lectures and he acknowledged her essential contributions citing her drawings as more powerful than his pen.

30 - **Claude Monet** (1840–1926) *Women in the Garden* is an oil painting begun in 1866. Monet painting its upper half with the canvas lowered into a trench he had *dug*, so that he could maintain a single point of view for the entire work. Monet remarked: "It's on the strength of observation and reflection that one finds a way. We must *dig and delve* unceasingly." In fact, his research reflects a precise and unique study of the passing of time as seen in the movement of light over forms.

31 - **Kimberly Hole: Kimberley, South Africa**. From 1871–1914, 50,000 miners dug this hole with picks and shovels, some for an entire lifetime, yielding 2,722 Kilograms (3 tons) of diamonds. The hole is 463 meters wide and 1097 meters deep. It is the biggest hand dug hole in the world along with Jagersfontein and Bultfontein diamond mines, also in South Africa.

32 - **Van Gogh, *The Digger*** (1882): "Now, such an enterprise as would be the drawing of a series of types of workmen, a sower, a digger, a plowman, a wash-woman...there are plenty of beautiful subjects. But what's your ultimate goal, you'll say. That goal will become clearer, will take shape slowly and surely, as the rough draft becomes a sketch and the sketch a painting, as one works more seriously, as one *digs* deeper into the originally vague idea, the first fugitive, passing thought, until it becomes firm".

33 - **Ways of measuring in archeology**. Artefacts were dug up over the course of centuries when objects ended up in archives without context. Along with their shovels, trowels and brushes, archeologists, over the years have met with many new technologies. For example, **Ground penetrating radar-1929–1975, magnetometers-1832, radiocarbon dating-1940, OSL optically stimulated luminescence-1955–1965**. Today, archaeologists focus more attention on the circumstances that are associated with the object, such as its relationship to other objects and its place in the stratigraphy of a site. Probably more than any other social science, archaeology is a multidisciplinary field of study. One that relies heavily on the natural sciences like geology, biology



and modern technology in the gathering, analysis, and interpretation of data.

34 - **Lorenzo Sawyer** (May 23, 1820 – September 7, 1891) was an American lawyer and judge. In 1883 San Francisco Bay was estimated to be filling with silt at a rate of one foot per year. Huge cliffs were carved by mighty streams of water, washing away entire mountains of gravel, imitating geological erosion that would have taken millions of years. Debris, silt, and millions of gallons of water used daily by the **North Bloomfield Mining and Gravel Company** caused extensive flooding, prompting Sacramento valley farmers to file the lawsuit. *Woodruff v. North Bloomfield Mining and Gravel Company*. On January 7, 1884 Judge Lorenzo Sawyer declared hydraulic mining illegal. Sawyer's decision is widely considered to be California's first environmental law.

35 - **Joseph Frank** (1885–1967) was an Austrian-born architect, artist, and designer who adopted Swedish citizenship in the latter half of his life. With a strong botanical interest Frank developed his own floral prints which were based on the colors and forms of nature. He wanted the observer to feel a change of pace even in confined rooms. Josef Frank has had an enormous impact on the history of Swedish design, despite the fact that he was already 50 years old when he fled the burgeoning antisemitism for Sweden. Joseph Frank's *Terrazzo, 1943* was inspired by agate rocks embedded in a terrazzo floor.

36 - **Nicolas Camille Flammarion** (1842–1925), astronomer and French writer. The Flammarion engraving by an unknown artist that first appeared in Camille Flammarion's book, *L'Atmosphère: Météorologie Populaire*, 1888. In the engraving a traveler *digs* his head through the edge of the firmament and the image depicts a man crawling under the edge of the sky as if it were a solid hemisphere, to look at the mysterious beyond. The caption underneath the engraving reads, "A medieval missionary says that he has found the point where heaven and Earth meet..."

37 - **William T. Love** (1844–1889). In 1890, William T. Love, an ambitious railroad entrepreneur, prepared plans to construct an urban community of parks and residences on the shore of Lake Ontario, believing it would serve the area's industries with much-needed hydroelectricity. Love felt that by digging a short canal between the upper and lower Niagara Rivers, power could be generated cheaply to fuel the industry and homes of his would-be model city. On May 23, 1894, work on the canal began in Niagara Falls, plowing a groove of earth about a mile long, 80 feet wide, and 15 feet deep and then was abandoned. "He dug a hole, then he left town." During World War II, the federal government built a dynamite factory there as well as radioactive waste. Up until 1953 the Hooker Electrochemical Company (now Occidental Chemical Corporation, or OXY) disposed of over 21,000 tons of hazardous chemicals into the abandoned Love Canal, contaminating soil and groundwater. On September 30, 2004, federal officials announced that the Love Canal Superfund cleanup had ended. The entire process occurred over 21 years and cost a total of \$400 million.

38 - **Dr. Maria Reiche** (1903–1998) was a German mathematician. She researched Peru's Nazca Lines in 1940, a group of geoglyphs made in the soil of the Nazca Desert in southern Peru. A

geoglyph is a large design or motif produced on the ground and often only fully visible from a distance or the air. The Nazca Lines, formed on the ground by digging a shallow trench, with a depth between 10 and 15 cm., were created between 500 BCE and 500 CE. The largest ones are about 370 m. long. Known as the “Lady of the Lines”, Maria Reiche made the documentation, preservation and public dissemination of the Nazca Lines her life’s work.

39 - **Trench construction diagrams from a 1914 British infantry manual.** Trench warfare is a type of land warfare using occupied fighting lines largely comprising military dugout systems, in which troops are well-protected from the enemy’s small arms fire. Trench warfare lasted for several years and took place on the Western Front in World War I, 1914–1918. A man, especially a private soldier was often addressed with: *How are you, Digger?*

40 - **Carlisle newspaper** (1906). The Indian school of Carlisle Pennsylvania (1879–1918) was the first of many away from family schools set on quickly and firmly assimilating and training native children to the disciplines of an agricultural lifestyle. Plowing, mining and damming were alien concepts to their customs and were considered inflicting loss and damage to nature. Quote: *Plow deep while sluggards sleep and you’ll have corn to sell and keep.*

41 - **Mother Nature Laid Bare** (1936). **Alexander Hogue** Was an American realist painter, his works focus on Southwestern and Central United States landscapes during the Dust Bowl. The loss of the grasslands in the Texas Panhandle and the *plow* become symbols for the rape of the land. Hogue connects the human body to the natural world. The landscape and the woman are both rendered completely barren by the plow. The land is beyond the point of help as water runs off instead of being absorbed.

42 - **An American Exodus, a Record of Human Erosion** (1939) by Dorothea Lange and Paul S. Taylor, is one of the masterpieces of the documentary genre. Produced by documentary photographer Dorothea Lange in the early 1930’s, when she took her camera out of her studio and into the street where she was on the photography staff of the *Farm Security Administration*. With text by her husband, Paul Taylor, this book was among the first to combine photographs with oral testimony providing an insight into the struggles of the depression and offering a profound look at the human condition. They brought the poverty and exploitation of sharecroppers, tenant farmers and migrant farmworkers to the attention of the American public in their hope that the *New Deal* would be extended to benefit those who worked on farms.

43 - **Marie Tharp** (Michigan, 1920–2006) was a geologist and cartographer and was the first to scientifically map the ocean floor. Women at the time were not allowed to work aboard ocean vessels so Tharp used the data collected to systematically map the ocean floor back at home. She took thousands of sonar readings and literally drew the deep underwater details of the ocean floor. *“Not too many people can say this about their lives: I had a blank canvas to fill with extraordinary possibilities, a fascinating jigsaw puzzle to piece together: mapping the world’s vast hidden seafloor. It was a once-in-a-lifetime—a once-in-the-history-of-the-world—opportunity for anyone,*



*but especially for a woman in the 1940s. The nature of the times, the state of the science, and events large and small, logical and illogical, combined to make it all happen”.*

44 - **Walter Benjamin** (1892–1940). Walter Bendix Schönflies Benjamin was a German Jewish philosopher, cultural critic and essayist. An eclectic thinker, combining elements of German idealism, Romanticism, Western Marxism, and Jewish mysticism. In one of his essays he wrote; “Memory is not an instrument for surveying the past but is its theater. It is the medium of past experience, just as the earth is the medium in which dead cities lie buried. He who seeks to approach his own buried past must conduct himself like a man digging”.

45 - **The Berkeley Pit** is a former copper mine located in Butte, Montana, United States. It is 1 mi (1,600 m) long by 1/2 mi (800 m) wide with an approximate depth of 1,780 feet (540 m). It is filled to a depth of about 900 feet (270 m) with water that is heavily acidic. The mine was opened in 1955 until its closure in 1982 when the water pumps in the nearby Kelley Mine were turned off, and groundwater from the surrounding aquifers began to slowly fill rising at about the rate of 1 foot a month. A \$19 million treatment facility was completed in August 2019 and the first discharge of treated water into a local creek happened in October 2019. Researchers studying the water composition, discovered a robust, single-celled algae known as ***Euglena Mutabilis***, thriving in the toxic waste. Intense competition for the limited resources caused these species to evolve the production of highly toxic compounds some of which have shown to fight against cancer cells. This is a good example of how we make a lot of money fast then must spend even more money to remedy the exploitation of the environment and dangers it causes to ourselves. Then in searching for remedies our destruction turns into researching how nature responds to extreme environments, and helps us to find ways to live amongst our own toxic waste.

46 - **Hole Joke, Readers Digest** (1954).

Mother: “What’s your little brother crying about? Didn’t I tell you to give him anything he wanted?”

Daughter: “Yes, but I’ve dug him a hole, and now he wants me to bring it in the house!”

47 - **Chariot project** (1958). Project Chariot was an idea by Edward Teller, a 1958 US Atomic Energy Commission proposal to construct an artificial harbor at Cape Thompson on the North Slope of the U.S. state of Alaska by *digging* holes and burying and detonating a string of nuclear devices. Opposition came from the tiny Inupiat Alaska Native village of Point Hope. Material from a nuclear explosion at the Nevada Test Site was transported to the Chariot site in August 1962, used in several experiments, then buried. Thirty years later, low levels of radioactivity at a depth of two feet (60 cm) were found in the burial mound. Outraged residents of the Inupiat village of Point Hope, who had experienced an unusually high rate of cancer deaths, demanded the removal of the contaminated soil, which the government did at its expense.

48 - **The Flintstones** is an American T.V. cartoon produced by Hanna-Barbera Productions. The series takes place in a romanticized Stone Age setting. It was broadcast on ABC from 1960–1966. The popularity of *The Flintstones* rests heavily on its juxtaposition of modern everyday tools and

appliances in the Stone Age setting, and many worked by employing animals. Fred Flintstone worked in a mine *digging* with a dinosaur. maybe a flint mine?

49 - **Joseph Kosuth, One and Three Shovels** (1965). Kosuth belongs to a broadly international generation of conceptual artists that began to emerge in the mid-1960s. His work consisted of an object, a photograph of it and dictionary definitions of the words denoting it. "That celebrated marriage of science, art and photography seemed, at the time to join together how we see the world-art with how we were coming to know it-science".

50 - **Making Craters –Cinder Lake, Flagstaff, Arizona**. The Moon's *Mare Tranquillitatis, the Sea of Tranquility* is a plain of volcanic rock pocked with craters. It was the site that was designated for Apollo 11's Moon landing in 1968. Engineers and scientists in the U.S. Geological Survey's Astrogeology branch reproduced a 10-acre swatch of *Mare Tranquillitatis* in Cinder Lake, a volcanic cinder field northeast of Flagstaff, Arizona, for use in Apollo astronaut training and lunar vehicle and equipment testing. They marked out crater locations, planted explosives, and set them off in three waves, *digging* 143 craters, some up to 10 meters wide. We dug holes on earth in order to study holes on the moon!

51 - **The Bucyrus Erie 3850-B Power Shovel named *Big Hog*** went to work next door to Paradise Fossil Plant for Peabody Coal Company's Sinclair Surface Mine in 1962. When it started work it was received with grand fanfare and was the Largest Shovel in The World with a bucket size of 115 cubic yards. This technological "star" churned through thousands of acres of Muhlenberg County land that laid above the coal seams there. After it finished work in the mid 1980's, it was buried in a pit on the mine's property. It remains there still today. A strange twist for a grand digger that ended up *digging* its own grave (maybe it went to Paradise?)!

52 - **John Prine's song, "*Paradise*"** was released in 1971 on his debut album. Paradise was an eastern Muhlenberg county town on the Green River about ten miles northeast of Greenville, Kentucky. It was settled early in the nineteenth century. His grandfather was a coal miner in paradise and his parents were both raised there. His song is about remembrance and loss. The town was torn down in 1967 by the Tennessee Valley Authority due to health concerns over its proximity to the nearby coal-burning electric plant. "*Then the coal company came with the world's largest shovel and they tortured the timber and stripped all the land Well, they dug for their coal till the land was forsaken Then they wrote it all down as the progress of man*".

53 - **Seamus Heaney: *Death of a Naturalist*** (1966). *Under my window, a clean rasping sound when the spade sinks into gravelly ground: My father, digging. The cold smell of potato mold, the squelch and slap of soggy peat, the curt cuts of an edge through living roots awaken in my head. But I've no spade to follow men like them. Between my finger and my thumb, the squat pen rests. I'll dig with it.*

54 - **Le Grotte di Frassasi** are a spectacular work of nature, with water incessantly digging and

flowing through natural cavities, slowly creating a breathtaking series of stalactites and stalagmites. Deep in the hill country near the remote village of Genga, the Frasassi caves are one of Europe's largest cave systems. This karst wonderland, gouged out by the river Sentino and discovered by a team of climbers in September 1971, can be explored on a guided tour which takes in features such as the **Ancona Abyss**, a cavernous 200m-high, 180m-long chamber that would comfortably accommodate Milan Cathedral and contains forests of stalactites and giant stalagmites that reach up to 20m and took 1.4 million years to form.

55 - **"Breathe" a song on Pink Floyd's 1973 album, *The Dark Side of the Moon*.**

Songwriters: David Jon Gilmour, Richard Wright and Roger Waters.

*Run, rabbit run/ Dig that hole, forget the sun/ And when at last the work is done*

*Don't sit down, it's time to dig another one/ For long you live and high you fly*

*But only if you ride the tide/ And balanced on the biggest wave/ You race towards an early grave.*

56 - **Chris Burden** (1946–2015), an American artist working in performance, sculpture and installation art, dug a hole in 1979 and called it *Honest Labor*, Vancouver, B.C. *Rather than meet with students to present and discuss his past work in a teaching context, Chris Burden requested that he be provided with tools and an empty lot. He set to work digging a straight ditch about 2 ½ ft. wide and 3 ft. deep. He dug from 9 to 5 every day.* Burden's hole suggests hard work, related to the phrase *spade's graft* 'the amount of earth that one stroke of a spade will move,' based on Old Norse *grǫftr* 'digging.' This wonderful and literal digging of holes to make art continues from the nineteen sixties and seventies to today, in different scales.

57 - **In 1980 the EPA (Environmental protection agency)** began to clean up contaminated sites and force the parties responsible for the contamination to either perform cleanups or reimburse the government for EPA-led cleanup work. *Love Canal Home Owners Association*: spearheaded by Lois Gibbs led president Carter to create the Superfund program in 1980 which later became the **Comprehensive Environmental Response, Compensation and Liability Act** (CERCLA). As of 2023 there were 1336 superfund sites in the United States. Love Canal was the first Superfund site on that list. While the **EPA** struggles to remediate and restore almost countless mine sites in the United States, efforts are underway to develop more open pit mines, clear examples of short-term profit gained at a long-term loss. The 50th anniversary of the *Clean Air Act* is a moment for hope: It's a reminder of how capable we can be of cleaning up pollution, and solving problems that seem intractable, when our political leaders are prepared to act on scientific evidence.

58 - **Picher, Oklahoma chat piles** (1917–1970), a boomtown of lead and zinc mining. By the time operations ceased over 10 million tons of ore had been removed from the area. The town ceased municipal operations in 2009. This monumental waste site has been continually expanding through the motion of the wind, rivers and aquifers. The term **chat** is applied to fragments of siliceous rock, limestone, and dolomite waste rejected in the lead-zinc milling operations in the first half of the twentieth century. These chats, found as huge man-made mounds, look like psoriasis of the earth surface from above. Today, approximately 100 million tons of chat remain in the states of

Oklahoma, Kansas, and Missouri. Federal govt. has spent 301 million dollars since 1983 chewing and **digging** away at the chat piles and estimated 178 million in the next 20 year.

59 - **The Quapaw Tribe**. This is where the real tragedy lies, a people that has already been once removed from its ancestral homelands of Arkansas, Missouri, Mississippi, and Tennessee in the 1800's, is left with an immense amount of waste on the land they were relocated to.

*"When we **dig** roots, we make little holes. When we build houses, we make little holes. But the white people plow up the ground, pull down the trees, kill everything? ... everywhere the White man has touched it, it is sore."*

William Commanda, Mamiwinini, Canada, 1991.

60 - **Kola Superdeep Borehole** (1970). The Kola Superdeep Borehole (Russian: Кольская сверхглубокая скважина) is the result of a scientific drilling project of the former USSR. The project attempted to drill as deep as possible into the Earth's crust. Drilling began on 24 May 1970. The hole reached 12,261 meters (40,230 ft) in 1989, and remains the deepest hole ever drilled.

61 - **The Yucca Mountain Nuclear Waste Burial Repository** (1987) is a deep geological storage facility within Yucca Mountain for spent nuclear fuel and other high-level radioactive waste in the United States. The site is located on federal land adjacent to the Nevada Test Site in Nye County. Most nuclear power plants in the United States have resorted to the indefinite on-site dry cask storage of waste in steel and concrete casks. This is a proposed sign for small disks that will be randomly scattered and buried within the controlled zone, to warn people digging that it is dangerous and they should stop.

62 - **Hammer and Nail** (1990), Virgin Songs Inc. and GODHAP Music, words and music by **Emily Ann Saliers**.

*A blistered hand on the handle of a shovel*

*I've been digging too deep, I always do*

*Gotta tend the earth if you want a rose...*

*I started seeing the whole as a sum of its parts.*

63 - **Lucy R. Lippard** (born April 14, 1937), American writer, art critic, activist and curator. The weft of her text is deeply entwined with Land; Land as place and identity, land as Mother Nature, how land has been imagined, captured and (ab)used. She has been a persistent advocate of excavating the dirty truths about human's damage to the earth's surface and how we have eroded the foundation of rock formation, damaged and weakened gradually and insidiously. Her years of hard work contain a mine of information. I dedicate this shovel to her task.

64 - **The big suck: DAC direct air capture units** (2015). The machines suck carbon dioxide from the atmosphere and pump it into the sedimentary rock formations below. Pumped back where it was taken and where it had once been for a long time. We **dig up** ways to undo what we did fast.

65 - **The New Yorker August 17, 2020 Article, Dani Kaufman, *The Last Stand Wisconsin dairy farmer's fate***. Jerry Volenec: "It's not the farming I was brought up with. It's not really even farming anymore. It's Mining. We're extracting resources and shipping them away, and they're not coming back. There's no cyclical nature to it. It's a straight line out." Here is his poem:

*Get Big or Get Out*

*I was told to buy a shovel*

*So, I bought a shovel*

*I was told to dig*

*So, I dug*

*What is the hole for, I asked?*

*For your neighbor, he has passed*

*I was told to keep digging*

*So, I put my shovel to the task*

*A hole for each Neighbor*

*Until I was the last*

*Keep digging I was told*

*I looked around and asked*

*Who for?*

*For yourself I was told*

*You are needed no more.*

66 - **Tommy Orange** was a finalist for the **2019 Pulitzer Prize** for his book, ***There There***.

He is a citizen of the Cheyenne and Arapaho Nations of Oklahoma. The book contemplates a North America where there is no take and give back or *Dig up* and put back. "*You are from a people who took and took and took and took. And from a people taken. You're both and neither. For Native people, cities and towns represent buried ancestral land, glass and concrete and wire and steel, unreturnable covered memory. There is no there there*".

67 - **The Stone Age Institute**, founded by **Kathy Schick and Nicholas Toth** in 2003, is an independent research center dedicated to the archaeological study of human origins and technological development. They have been working at Olduvai Gorge, Tanzania ("The Cradle of Humankind") for decades, including archaeological excavations and geological drilling/coring targeting the ancient lake deposits in the sedimentary basin and more than doubled the known stratigraphic section at Olduvai. The deepest borehole was 245 meters, going back to 2.4 mya. They now hope to drill down to ca. 450 meters below the present land surface targeting a location that should take us to the bottom of the basin, perhaps down to more than 3 or 4 mya.

68 - **Leanne Wijnsma**, a Dutch artist, feels there is too much choice in our urban societies. To escape the stress, she started to hand-dig small holes and climb inside. "*Escape, 2022, is an action triggered by the paradox of freedom. It is a response to this world in which we are always connected, always available. It is an urge to do something really banal yet essential. The hole doesn't lead to freedom. The choice to **dig** however becomes the freedom itself.*" She is interested

in creating experiences for our senses, trusting that instinct evokes an inherent truth.

69 - **Jae Rhim Lee**, a visual artist and researcher, has designed a *mushroom burial suit* that converts our unused bodies efficiently into clean compost, seeded with *pollution-gobbling mushrooms*. In this way accepting death as awareness that we are physical beings intimately connected to the environment. For example, mycelium is utilized to clean up soil and some farmers also apply it to make the land healthy again. Mycoremediation, a bioremediation technique that uses fungi to help decontaminate the environment. neutralize toxins and provide nutrients to surrounding plant life. **Bob Hendrikx**, founder of *Loop*, invented the “Living Cocoon” in his student laboratory at Delft Technical University. It is a fully biodegradable casket made out of mycelium fungi. “*We have showed humanity that this is our opportunity to no longer accept to leave our planet and loved ones with a scar but actually enrich life after death by becoming living compost and part of the cycle of life, death and renewal. We have a dream in which we go to different cities and search for the dirtiest soil and start cleaning that up.*” More wonderful still, the basic reproductive structure of the mycelium, involves a paradigm that can be observed throughout the universe. Its network-like design mirrors that of dark matter, neural connections in the brain, and even the human-created Internet. As deep as fungi **dig** into our planet’s past, so too do they offer exciting pathways to a more earthy, sustainable future.

70 - **Esther Quaedackers** (2023) is a Lecturer in *Big History* at the University of Amsterdam, where she has been developing, coordinating, and teaching big history courses for over a decade. She is the inventor of the ‘little big history’ approach, which is a research and teaching method in which small subjects are connected to aspects of big history. It also enables students to envision the future in an interconnected/interdisciplinary way, thinking about many subjects relevant to our world. This shovel demonstrates a teaching model of different levels of complexity, (material, biological, cultural) that have histories of different lengths, material history being the longest, cultural history being the shortest, but all extending up to the present. The stacking helps to research the interactions between the levels, exploring the connections, and so leading to new knowledge that has not been explored. The layered model feels like **digging** into deeper levels and then popping up from the hole, an up and down, back and forth journey.