
Glossary

This glossary provides brief explanations of the technical terms used in the introductions to the chapters and in the 'conclusions' sections of the site reports. These explanations are not rigorous scientific definitions but are intended to help the general reader. Detailed stratigraphical terms are omitted as they are given context within the tables and figures. Genus and species names are also excluded but can be found in the Fossil Index. References to geological time are based on Gradstein *et al.* (2004).

Adapisoriculid: any member of the extinct mammal family Adapisoriculidae (tentatively referred to the order Lipotyphla). Small insect eaters, they evolved in the Paleocene Epoch and became extinct during the Eocene Epoch.

Afrosoricida: also known as 'Tenrecomorpha', a mammal order of the magnorder Afrotheria. Contains two families of small mammals, the Tenrecidae (tenrecs) and the Cluysochloridae (golden moles).

Afrotheria: a magnorder of the class Mammalia that links the African mammals together according to molecular evidence. A large and diverse group consisting of about one third of all living placental mammal orders, it is thought to be one of the first clades to diverge from other placental mammals. From an ultimately Gondwanan origin its members are inferred to have evolved and radiated in Africa in the Cretaceous Period (100–88 Ma) when Africa was drifting and isolated from the other continents. Includes elephants, hyraxes, sea cows, elephant shrews, tenrecs, golden moles and aardvarks.

Albian Stage: a chronostratigraphical division of the Cretaceous Period. The last stage of the Early Cretaceous Epoch, it ranges from approximately 112 to 100 million years ago and is preceded by the Aptian Stage and followed by the Cenomanian Stage.

Allotherian: any member of the extinct mammal subclass Allotheria, consisting of two one orders, the 'Haramyida' and Multituberculata. First appearing in Late Triassic times they existed for over 100 million years until the Eocene Epoch.

Amniote: any member of the group Amniota, which contains modern reptiles, birds (aves), and mammals. This group of tetrapods arose during the Carboniferous Period and divided into three main branches, the Anapsida, Diapsida and Synapsida, and were the first creatures to break the link with water. They lay eggs that have a semi-permeable outer membrane and a shell that allows gases to pass through, and therefore they do not need to lay them in water.

Amphibian: any member of the class Amphibia (subphylum Vertebrata), the first animals to colonize the land. They do not have amniotic eggs and therefore lay their eggs in water. Most species spend time on both land and in the water. Includes frogs, salamanders, newts and toads.

Amphicyonid: any member of the extinct mammal family Amphicyonidae (suborder Caniformia, order Carnivora), which lived from Eocene to Miocene times. Described as 'bear-dogs', they were closely related to bears and were often large and predatory.

Amphilemurid: any member of the extinct mammal family Amphilemuridae (order Lipotyphla, suborder Erinaceomorpha). Small, hedgehog-like animals.

Amphilestid: any member of the extinct mammal family Amphilestidae, which lived from mid-Jurassic to Early Cretaceous times.

Anapsid: any member of the subclass Anapsida (class Reptilia, series Amniota). Characterized by a roofed temporal region in which there are no openings, this early branch of amniotes gave rise to the turtles.

Anatid: any member of the bird family Anatidae (order Anseriformes). Includes ducks, geese and swans.

Anoplotheriid: any member of the extinct mammal family Anoplotheriidae (order Artiodactyla), which died out in the Oligocene Epoch.

Anoxic: literally 'without oxygen'; often used to describe an anaerobic environment.

Anseranatidae: a family of the bird order Anseriformes. Today represented only by the magpie goose.

Anseriform: any member of the bird order Anseriformes. Includes waterfowl such as ducks, geese, swans and screamers.

Apodidae: a family of the bird order Apodiformes. Includes true swifts.

Apodiform: any member of the bird order Apodiformes. Includes hummingbirds and swifts.

Aptian Stage: a chronostratigraphical division of the Cretaceous Period. The penultimate stage of the Early Cretaceous Period, it ranges approximately from 125 to 112 million years ago and is preceded by the Barremian Stage and followed by the Albian Stage.

Archaeocete: any member of the extinct mammal suborder Archaeoceti (order Cetacea). These ancient aquatic creatures were primitive whales and the oldest known cetaceans to have flourished in the Eocene Epoch.

Archetype: an ideal model of particular broad classes of animals.

Archipelago: a group of islands.

Archonta: a mammal clade comprising Euarchonta and Chiroptera (bats).

Arctocyonid: any member of the extinct mammal family Arctocyonidae (order 'Condylarthra'). These dog-sized animals had broad molars for crushing plant food. Some had mobile ankle joints suggesting that they climbed trees.

Arenite (adj. arenaceous): a general term for a detrital, clastic sedimentary rock made of sand-sized particles.

Artiodactyl: any member of the ungulate (hoofed mammal) order Artiodactyla or cloven-hoofed mammals (superorder Cetartiodactyla). Terrestrial mammals characterized by having an even number of hooves or toes, and where the axis of the foot passes between the third and fourth digits. Examples include the two-hoofed modern camels, sheep and cows, and the four-hoofed modern pigs and hippos.

Australosphenida: a mammal subclass consisting of a southern group of mammals which evolved in Gondwana in the Jurassic Period. The Australian monotremes (division Monotremata) are the only living representatives.

Ayes: a class of vertebrates composed of the birds — 'warm-blooded', egg-laying tetrapods primarily adapted for flying.

Avifauna: the collection of birds characterizing a period, region or environment.

Barremian Stage: a chronostratigraphical division of the Cretaceous Period. The fourth stage of the Early Cretaceous Epoch, it ranges approximately from 130 to 125 million years ago and is preceded by the Hauterivian Stage and followed by the Aptian Stage.

Bathonia' n Stage: a chronostratigraphical division of the Jurassic Period. The penultimate stage of the Middle Jurassic Epoch, it is dated to approximately 168–165 Ma and is preceded by the Bajocian Stage and followed by the Callovian Stage.

Bed: in lithostratigraphy, a subdivision of either a member or a formation; the smallest unit within the scheme of formal lithostratigraphical classification. Also used informally to indicate a stratum within a sedimentary rock succession.

Berriasian Stage: a chronostratigraphical division of the Cretaceous Period. The first stage of the Early Cretaceous Epoch, it ranges from approximately 146 to 140 million years ago and is followed by the Valanginian Stage.

Biogenic: produced by living organisms or biological processes.

Biostratigraphy: the stratigraphical subdivision, classification and correlation of sedimentary rocks based on their fossil content.

Biostratinomy: the study of what happens between the death of an organism and burial.

Bolonian Substage: a chronostratigraphical subdivision of the Tithonian Stage of the Jurassic Period. The earlier of two such substages, it ranges approximately from 151 to 148 million years ago and is followed by the Portlandian Substage.

Boreoeutheria: the 'northern placentals', a magnorder of placental mammals that, according to molecular evidence, remained after the Afrotheria and Xenarthra split off. During the Cretaceous Period it too divided into two major groups, the Laurasiatheria and Euarchontoglires grandorders.

Boreosphenida: a major clade of mammals including marsupials, placentals (Theria) and extinct relatives that originated and radiated in the northern continents during the Cretaceous Period. During the Cenozoic Era they spread to all continents.

Brontothere: any member of the extinct mammal family Brontotheriidae (order Perissodactyla), which were widespread in the Eocene Epoch. Late members were large creatures similar in appearance to modern-day rhinos; they had nose horns and are believed to have roamed in herds.

Calcarenite: a limestone composed mainly of sand-sized calcium carbonate grains.

Callovian Stage: a chronostratigraphical division of the Jurassic Period. The last stage of the Middle Jurassic Epoch, it ranges approximately from 165 to 161 million years ago and is preceded by the Bathonian Stage and followed by the Oxfordian Stage.

Caniform: any member of the mammal suborder Caniformia (order Carnivora). Includes dogs, bears, the extinct amphicyonids, racoons, weasels and pinnipeds.

Carbonate: a mineral salt of carbonic acid, usually referring to the common sedimentary form of calcium carbonate in limestones and invertebrate shells, but also encompassing other minerals, notably dolomite.

Carboniferous Period: a geological time division (see chronostratigraphy) of the Paleozoic Era. Ranging from 359 to 299 million years ago, it precedes the Permian Period and follows the Devonian Period.

Carnian Stage: a chronostratigraphical division of the Triassic Period. The first stage of the late Triassic Epoch, it ranges approximately from 228 to 217 million years ago and is preceded by the Ladinian Stage and followed by the Norian Stage.

Carnivora: a placental mammal order, referred to as 'carnivorans' (meat eaters), although not all meat eaters are in this order, and not all Carnivora are meat eaters (e.g. the panda). Includes modern cats, dogs, bears, seals and sealions.

Carnivore: meat eaters. Includes, but is not exclusive to, members of the order Carnivora.

Cathartid: any member of the bird family Cathartidae (order Falconiformes). Includes the new world vultures such as turkey vultures, black vultures and condors.

Cebochoerid: any member of the extinct mammal family Cebochoeridae (order Artiodactyla). Small pig-like creatures.

Cenozoic Era: a geological time division (see chronostratigraphy) ranging from approximately 66 million years ago to the present day, and comprising the Paleogene and Neogene periods, and the Tertiary and Quaternary sub-eras.

Cetacean: any member of the mammal order Cetacea (superorder Cetartiodactyla). Includes whales, dolphins and porpoises.

Cetartiodactyl: any member of the mammal superorder Cetartiodactyla. Consists of two orders, Cetacea and Artiodactyla, following studies that have indicated that whales are close relatives of artiodactyls.

Chalicothere: any member of the extinct mammal family Chalicotheriidae (order Perissodactyla), which lived in the Eocene and Pleistocene epochs. Characterized by distinct three-clawed, three-toed 'feet', some of them were 'knuckle walkers' and were gorilla-like. Modern-day relatives include rhinos, horses and tapirs.

Charadriiform: any member of the bird order Charadriiformes. Includes plovers, oystercatchers, sandpipers, skuas, gulls, terns, guillemots and puffins.

Chert: microcrystalline silica (quartz and chalcedony), which may be of organic or inorganic origin. It occurs as layers or nodules in sedimentary rocks (mainly chalk and other limestone).

Chiroptera: a mammal order of comprising the bats. The order has a history dating back to the beginning of the Eocene Epoch and contains a very large number of species.

Chronostratigraphy: the subdivision and correlation of rock units on the basis of relative age. The hierarchy of principal chronostratigraphical units to which layers of sedimentary rock are allocated through the study and interpretation of their stratigraphy is era, period, epoch and stage (Gradstein *et al.*, 2004).

Ciconiiform: any member of the bird order Ciconiiformes. Consists of five or six families of stork-like birds, including herons, bitterns and ibises.

Clade: a group of all the organisms that share a particular common ancestor and therefore have similar features.

Cladistics: a system of phylogenetic classification in which organisms are grouped together on the basis of similarities due to recent origin from a common ancestor.

Cladogram: a branched tree-like diagram produced by a cladistic analysis.

Class: a category used in the taxonomic classification of organisms, which consists of one or several related orders. Similar classes are grouped into a phylum.

Clast (adj. clastic): a fragment of a pre-existing rock.

Clay: an extremely fine-grained sediment (grain-size less than 0.004 mm) composed of so-called 'clay minerals'.

Columbiform: any member of the bird order Columbiformes. Includes pigeons and doves.

'Condylarth': any member of the extinct mammal order 'Condylarthra', which lived in the Paleocene and Eocene epochs. This large group of placental, modest-sized animals, were five-toed and are believed to be the distant ancestors of hoofed mammals and whales.

Conglomerate: a sedimentary rock consisting of rounded pebbles.

Coraciiform: any member of the bird order Coraciiformes. Includes kingfishers, bee-eaters, hoopoes and hornbills.

Creodont: any member of the extinct mammal order Creodonta, which ranged from Paleocene to Miocene times. Meat-eaters, they may have looked superficially like cats and dogs but are only distantly related to modern Carnivore order.

Cretaceous Period: a geological time division (see chronostratigraphy) of the Mesozoic Era. Ranging from 146 to 66 million years ago, it follows the Jurassic Period and precedes the Tertiary Sub-era and Paleogene Period.

Cuculiform: any member of the bird order Cuculiformes, land birds that are mostly insectivorous. Includes cuckoos and roadrunners.

Cynodont: a stem group of extinct mammal-like reptiles of the order 'Cynodontia' that includes the ancestors of mammals.

Deinothere: any member of the extinct mammal family Deinotheriidae (order Proboscidea), which flourished during Miocene and Pliocene times until about 2 million years ago. They looked much like small elephants, but with downturned tusks in the lower jaws.

Dendrochronology: the dating and study of tree rings.

Dermoptera: a mammal order of the grandorder Euarchonta or of the superorder Archonta. Also referred to as the 'flying lemurs', or colugos, only two living species in a single genus exist, found in south-east Asia.

Devonian Period: a geological time division (see chronostratigraphy) of the Paleozoic Era. Ranging from 416 to 359 million years ago, it precedes the Carboniferous Period and follows the Silurian Period.

Diapsid: any member of the subclass Diapsida (class Reptilia, series Amniota). Characterized by a pair of openings in the skull immediately behind the eye socket, this extant branch of amniotes includes crocodiles, lizards, snakes, dinosaurs, and the descendent birds.

Docodont: any member of the extinct mammal order Docodonta. One of the most primitive orders of mammals known, found in Jurassic deposits, they were mouse-sized with long narrow snouts.

Dryolestid: any member of the extinct mammal family Dryolestidae of the clade cladotheria, sister group to Boreosphenida The most diverse group of mammals in late Jurassic and early Cretaceous times, most were small and similar in size and shape to a shrew or mouse, with teeth adapted for eating insects.

Enantiornithid: any member of the extinct bird order Enantiornithes, which flourished in the Cretaceous Period. Termed 'opposite birds' because the bone structure of the shoulder blade, which is oriented opposite to that of modern birds.

Entelodont: any member of the extinct mammal family Entelodontidae (order Artiodactyla), distant relatives of living pigs.

Eocene Epoch: a geological time division (see chronostratigraphy) of the Paleogene Period (Tertiary Sub-era, Cenozoic Era). Ranging from approximately 56 to 34 million years ago it follows the Paleocene Epoch and precedes the Oligocene Epoch.

Eomyid: any member of the extinct mammal family Eomyidae (order Rodentia), which is related to the North American pocket mice and pocket gophers.

Epoch: a chronostratigraphical unit, of shorter duration than a period and itself divisible into stages.

Era: a major chronostratigraphical unit, which is divided into periods (e.g. the Paleozoic Era).

Euarchonta: superorder, which includes the orders Primates, Scandentia (tree shrews) and Dermoptera (colugos).

Euarchontoglires: a mammal grandorder, based on molecular evidence, which includes the orders Primates, Rodentia and Lagomorpha.

Eutherian: any mammal of the cohort Eutheria. Includes all placental mammals (Placentalia) plus their extinct relatives.

Evaporite: a sediment or mineral grown from a saline solution by evaporation of water, which may be marine or continental in origin.

Falconid: any member of the bird family Falconidae (order Falconiformes). Includes falcons and caracaras.

Falconiform: any member of the bird order Falconiformes. Includes diurnal birds of prey, such as vultures, eagles, hawks, falcons and ospreys.

Family: a category used in the taxonomic classification of organisms, which consists of one or several related genera. Similar families are grouped into an order.

Fauna: animals — often referring to the characteristic animal assemblage of a region or time period.

Feliform: any member of the mammal sub-order Feliformia (order Carnivora). Includes cats, mongooses, civets and hyaenas.

Flora: plants — often referring to the characteristic plant assemblage of a region or time period.

Formation: a succession of contiguous rock strata that is distinctive enough in its lithology from the surrounding rocks to be mapped as a unit; the fundamental unit of lithostratigraphy.

Galliform: any member of the bird order Galliformes (Galloanserae subdivision). A large and diverse group, with 70 genera and more than 250 species, members are commonly referred to as 'gallinaceous birds' (meaning 'chicken-like') or game birds because of their chicken-like appearance. Includes turkeys, grouse, quails and pheasants.

Galloanserae: a subdivision of the bird super-division Neornithes. Consists of two orders, the Anseriformes and the Galliformes, and includes ducks and chickens.

Gaviiform: any member of the bird order Gaviiformes. Large aquatic birds, the order contains a single family, the Gaviidae (loons or divers).

GCR: Geological Conservation Review, in which nationally important geological and geomorphological sites were assessed, and selected with a view to their long-term conservation as SSSIs.

Genus (pl. genera): a category used in the taxonomic classification of organisms, which consists of one or several related species. Similar genera are grouped together into a family. Forms the first part of a binomial scientific (Latin) name.

Glires: a placental mammal clade. Includes rodents (Rodentia) and rabbits, hares and pikas (Lagomorpha).

Glirid: any member of the mammal family Gliridae (order Rodentia). Dormice.

Gomphothere: any member of the extinct mammal family 'Gomphotheriidae' (order Proboscidea), which lived in the Oligocene and Pliocene epochs. Extinct relatives of modern elephants, they had four tusks.

Gondwana: a grouping of the major southern continental plates of Africa, Australasia, Antarctica, South America, India, and several smaller plates and fragments of what are now parts of Mediterranean Europe, which together formed a massive southern supercontinent straddling the South Pole in early Paleozoic times. It began to split up when Avalonia broke away in early Ordovician times.

Grainstone: a term used in the 'Dunham' system of limestone classification to denote a mud-free, grain-supported, carbonate sedimentary rock.

Granivore: an animal that eats mainly seeds.

Gruiform: any member of the bird order Gruiformes. A very diverse group of ground-feeding and usually ground-nesting birds, it includes bustards, cranes and rails.

Hakorynithidae: an extinct bird family from the order Coraciiformes, which existed in the Eocene Epoch. Originally thought to be kingfishers.

Hauterivian Stage: a chronostratigraphical division of the Cretaceous Period. The third stage of the Early Cretaceous Epoch, it ranges approximately from 136 to 130 million years ago and is preceded by the Valanginian Stage and followed by the Barremian Stage.

Hesperornithiform: any member of the small extinct bird order Hesperornithiformes. A highly specialized order of Cretaceous toothed birds, they were mostly flightless and specialized for diving.

Homoplastic: of, or relating to, physical characteristics or resemblance not due to inheritance from a common ancestry; e.g. parallelisms, convergences and reversals.

Hyrachyid: any member of the extinct family 'Hyrachyidae' (order Perissodactyla). These small, browsing, herbivores are primitive rhino relatives that lived during the Eocene Epoch.

Hyracoidea: a mammal order considered to be a close relative of the order Proboscidea. Consists of small rabbit-like hyraxes from Africa and the Middle East.

Hystricognath: any member of the suborder Hystricognathi (order Rodentia). Includes guinea pigs, capybaras and chinchillas.

Ichthyornithiform: any member of the extinct bird order Ichthyornithiformes, which lived in the Cretaceous Period. A small order of flying, toothed birds.

Insectivore: any member of the order Insectivora, a 'wastebasket' order which had been used to group together all the small insect-eating mammals. The term is also broadly given to any insect-eating animal or plant. Modern insectivorans are commonly grouped together in the restricted order Lipotyphla, which includes shrews, hedgehogs and moles. Other insectivores have been relegated to different groups, e.g. Macroscelidea, Scandentia.

Invertebrate: any animal lacking a backbone.

Jurassic Period: a geological time division (see chronostratigraphy) of the Mesozoic Era. Ranging from about 200 to 146 million years ago; it precedes the Cretaceous Period and follows the Triassic Period.

Karst: descriptive of a distinctive terrain developed upon a soluble rock, typically limestone; characterized by caves, sinkholes and dry valleys.

Kimmeridgian Stage: a chronostratigraphical division of the Jurassic Period. The second stage of the Late Jurassic Epoch it ranges approximately from 155 to 151 million years ago and is preceded by the Oxfordian Stage and followed by the Tithonian Stage.

Kuehneotheriid: any member of the primitive extinct mammal family Kuehneotheriidae, which lived in Late Triassic to Early Jurassic times. Tiny mammals, they preyed upon insects.

Lagomorph: any member of the mammal order Lagomorpha (clade Glires, superorder Anagalida). These plant-eating creatures have fully furred feet and two pairs of upper incisors. Includes rabbits, hares and pikas.

Laurasiatherian: any member of the mammal grandorder Laurasiatheria (magnorder Boreoeutheria) based on molecular evidence. Orders assigned to this group were first found in the supercontinent Laurasia and include Cetacea (whales), Chiroptera (bats), Carnivora, Perissodactyla, Artiodactyla, Pholidota and Lipotyphla.

Lias (adj. Liassic): a lithostratigraphical group of mainly Early Jurassic strata, but also used as a time term equating with the Early Jurassic Epoch.

Limestone: sedimentary rock composed largely of calcium carbonate, often partly derived from the shells of organisms.

Lipotyphlan: any member of the order Lipotyphla, modern insect-eaters (insectivores). Includes moles, hedgehogs and true shrews.

Lithology: descriptive of the constitution of a sediment or other rock, including composition, texture, colour and hardness.

Lithostratigraphy: the organization and division of strata into mainly mappable rock units and their correlation, based entirely upon their lithological characteristics. Units are named according to their rank in a formal hierarchy, namely supergroup, group, formation, member and bed.

Lithornithid: any member of the bird family Lithornithidae (order Lithornithiformes). Related to Ratites (ostriches etc.).

Maastrichtian Stage: a chronostratigraphical division of the Cretaceous Period. The final stage of the Late Cretaceous Epoch, it ranges approximately from 71 to 66 million years ago, and is preceded by the Campanian Stage.

Macroscelidea: a placental mammal order comprising the elephant shrews of Africa.

Maim Epoch: also known as the Late Jurassic Epoch. A geological time division of the Jurassic Period, it lasted from 161 to 146 million years ago.

Mammal: any member of the class Mammalia, which all share three characteristics not found in other vertebrates — three middle ear bones, hair, and the production of milk by mammary glands. Modern mammals are divided into three major clades, the Eutheria (placental mammals), Metatheria (Marsupialia pouched mammals) (together the theria), and the Monotremata (egg-laying mammals).

Mandible: lower jaw.

Marsupial: any member of the infraclass Marsupialia, grouped with its nearest extinct relatives in the Glade Metatheria. Commonly thought of as pouched mammals they give birth to live young and carry them in their pouches for weeks or months.

Member: in lithostratigraphy, a subdivision of a formation.

Metatheria: see marsupial.

Mesonychid: any member of the extinct mammal family Mesonychidae (order 'Condylarthra), which lived in the Paleocene and Eocene epochs. These hoofed, hyaena-like land-dwelling mammals were once thought to have been the ancestors of the whales.

Mesozoic Era: a geological time division (see chronostratigraphy) ranging from 251 to 66 million years ago and comprising the Triassic, Jurassic and Cretaceous periods.

Micrite: a microcrystalline calcite; typically a lime mud.

Miocene Epoch: a geological time division (see chronostratigraphy) of the Neogene Period (Cenozoic Era). Ranging from approximately 23 to 5 million years ago it follows the Oligocene Epoch and precedes the Pliocene Epoch.

Monophyletic: pertaining to a natural taxonomic group (clade) that includes all descendants of a single common ancestor. An example is the Amniota, which includes the reptiles, birds and mammals.

Monotreme: any member of the mammal order Monotremata, also referred to as prototherians. They lay shell-covered eggs that are incubated and hatched outside of the body. This small group consists of only three members, the platypus and two echidnas, and is considered to be the most primitive of all modern mammalian groups.

Morganucodontid: any member of the extinct mammal family Morganucodontidae, which lived in from Late Triassic to Middle Jurassic times. These tiny shrew-like creatures were among the most primitive mammals.

Morphospecies: a group of biological organisms that differs in some morphological respect from all other groups.

Mudstone (mudrock): a fine-grained sedimentary rock; lithified mud.

Multituberculata: any member of the extinct mammal order Multituberculata. They lived

in mid Jurassic to Late Eocene times. Together with their relatives, the Haramyids, they were the first plant-eating mammals.

Musophagid: any member of the bird family Musophagidae (order Cuculiformes). Includes touracos.

Myomorph: any member of the mammal infra-order Myomorpha (order Rodentia). This group radiated 'explosively' in the last 20 million years and includes rats and mice.

Mysticete: any member of the mammal suborder Mysticeti (order Cetacea). Also known as the 'baleen whales' or 'whalebone whales', they are largest animals on earth, and include right whales, blue whales and humpback whales.

Neogene Period: a geological time division (see chronostratigraphy) of the Cenozoic Era. Ranging from approximately 23 million years ago until the present day, it includes the Miocene, Pliocene and Pleistocene epochs.

Neornithes: a superdivision of the birds. Also referred to as 'new birds', it contains all modern birds and is divided into two divisions.

Neptunian dyke: a sheet-like body of sand or other sediment that cuts through bedded sediment in a manner analogous to an igneous dyke. Formed by the upward or downward injection of liquefied sand through a fissure, often as a result of earthquake activity.

Norian Stage: a chronostratigraphical division of the Triassic Period. The second (and middle) stage of the Late Triassic Epoch, it ranged approximately from 217 to 204 million years ago and is preceded by the Carnian Stage and followed by the Rhaetian Stage.

Odontocete: any member of the mammal suborder Odontoceti (order Cetacea), also defined as 'toothed whales'. Includes dolphins, killer whales, and sperm whales.

Odontopterygiformes: a bird order proposed by Harrison and Walker (1979b), consisting of the bony-toothed birds — the families Odontopterygidae, Pseudodontopterygidae and Dasornithidae. All of these families are grouped in the extinct family Pelagornithidae by Olson (1985) within the modern order Pelecaniformes.

Oligocene Epoch: a geological time division (see chronostratigraphy) of the Paleogene Period (Cenozoic Era). Ranging from approximately 34 to 23 million years ago it follows the Eocene Epoch and precedes the Miocene Epoch.

Omomyid: any member of the extinct mammal family Omomyidae (order Primates), which lived in the Eocene to Miocene epochs. Generally very small and nocturnal, most fed on fruit and insects, some including leaves in their diet.

Oolith (oid): a spherical or sub-spherical carbonate-coated sedimentary particle, less than 2 mm in diameter.

Oolite (adj. oolitic): a rock, usually limestone, made up largely of ooids produced by accretion of carbonate around a nucleus.

Order: a category used in the taxonomic classification of organisms, which consists of one or several related families. Similar orders are grouped together in a class.

Oxfordian Stage: a chronostratigraphical division of the Jurassic Period. The first stage of the Late Jurassic Epoch, it is dated to approximately 161–155 Ma, and is preceded by the Callovian Stage and followed by the Kimmeridgian Stage.

Palaeo-: 'ancient' (occurring, or formed in, geological time).

Paleocene Epoch: a geological time division (see chronostratigraphy) of the Paleogene Period (Cenozoic Era). Ranging from approximately 66 to 56 million years ago it is the first epoch of the Paleogene Period, and precedes the Eocene Epoch.

Palaeoclimate: the climate at a particular geological time.

Paleogene Period: a geological time division (see chronostratigraphy) of the Cenozoic Era. Ranging from approximately 66 to 23 million years ago it includes the Paleocene, Eocene and Oligocene epochs.

Palaeognathae: a division of the bird superdivision Neornithes. Represented by modern ostriches and emus and by extinct Lithornithidae, they are mostly flightless and are grouped together taxonomically based on palate (jaw) structure.

Palaeontology: the study of fossil fauna and flora, including their evolution and the reconstruction of the environments in which they lived.

Paleozoic Era: a geological time division (see chronostratigraphy), ranging from 542 to 251 million years ago and comprising the Cambrian, Ordovician, Silurian, Devonian, Carboniferous and Permian periods.

Paludal: of or relating to a swamp; marshy.

Palyno-: prefix indicating 'pollen' or 'spores'.

Palynomorph: a microscopic, acid-resistant, organic-walled body studied in palynology.

Pandionid: any member of the bird family Pandionidae (order Falconiformes). Ospreys.

Pantodont: any member of the extinct mammal order Pantodonta, which lived in Paleocene to Late Eocene times. Some of the largest mammals of the Paleocene Epoch, they reached bear-size, and were slow-moving plant-eaters, believed by some to look similar to modern hippos.

Pantolestid: any member of the extinct primitive placental mammal family Pantolestidae (order Pantolesta). Otter-like, with long sharp canines and broad molars.

Paramyid: any member of the mammal family Paramyidae (order Rodentia). One of the oldest known families of rodents, they were widespread in the Eocene Epoch.

Passeriform: any member of the bird order Passeriformes. Known as the 'perching birds' or 'songbirds', the Passeriforms underwent a huge radiation in Tertiary times. Includes song thrushes and sparrows.

Pelagornithid: any member of the extinct bird family Pelagornithidae (order Pelecaniformes). Large seabirds, Olson (1985) argued that the members of the bony-toothed order Odontopterygiformes should be included within this family.

Pelecaniform: any member of the bird order Pelecaniformes. Includes modern pelicans, cormorants and gannets, and extinct Pelagornithids.

Period: a geological time unit (see chronostratigraphy); of shorter duration than an era and itself divisible into epochs.

Perissodactyl: any member of the 'ungulate' (hoofed mammal) order Perissodactyla (grandorder Laurasiatheria). Terrestrial herbivorous creatures characterized by having normally an odd number of hooves or toes, or where the axis of the foot runs down the middle digit. Examples include horses, tapirs and rhinos, and extinct brontotheres and chalicotheres.

Permian Period: a geological time division (see chronostratigraphy) of the Paleozoic Era. Ranging from about 299 until 251 million years ago, it follows the Carboniferous Period and precedes the Triassic Period.

Phasianid: any member of the bird family Phasianidae (order Galliformes). Also referred to as the 'pheasant family', it includes the partridge and peacock.

Pholidotan: any member of the placental mammal order Pholidota. This small group of mammals commonly known as 'pangolins' or 'scaly anteaters' feed mainly on ants. The oldest undoubted fossils are from Middle Eocene deposits.

Phylum (pl. phyla): a category used in the taxonomic classification of animals, which consists of one or several related classes.

Phylogeny (adj. phylogenetic): the line, or lines, of direct descent in a given group of organisms.

Pinniped: an aquatic member of the order Carnivora. Includes sealions (Otariidae) seals (Phocidae), walrus (Odobenidae), and extinct relatives with fin-like flippers as organs of locomotion. Their nearest relatives are bears.

Pisolite (adj. pisolitic): a sedimentary rock consisting mainly of pisoids, which are like clogs but larger (>2mm diameter).

Plagiaulacid: any member of the extinct mammal family Plagiaulacidae (order Multituberculata), which lived in Late Jurassic to Early Cretaceous times. Small plant eaters.

Pleistocene Epoch: a geological time division (see chronostratigraphy) of the Neogene Period (Quaternary Sub-era, Cenozoic Era). Ranging from approximately 1.81 million years ago to 10 000 years ago, it follows the Pliocene Epoch and precedes the Holocene Epoch.

Plesiadapiform: any member of the extinct mammal order Plesiadapiformes, which lived in the Paleocene and Eocene epochs. These tree-dwelling plant eaters were originally classified as primates.

Pliocene Epoch: a geological time division (see chronostratigraphy) of the Neogene Period (Cenozoic Era). The second epoch of the Neogene Period it is dated to approximately 5 to 1.81 million years ago and follows the Miocene Epoch and precedes the Pleistocene Epoch.

Polyphyletic: relating to, or characterized by, evolution from more than one ancestral type. For example, the classes Mammalia and Aves, whose 'warm-bloodedness' was independently evolved.

Portlandian Substage: a chronostratigraphical subdivision of the Tithonian Stage. The later of two such substages, it ranges approximately from 148 to 146 million years ago and is preceded by the Bolonian Substage.

Presbyornithid: any member of the bird family Presbyornithidae (order Anseriformes). Now extinct, the presbyornithids were present in Paleocene and Eocene times and have a good fossil record.

Primate: any member of the mammal order Primates (clade Euarchonta, superorder Archonta). Includes humans, monkeys, apes, chimpanzees, lemurs, lorises and bushbabies and the extinct omomyids and adapids.

Primoscenid: any member of the extinct bird family Primoscenidae (order Passeriformes), which lived in early Tertiary times.

Proboscidean: any member of the mammal order Proboscidea. Includes elephants and their relatives and evolved largely in Africa before expanding worldwide as a diverse group in the Miocene Epoch. Close relatives include the orders

Sirenia (sea cows) and Hyracoidea (hyraxes).

Procellariiform: any member of the bird order Procellariiformes. Includes petrels, shearwaters, fulmars and albatrosses.

Pseudosciurid: any member of the extinct mammal family Pseudosciuridae (order Rodentia).

Psittaciform: any member of the bird order Psittaciformes. Includes parrots and cockatoos.

Quaternary Sub-era: a geological time division (see chronostratigraphy) of the Cenozoic Era. In modern definitions it corresponds to the very latest part of the Neogene Period and follows the Tertiary Sub-era. It begins in late Pliocene times at the beginning of the Gelasian Stage, 2.6 million years ago and ranges up to the present day.

Radiometric dating: methods of dating rocks or minerals using the relative abundances of radioactive and stable isotopes of certain elements, together with known rates of decay of radioactive elements. Radiocarbon dating can extend back to only 50 000 years, but other elements (potassium, argon, lead, uranium) can be used to obtain dates of the order of tens to thousands of millions of years.

Regression: retreat or contraction of the sea as a result of a fall in sea level or uplift of the land.

Reptile: any member of the class 'Reptilia'. These amniote vertebrates have a long fossil history dating back to the Carboniferous Period. Characterized by being 'cold-blooded', usually egg-laying, they have an external covering of scales or plates. Examples include snakes, turtles, crocodiles and lizards. Not a clade, since it excludes its descendants, the birds and mammals.

Rhaetian Stage: a chronostratigraphical division of the Triassic Period. The last stage of the Late Triassic Epoch, it is dated to approximately 204–200 million years and is preceded by the Norian Stage and followed by the Hettangian Stage.

Rodent: any member of the mammal order Rodentia (clade Glires, superorder Anagalida). The largest modern order of mammals, over 1800 species exist (40% of all mammal species). Includes mice, rats, squirrels and guinea pigs. The lagomorphs (rabbits and hares) are close relatives.

Ruminant: any member of the mammal infra-order Ruminantia (order Artiodactyla). These even-toed (cloven-hoofed), usually horned, creatures are characterized by having a stomach divided into three or four compartments and chewing cud. Includes cattle, sheep, goats, deer and giraffes.

Scandentia: a placental mammal order of the clade Euarchonta, superorder Archonta. Also known as 'treeshrews'.

Sciuriform: any member of the mammal infraorder Sciuriforma (order Rodentia). Includes squirrels and beavers.

Shale: a mudrock that splits easily into layers.

Sinemurian Stage: a chronostratigraphical subdivision of the Jurassic Period. The second stage of the Early Jurassic Epoch, it ranges from approximately 197 to 190 million years ago and is preceded by the Hettangian Stage and followed by the Pliensbachian Stage.

Sinoconodont: any member of the mammal family Sinoconodontidae. A very early and primitive family known only from China.

Sirenia: a mammal order of the magnorder Afrotheria. These large, cylindrical, herbivorous marine creatures are commonly referred to as 'sea cows'. They include manatees and the dugong and their nearest terrestrial relatives are elephants and hyraxes.

SSSI: Site of Special Scientific Interest; the designation of an area of land for statutory protection under the Wildlife and Countryside Act 1981.

Stage: a chronostratigraphical division of lower rank than an epoch, and usually taken to be the smallest standard unit. The fundamental unit for establishing chronostratigraphical boundaries at all ranks.

Stratigraphy: the study of the temporal and spatial relationships within a rock succession.

Stratotype: a sequence of sedimentary rocks at a particular locality chosen as the standard against which other sequences can be compared. Stratotypes are established for lithostratigraphical, biostratigraphical and chronostratigraphical units, both regionally and internationally.

Subsidence: the sinking of a local or regional portion of the Earth's surface with respect to its surroundings.

Synapsid: any member of the clade Synapsida (class Reptilia, series Amniota), the group that includes mammals and their stem relatives, mammal-like reptiles.

Systematics: the scientific study of the classification of living organisms into a hierarchical series of groups which emphasizes their natural interrelationships.

Taphonomy: in palaeontology, the study of the changes, including transportation, that affect organisms after death, including the physical and chemical interactions that take place between burial of the organism and its subsequent discovery as a fossil.

Taxonomy (adj. taxonomic): the science and principles of classification.

Taxon (pl. taxa): in biology, a group of organisms; the hierarchical system (largest to smallest group) is kingdom, phylum, class, order, family, genus and species.

Terrestrial: of or relating to the Earth or the Earth's dry land. As an ecological term, referring to animals living on the ground.

Tertiary Sub-era: a geological time division (see chronostratigraphy), now commonly considered as obsolete. Ranging from 66 to 2.6 million years ago, it is decoupled from the Neogene and Paleogene periods, and is therefore often referred to as a 'Sub-era', preceding the Quaternary Sub-era, and part of the Cenozoic era.

Tethys: an E—W-extending major ocean, which separated the southern supercontinent of Gondwana from Laurasia in Mesozoic times; subducted to form the Alpine—Himalaya mountain belt.

Tetrapod: any member of the vertebrate superclass Tetrapoda. Characterized by having four limbs, the first tetrapods arose in the Devonian Period and lived an amphibious lifestyle. During the Carboniferous Period a new group of tetrapods, the amniotes arose, which were able to walk and survive on land. Tetrapods can be considered to have two subgroups, amphibians and amniotes.

Therapsid: any member of the order 'Therapsida' (clade Synapsida). These extinct mammal-like reptiles lived during late Permian to early Triassic times and are considered to include the direct ancestors of mammals.

Therian: any member of the mammal clade Theria, including all living mammals except the monotremes. Divided into two living groups, the Eutheria (placental mammals), and the Metatheria (marsupials).

Tithonian Stage: a sub-division of the Jurassic Period. The last division of the Late Jurassic Epoch, it ranges from approximately 151 to 146 million years ago and is subdivided into the Bolonian Substage and the Portlandian Substage.

Transgression (adj. transgressive): the inundation of the land by water due to sea-level or lake-level rise or land subsidence.

Triassic Period: a geological time division (see chronostratigraphy) of the Mesozoic Era. Ranging from 251 to 200 million years ago, it is preceded by the Permian Period and followed by the Jurassic Period.

Triconodont: any member of the extinct mammal order Triconodonta. Characterized by the possession of shearing molar teeth with three main cusps.

Tubulidentata: a mammal order of the magnorder Afrotheria. The sole living member is the armadillo.

Type locality/area: the place where the type section (or stratotype) for a stratigraphical unit is located, or from where the type specimen of a fossil came.

Type section: see stratotype.

Type specimen: in palaeontology, a single fossil specimen or one of a series of specimens, designated as typifying a named species or subspecies.

Ungulate: any hoofed mammal belonging to the superorder Ungulata. According to morphological characteristics, ungulates are grouped into the orders Artiodactyla (even-hoofed representatives), Cetacea (whales), Perissodactyla (odd-hoofed representatives), Sirenia (sea cows), Hyracoidea (hyraxes), Proboscidea (elephants) and their extinct relatives. On molecular evidence, these orders are divided between two major clades, the Laurasiatheria and Afrotheria.

Unconformity: the surface that separates two sedimentary rock sequences of different ages; it represents a gap in the geological record when there was no deposition, usually accompanied by erosion, and/or tectonism. There is often an angular discordance between the stratification of the sequences either side of the unconformity.

Valanginian Stage: a chronostratigraphical subdivision of the Cretaceous Period. The second stage of the Early Cretaceous Epoch, it ranges approximately from 140 to 136 million years ago and is preceded by the Berriasian Stage and followed by the Hauterivian Stage.

Vertebrate: any animal of the subphylum Vertebrata. Characterized by the presence of a backbone, the vertebrates include the fish, amphibians, reptiles, birds (aves) and mammals.

[References](#)