

Glossary

abiotic (opposite: biotic) non-biotic, meaning absent of organic life

aleatoric (see also: stochastic) unintentional, defined by chance or undefined elements

aerobic (opposite: anaerobic) only possible in the presence of oxygen, or relating to the consumption of oxygen and capacity to do the same

amoeba one-celled protozoa that move by projecting non-permanent pseudopodia, devoid of permanent organelles

anthro-genesis the study of humanity's origins from the beginning of known time, across all scientific and humanistic disciplines

anthropocentric (see also: human exceptionalism) a stance that prioritises humanity and/or imposes human values, features or perspectives upon non-human life

Anthropocene geological epoch following the Holocene, during which the cumulative effects of human activity became the dominant force of biological, chemical and geological processes on earth

anthropogenic an event or phenomenon which is human caused, especially the cumulative impact or influence of humanity upon the entire non-human world

anthropos Greek term for human

assisted evolution a defined range of active interventions aimed at predicting and accelerating ordinary or natural evolutionary processes, especially in conservation biology

australopithecus extinct genus of early hominids inhabiting southeastern Africa, includes the immediately prior ancestor to the *Homo* genus

axial tilt (see also: eccentricity and precession) the angle of a planet's rotation axis within the plane of orbit, on earth responsible for seasons and – in concert with related phenomena – causing the onset and termination of glacial periods; also known as obliquity

bataille-esque (see also: fuller-esque) referring to Georges Bataille (1867 to 1962), a French writer who explored notions of excess across academic and artistic genres

biocentric (see also: zoocentric) a stance which notionally regards many forms of sentient life as possessing inherent or intrinsic value, but with an implicit bias toward the human, as in regarding 'biography' as meaning 'the life of a person'

bioengineering (see also: synthetic biology) the use of interventionist techniques to engineer modified versions of naturally occurring organisms

biogenesis life that is generated from pre-existent life

biogeochemistry the cyclic rotation or separation of chemical elements or compounds between the living and non-living aspects of an ecosystem

Biomass Energy Carbon Capture and Storage (BECCS) the trapping and (supposed) 'long-term' storage of CO₂, harnessed when particular biomass is converted into fuels or directly burned to generate energy

biomedical engineering the application of engineering principles and techniques to biology and medicine

biomes major types of ecological communities (such as intertidal ocean zones, rainforest, or desert)

biophysical the combination of biological and physical entities, especially the study of the physical quantities in biological systems

biotic from, of, or caused by living organisms

Cambrian geological period beginning ca. 540 million years ago, and ending ca. 485 million years ago

Carboniferous geological period beginning ca. 360 million years ago, and ending ca. 290 million years ago

Carbon Dioxide Removal (see also: climate engineering) the capturing of CO₂ from the atmosphere and its (supposed) removal and ‘long-term’ storage

cataclysm an event or series of events characterised by extreme destruction and upheaval of a previously existing state of an abiotic and/or biotic system

catastrophism the geological theory positing that alterations in the earth’s crust were caused suddenly by violent events of a type and/or scale unknown today

Cenozoic the (arguably) current geological era, beginning 66 million years ago, with the end of the non-avian dinosaurs

chemosynthetic the use of energy of living organisms, derived from inorganic chemical reactions to produce a synthesis of organic compounds

Chixculub name given to an asteroid, circa 10 kilometres in diameter, that struck earth 66 million years ago, causing cataclysmic climatic and geological events that constitute the start of the Cenozoic era

clade (evolutionary biology) a group of biological classifications including all the known descendants of a single common ancestor

class (evolutionary biology) a taxonomic rank in biological classification, here running from largest to smallest: life, domain, kingdom, phylum, class, order, family, genus, and species

closed ecological system an isolated ecological system that – which the exception of energy – operates independently, and, without exchanges outside the closure of the system

contusioned ‘contusion’ meets ‘confusion’, owing to a contusion (on the brain), begetting the wrong word (‘contusioned’), in favour of the correct word (‘confused’)

court jester (theory of evolution) (see also: red queen) posits that the major driving forces in evolutionary processes causing speciation are abiotic forces, including planetary climate, and not biotic competition between species

Cretaceous-Paleogene boundary the stratigraphic boundary marking the end of the Cretaceous period and the beginning of the Paleogene period, also known as the K-Pg boundary

cryobank (conservation biology) a facility that collects biological samples, stored by means of minutely controlled freezing, for potential later use in conservation

cryosphere the section of the earth's surface distinguished by the constant presence of frozen water

cyanobacteria a major group of photosynthetic single-celled bacteria that nonetheless create filament-, sheet-, or sphere colonies, found in varying environments

deep time a recently coined term for geologic or cosmic time, denoting timescales of billions upon billions of years

disequilibrium the absence or lack of equilibrium, or balance in a system, whether abiotic and/or biotic

distal (opposite: proximal) located at a distance from the point of origin, remote from the point of attachment or central point of the whole

Devonian geological period beginning ca. 420 million years ago, and ending ca. 360 million years ago

dour literally harsh, severe and obstinate, here referring to a mental posture that reflects these values in refusing to soften, censor or otherwise mitigate the fact of the current extinction and climate cataclysm in any way

earth system science the integrated examination of biological, physical, and chemical processes that collectively shape abiotic and biotic conditions on earth

earthia (see also: melarthelia) the planet earth is, more accurately, earTheia, as it is the sum of the hypothesised collision between the early earth, and the planet Theia

eccentricity (see also: axial tilt and precession) the deviation of an astronomical orbit from perfect circularity

ecocide the wilful and knowing destruction of earth's ecosystems by humans

ecological niche the niche occupied by a lifeform or species within its ecosystem, referring to both the conditions necessary for its survival and its role in the maintenance of the system

ecosystem (includes: ecology) a community of deeply interdependent organisms and their environment, forming a functional ecological unit, or ecology

El Niño Southern Oscillation (ENSO) unpredictable and volatile global climate phenomenon resulting from variations in wind systems and ocean surface temperature across the tropical Pacific

elliptical in astronomy, elliptical orbits that are oval rather than circular, and in language, deliberate obscurity, avoidance, or extreme reduction of facts

entropy (opposite: negentropy) generally the level of chaos and uncertainty within a system, specifically the degradation of universal energy and matter towards a final state of inert uniformity

environmentalism a socio-cultural and economic-political movement aiming for the protection, preservation and restoration of earth's ecosystem and environment

eon formally, the largest geological unit of time, generally, one billion years

epistemology (see also: world turtle) a branch of philosophy examining the definition and origins of knowledge, particularly referring to its limitations and absolute validity

epoch a geological unit of time less than a period but greater than an age, generally an extended time period distinguished by distinctive new developments or trends

epochal consciousness a contested term for the collective experience of humans living within their epoch or times and the way it affects their perspective, thinking and self-awareness

eras (geology) one of the largest units of geological time, less than an eon but more than a period

eukaryotes one of the three major domains of life forms, which features one or multi-celled organisms with evident nuclei and organelles, including animals, plants, seaweeds, fungi, and single-celled organisms

existentialism collection of twentieth century philosophical stances focussed on the examination of individual existence in an unfathomable universe, and the dilemma of individuals assuming absolute responsibility for their exercise of free will without any guarantee of 'right' or 'wrong'

extremophiles organisms, most commonly from the domain archaea, which survive and/or thrive under extreme environmental conditions such as drastic cold or heat, deep ocean pressure or high altitudes

family (evolutionary biology) a rank of biological classification greater than a genus and lesser than an order, usually including multiple genera

fitness (biology) a quantitative measure of individual reproductive success; also called Darwinian fitness

Frankensteinian referring to Mary Shelley's *Frankenstein; or, the Modern Prometheus*, a nineteenth-century gothic horror novel exploring many themes, but most pertinently notions of human hubris and blind faith in scientific invention despite the risk of fatal outcomes

Fuller-esque referring to Buckminster Fuller (1895 to 1983), an American designer, engineer and inventor whose work explored a mechanistic and managerial mindset of human relations to earth systems and non-human life

gametes mature male or female germ cells capable of initiating the creation of a new individual by fusion with a gamete of the opposite sex

gene drives so-called 'selfish' genetic aspects that are transmitted to progeny at frequencies greater than 50%, used in laboratory settings to reduce the prevalence of vector-borne diseases, crop pests and non-native invasive species

genome a single haploid set of chromosomes, including all genes they contain; more generally, all genetic material of an organism

genotype all or part of the genetic makeup of an individual or group of living organisms

genus biological classification greater than a species but lesser than a family, comprising related species or single species with unusual differentiation

geocentric a perspective centred on the earth, literally to, from or as if observed from the earth's centre

geodesic a method of construction using light straight building elements that form a curved surface, mostly secured using mutual tension

geoengineering (see also: climate engineering) a range of interventionist techniques designed to directly and consciously impact and alter the planetary climate, in order to mitigate human-caused climate change

geomorphology the science of examining the relief features of the earth (or other celestial bodies) and interpreting them in terms of origin and development

geostationary the state of possessing an equatorial orbit at an altitude of circa 36,000 kilometres, with an identical angular velocity to the earth, so that the orbiting object remains in a fixed position with respect to the earth

ghost in the shell the sense of ancient ancestral hominid ghosts lurking in our modern *homo sapiens* selves, here referring to Oshii Mamoru's eponymous 1995 film, which express this idea

global heating a general term for the overall increase in average temperatures of all zones of the biosphere due to earth's current net positive energy imbalance, having replaced 'global warming' and 'climate change' due to how innocuous these terms became

global dimming the decrease in sunlight reaching earth's surface caused by atmospheric particles (particularly sulphate aerosols from human-caused pollution), first observed in the 1950s and worsening by 4 to 5% per decade up to the 1980s, when the trend was partially reversed

great oxygen/oxygenation event a period beginning circa 2.4 billion years ago and ending circa 2 billion years ago, during which the amount of free oxygen in the earth's atmosphere and shallow seas first significantly increased, making them toxic to the then-largely anaerobic organisms on earth and believed to have caused their mass extinction; also known as great oxygen holocaust/crisis/catastrophe/revolution

guttural the quality of something being like a gutter

Hadean earliest defined eon of geological time, beginning with the planet's formation circa 4.6 billion years ago and ending circa 4 billion years ago

heliocentric centred literally or figuratively on the sun

heliosphere the region around a sun influenced by the sun directly or through solar winds

Holocene recent epoch of geological time, beginning circa 11,700 years ago and arguably running until the present (although this is contested by those who define the current epoch as the Anthropocene, beginning in the eighteenth century with the Industrial Revolution)

homeostasis a fairly stable equilibrium (or tendency towards the same) achieved between various interdependent parts of an organism, population or other group

hominid any member of the biological family *hominidae*, comprising erect bipedal primates, including modern *homo sapiens* as well as extinct ancestral and related species and all great apes

homo sapiens and homo sapiens sapiens the two modern human species (literally 'thinking man'): *homo sapiens*, which emerged in Africa circa 300,000 years ago from the species *homo heidelbergensis* (descendants of *homo erectus*) and eventually spread globally, interbreeding with and ultimately replacing all other archaic humans and becoming *homo sapiens sapiens* roughly 160,000 years ago

hotspots extremely vast accumulations of igneous rocks formed by the passage of magma through the earth's crust towards the surface, leading to extensive volcanism

human exceptionalism to posit that human life is fundamentally of greater value than non-human life, by asserting that humans are qualitatively differentiated from the rest of the biosphere and possess moral primacy, an attitude now often characterised as speciesism or unjustified bias towards other species

hydrosphere the aqueous elements of the earth's biosphere, including all bodies of water and atmospheric aqueous vapor

intervention ecology the intentional alteration of both biotic and abiotic processes and structures in an ecosystem

Intergovernmental Panel on Climate Change (IPCC) intergovernmental body of the United Nations, activated in 1988 and integral to the United Nations Framework Convention on Climate Change

isostatic rebound the rise of land masses following the lifting of the weight of massive ice sheets following the end of an ice age; also called crustal rebound

jabberwocky meaningless speech or written matter, from Lewis Carroll's 1872 poem titled "Jabberwocky" in his book *Through the Looking-Glass and What Alice Found There*

Jurassic geological period beginning ca. 201 million years ago, and ending ca. 145 million years ago

Kafkaesque referring to the work of Franz Kafka (1883 to 1924), an Austrian-Czech writer whose narratives are famous for their often nightmarishly illogical, inhumane and maze-like qualities

karst an area of irregular limestone region characterised by sinkholes, subterranean streams and caverns

kingdom (evolutionary biology) a major biological classification greater than a phylum and lesser than a domain

Last Universal Common Ancestor (LUCA) the hypothesised common ancestral unicellular lifeform from which the three domains of life on earth emerged: bacteria, archaea and eukaryota

lithosphere the exposed outer solid layer of a celestial body, on earth comprising the crust and the outermost mantle, around 100 kilometres in thickness

macrocosm a complex that constitutes a larger-scale version of one of its constituents (similarly microcosm, a smaller scale version, and mesocosm, a mid-scale version)

marine cloud brightening making clouds brighter in order to mitigate solar radiation by reflecting a small percentage of sunlight back into space, achieved by generating a fine mist of seawater salt and delivering this mist into stratocumulus cloud banks via ships

mass extinction event a rarely occurring event in which 75% or more of all living species on earth die out within a short period of geological time, usually due to catastrophic natural phenomena, now associated mostly with human impacts, as per the Anthropocene

Mesozoic second most recent era of geological time, beginning circa 252 million years ago and ending circa 66 million years ago

metaphysics branch of philosophy examining the fundamental nature of existence and reality

microfiche largely obsolete form of physical data storage, wherein a sheet of microfilm contains images of printed pages, which can be read using a microfiche machine

Mid-Pliocene Warm Period (MPWP) a period during the Pliocene epoch, beginning circa 3.3 million years ago and ending circa 3 million years ago, during which the average temperature of earth was 2 to 3°C higher than today, and global sea levels 25 metres higher

melarthelia (see also: *eartheia*) melarthelia is the name given to the theoretical by-product of a future collision between *eartheia* and a rogue planet, like the planet Melancholia in the eponymous Lars von Trier film, which results in the end-of-the-planet itself, as per the film's *finale*

ModCon abbreviation for Modern Conveniences, meaning all human technology not strictly necessary for survival but designed to make life more convenient or more comfortable, and its corollary: Modern Conservation, where said technology is used to offset the effects of such conveniences on the biosphere, through intervention ecology, assisted evolution, synthetic biology, and climate engineering

Negative Emissions Technologies (NETS) a range of proposed technologies for the removal of carbon dioxide from earth's atmosphere and (so-called) 'securely' storing or converting it into a form that sequesters the greenhouse gasses

nematode long cylindrical worms that are parasitic in animals and plants, but live free in soil and water feeding on microscopic organisms

net positive energy balance (opposite: net negative energy balance) an energy balance in a system, such as a cell or an atmosphere, wherein the intake of energy exceeds its expenditure

nihilism a philosophy that denies any fundamental truths, rendering existence meaningless and senseless

Non-Linear System Dynamics (N-LSD) the study of shifts and complex interactions within and between systems over time, emerging from mathematical analysis of chaos and complexity

northern hemisphere glaciation the process of intense glaciation at the north pole, which gained momentum circa 3.5 million years ago and has defined the current (Quaternary) geological period, with the hitherto unprecedented situation of both poles remaining glaciated

Northern Polar Jet Stream and Northern Polar Vortex two circles of rapidly moving air centred around the Arctic, which impact global weather patterns significantly; the Polar Jet Stream is tropospheric, characterised by a belt of wind blowing west to east in the lowest layer of the atmosphere; the Polar Vortex is stratospheric (higher) and is still not fully understood, but is more volatile than the Jet Stream

obliteration obliterated literature – well may we have written ourselves into the geology of the planet, but in so doing we have written ourselves out of history

ocean acidification reduction of global ocean acidity, largely caused by the uptake of carbon dioxide into the atmosphere and threatening all current ocean ecosystems

ontology area of metaphysics focussed on the nature and interconnections of existence or being; also a specific stance on what things can actually be said to exist

order (evolutionary biology) biological classification greater than a family and lesser than a class

Ordovician geological period beginning ca. 485 million years ago, and ending ca. 445 million years ago

osmosis diffusion or absorption caused by the movement of a solvent through any semipermeable barrier, that tends to balance the composition of the substances on both sides of that barrier; also used as a metaphor for the same

Palaeolithic of or from the period known as the Stone Age, the first known period of humans using stone tools, beginning circa 3.3 million years ago and ending circa 3000 BCE

Palaocene-Eocene Thermal Maximum (PETM) a geologically brief period, beginning circa 55.8 million years ago and lasting circa 200,000 years, during which average global temperatures rose 5 to 8°C and there was massive carbon input into both the ocean and atmosphere

panspermia evolutionary theory, originating in nineteenth century, that living organisms exist and reproduce throughout the universe, wherever conditions are favourable to their needs

periodicity the state of being regularly occurring, or occurring in periods

permafrost the layer of the earth's surface (erroneously) considered 'permanently frozen', occurring at and to varying depths in the coldest regions of earth, and now melting

perturbation the disrupting of a course, motion, state of balance or status quo; astronomically the disturbance of the normal motion of any celestial body

petrification literally the conversion of organic matter into a hard and resilient substance by means of mineral deposit; generally the process of becoming lifeless, unchanging and rigid

Permian geological period beginning ca. 300 million years ago, and ending ca. 250 million years ago

permineralized a state of being fossilised by a process of minerals being deposited into organic tissue via water, which later evaporates

phenotype features or traits of any organism caused by its interaction of its genotype and the environment, literally the observable expression of one or more genes

phosphate salt or ester from phosphoric acid; organic compound of phosphoric acid wherein the acid is bonded to nitrogen or carboxyl in a manner that allows energy to be released

photosynthesis production of carbohydrates using carbon dioxide and any source of hydrogen (such as water) in the chlorophyll rich cells of green plants when exposed to favourable forms of light

phylum (evolutionary biology) biological classification lesser than a kingdom and greater than a class, also any group that displays the unity of a biological phylum

planetology area of astronomy focussed on studying planetary systems, particularly planets and celestial bodies within the solar system

plate tectonics the generally accepted theory that the earth's lithosphere is made up of vast tectonic plates, which have been in motion for around 3 to 4 billion years

Pleistocene relatively recent geological epoch, beginning circa 2.58 million years ago and ending circa 11,700 years ago, during which much of the evolution of the genus *Homo* occurred

Pliocene geological epoch beginning circa 5.33 million years ago, and ending circa 2.58 million years ago, during which the genus *Homo* first appeared

postwar referring to the period following the end of World War II in 1945, often seen as ending with the beginning of the Vietnam War

precession (see also: axial tilt and eccentricity) relatively slow gyration of the rotational axis of any rotating body around an intersecting line, describing a ‘cone’ of motion

proprioceptive of stimuli, occurring within an organism, and especially to do with the position or movement of a body

proximal (see also: distal) located close to the point of origin, point of attachment or central point of the whole

Quaternary current geological period beginning circa 2.58 million years ago

red queen (theory of evolution) (see also: court jester) the red queen hypothesis of evolution, first proposed in 1973, posits that species must undergo constant adaption, evolution and multiplication to survive in sometimes violent competition with other similarly constantly evolving species

refugia regions of relatively unchanged climate, inhabited by organisms during periods of critical climate change, creating ecosystems where otherwise decimated species may potentially survive, and re-emerge following the cessation of climatic change

rupture literally to physically break apart by violence or force, also used to indicate a breaking of existing accords in a violent manner

saccharomyces cerevisiae a species of yeast (single celled fungal microorganisms) fundamental to baking and beer brewing, intensely studied as a model of eukaryotic organisms and engineered in synthetic biology

saltation (evolutionary biology) an hypothesis of sudden and drastic evolutionary change, where the origination of novel species or higher biological classification can occur within a single evolutionary step

Silurian geological period beginning ca. 445 million years ago, and ending ca. 420 million years ago

Sixth Extinction Event (see also: Mass Extinction Event) the Mass Extinction Event currently occurring, differing from prior mass extinction events in that it has been caused by human activity, including agriculture, habitat destruction, deforestation, diversion of freshwater and massive biophysical and atmospheric pollution

Solar Radiation Management (see also: climate engineering) proposals to limit global heating by increasing the percentage of sunlight reflected back into space and by reducing the capture of thermal radiation from the sun within earth’s atmosphere

stochastic (see also: aleatoric) somehow dependent upon or involving a random variable or chance

synecdoche a linguistic device wherein a part stands for the whole or the whole stands for a part (such as all hands-on-deck where hands refers to workers), or the composite material stands for the thing produced (walking the boards for walking onstage)

synthetic biology (see also: bioengineering) a branch of bioengineering using multidisciplinary research to engineer or manipulate naturally emergent biological systems, for application in biomanufacturing, biofuels, conservation, and, much more recently, global heating mitigation

Stratospheric Sulphur Particle Injection (SSPI) a proposed method of climate engineering designed to reduce global heating by introducing aerosols into the stratosphere to produce solar dimming, only naturally seen during a volcanic winter

superfamily (evolutionary biology) biological classification lesser than an order and greater than a family

symbiosis a state of mutually beneficial co-existence or union between two disparate organisms

tardigrade microscopic eight-legged invertebrates that usually live in water or moss but can survive in extremely inhospitable environments, largely due to their ability to dehydrate and enter a form of suspended animation before rehydrating and reviving; also known as water bears

technofix literally ‘technological-fix’: a rapid, short-term intervention in a problem, reliant on technology and not integrated into a long-term plan for positive outcomes

technoscience the human development of, relationship to, and reliance upon technological science, often with emphasis upon human hubris in technological development (as in synthetic biology, climate engineering, and assisted evolution)

temporal relating to earthly life, or secular life; also relating to time, as opposed to space, or eternity

tensegrity a feature of any structure that comprises both parts with continuous tension (such as wires) and parts with non-continuous compression (such as any kind of metal tube), which together produce a rigid form

thermodynamics (second law) law of physics positing that heat must always move from hotter to colder areas of matter, from which the concept of entropy arises, wherein disorder in an isolated system tends to increase, leading to universal heat death (see below)

thermohaline circulation a part of the massive ocean circulation powered by surface heat and freshwater fluxes; for example, wind powered surface current like the Gulf Stream move polewards from the equatorial Atlantic, producing a cooling effect en route

thermonuclear of or related to the alterations in the nuclei of atoms possessing low atomic weight (such as hydrogen), which require an extremely high temperature for the initiation or inception of such changes

tolerance thresholds (evolutionary biology) the upper and lower limits to the range of particular environmental factors (such as light, temperature, availability of water) within which an organism can survive

transmogrifying to cause extreme transformation, often with repulsive or comical effects

Triassic geological period beginning ca. 250 million years ago, and ending ca. 200 million years ago

Triassic-Jurassic extinction event extinction event between the Triassic and Jurassic periods, circa 201 million years ago, arguably caused by massive volcanic activity and the associated release of carbon dioxide

vicissitude fluctuation of situation or condition, whether naturally occurring or consciously caused; also the state of being volatile or unstable

world turtle referring to the problem of infinite regress, expressed by the mythic theme of a giant turtle or tortoise supporting or enclosing the earth, which appears in Hindu and ancient Chinese mythology, as well as the mythologies of certain indigenous peoples of the Americas, and is referenced in various schools of epistemology concerning limits to possible human knowledge

United Nations Framework Convention on Climate Change (UNFCCC) convention for the governance of anthropogenic climate change, signed in 1992 by 154 nations, and activated in 1994

universal heat death hypothesis on the ultimate fate of the universe, which posits that the universe will progress towards a state in which there is no more thermodynamic free energy, ceasing all processes that increase entropy, thereby achieving thermodynamic equilibrium

upper palaeolithic revolution the transition from the Middle Palaeolithic to Upper Palaeolithic, occurring around 50,000 to 40,000 years ago, marked by a revolution in the technological and social development of humankind

zeitgeist from the German, refers to the overall cultural, social, ethical, intellectual, creative atmosphere of a given time period

zoocentric (see also: biocentric) a stance which regards all forms of life as possessing inherent or intrinsic value

zooxanthellae symbiotic marine plankton (dinoflagellates) dwelling inside the bodies or cells of other organisms (such as coral polyps)

