

**A. *n* dates:** see Oakley's dating series in box below.  
**AAA:** abbreviation for several societies of interest to **human evolutionary biologists**, including the **American Anthropological Association** and the **American Anatomical Association**.

**A antigen: epitope** that specifies the A in the **ABO blood group**. It consists of four precursor sugars attached to glycoproteins of the cell membrane, aka **H substance**, plus a specific fifth terminal sugar, N-acetylgalactosamine, that is attached by an enzyme.

#### Oakley's absolute dating series

- A.1 date:** highest of Oakley's hierarchical levels of **absolute dating**, the direct dating of a specimen, e.g. by measuring the radiocarbon activity of a bone itself.
- A.2 date:** one of Oakley's hierarchical levels of **absolute dating**, dating derived from direct determination by physical measurement of the age of the sediments containing the fossil specimen.
- A.3 date:** one of Oakley's hierarchical levels of **absolute dating**, the correlation of a fossil-bearing horizon with another deposit whose age has been determined directly by A.1 or A.2 methods. See **biostratigraphy**.
- A.4 date:** lowest of Oakley's hierarchical levels of **absolute dating**, estimating an absolute age on the basis of some theoretical consideration, such as matching climatic fluctuations observed in strata with astronomically derived curves of effective solar radiation, or matching terrestrial glacial and interglacial episodes with the known marine paleotemperature or **oxygen isotope stage**.

(Cf. *R.n* dates)

This enzyme differs from its homologue that attaches the B-specific sugar by one amino acid substitution. See **B antigen** and **O null allele**.

**AAFS:** see **American Academy of Forensic Scientists**.

**AAPA:** see **American Association of Physical Anthropologists**.

**abaxial:** on the opposite side of, or facing away from, the axis of a structure or an organism.

**Abbeville:** archaeological site found in 1830 in the French Valley of the Somme, possibly dated to the first interglacial (= **Pleistocene** deposits) described by **Boucher de Perthes** in 1847; one of the first historical cases of **artifacts** of arguable antiquity; used as proof of the existence of early humans contrary to the story contained in Genesis. Through the early twentieth century the term **Abbevillian** was applied globally to the most ancient tool deposits; **Oakley** lumped both **Oldowan** choppers and **Acheulean** choppers under this term. Aka Port du Bois, Menchecourt-les-Abbeville.

**Abbevillian tool tradition:** term that refers to pre-Acheulean stone-tool assemblages found in Europe; among the artifacts are crude **bifacial tools** constructed with a **hammerstone** rather than a softer striking instrument (as in **Acheulean**). Aka **Chellean**. See **Oldowan**.

**abdomen:** portion of the body between the thorax and the pelvis.

**abdominal cavity:** space within the body between the **respiratory diaphragm** and the **pelvic inlet** in which the abdominal viscera are contained; abdomen. Cf. **coelom**.

**abdominal circumference: anthropometric** measurement; distance around the **torso** measured with a tape measure placed at the level of the greatest anterior extension of the **abdomen** in the horizontal plane, normally the **umbilicus**, passed horizontally around the body. The measurement is taken after a normal expiration. Used for various body indices pertaining to adipose distribution. Cf. **waist circumference**.

**abdominal skinfold: anthropometric** measurement; skinfold measured about 3 cm lateral to the **umbilicus**. Used in combination with other **skinfold measurements** to estimate body composition. See **skinfold thickness**.

**abductor:** muscle or muscle group that moves a body part away from the mid-line; aka levator. Cf. **adductor**.

**abductor pollicis brevis: intrinsic muscle** of the hand; it originates from the **scaphoid** and **trapezium** and inserts into the lateral surface of metacarpal I. Its action is to abduct the thumb; one of the thenar group of muscles. Cf. **adductor pollicis**.

**abductor pollicis longus:** muscle that acts on the hand; it originates from the posterior surface of the **radius** and **ulna** and inserts into the base of metacarpal I. Its action is to abduct and extend the thumb.

**Abdur Reef:** archaeological site near Abdur along the Bari Coast in Eritrea on the coast of the Red Sea, dating to 125 kya (U/Th). The elevated reef contains artifacts including bifacial hand-axes, blade tools and sharpened obsidian flakes found among shellfish remains and animals bones deposited on an uplifted reef system. Aka Abdur Limestone Site.

## abris

**aberrant:** 1. a departure from the norm; an anomaly or aberration. 2. in genetics, an individual phenotype that exhibits atypical characteristics due to the influence of the environment rather than from genetic factors.

**ABH blood group (ABH):** a **polymorphism** found in many organisms and determined by the presence or absence of A, B, and/or H **antigens** found on cell membranes such as erythrocytes. In humans, this system has been modified and is named the **ABO blood group**.

**abirotrophy:** 1. general term denoting degenerative changes of tissue due to genetic causes. 2. deterioration of the body.

**abnormal:** 1. not normal. 2. departing from the usual structure, position, or condition. Abnormality.

**abnormal hemoglobins:** any of the **hemoglobin alleles** other than hemoglobin A; most are causes of **hemoglobinopathies**, such as **sickle cell anemia** and **thalassemia**.

‡ **ABO blood group: polymorphism** based on the presence or absence of two **antigens** (I<sup>A</sup> and I<sup>B</sup>) found on the cell membrane of **erythrocytes** (red blood cells); the antigens are also found on other cells. The 'O' factor is an absent or 'null' **allele**, not an antigen. See **H substance**.

**ABO disease association:** any abnormal condition correlated with an allele or genotype of the ABO blood group. A number of diseases are associated with the presence of each of the A, B and O alleles in the ABO blood group; among the more prominent are salivary gland tumors (type A), ulcers (type O), and certain infant diarrheas (types A and B).

**ABO hemolytic disease of the newborn (HDN):** destruction of the **erythrocytes** of a **fetus**; a maladaptive condition roughly twice as common as the **Rhesus incompatibility** form of HDN, but almost always clinically milder in its manifestation. Caused by some of the smaller anti-A or anti-B **antibodies** in a mother's immune system penetrating the **placental membranes**.

**ABO incompatibility:** lowered probability of conception owing to the genotypes in the ABO blood group possessed by potential parents. In populations that maintain all three alleles, it has been suggested that type O mothers produce fewer offspring than expected when the fathers are either type A or type B; this may be due to the presence of either antibodies in the mother's vaginal secretions (that could agglutinate sperm), or certain smaller classes of maternal anti-A and anti-B antibodies that could pass through the placenta and affect the development of the fetus.

**aboriginal:** indigenous; native to; original biological species or populations inhabiting a particular geographical region, particularly referring to groups

antecedent to later colonizers. In reference to humans, this term has been applied most often to the original inhabitants of Australia; aborigine. Cf. **indigenous**, **autochthonous**.

**abortion:** 1. arrest of a process or disease before completion. 2. interruption of pregnancy before the fetus has attained a stage of viability, usually before the 24th gestational week. There are two classes: an *induced abortion* is the termination of a pregnancy, often for medical reasons, by means other than those causing spontaneous abortion (aka clinical abortion, therapeutic abortion, feticide). A *spontaneous abortion* is the natural termination of a pregnancy before the **fetus** can survive outside the uterus (between 0 and 20 weeks); occurs in about 30% of first pregnancies, frequently so early that a woman is not aware that she was pregnant, and is most often due to chromosomal errors (50–60%); sometimes applied to a specific period of **gestation**, such as during the first 20 weeks of **pregnancy** (aka early fetal death). See **miscarriage** and **stillbirth**.

**Abri Pataud:** archaeological site found in 1949 near Les Eyzie in the Vézère River Valley, Dordogne, France, dating from 34 kya and persisting for over 14 ky; excavated by H. Movius; contains over 25 000 Aurignacian II artifacts including burins, an engraving tool for working antlers, a venus figurine in relief on stone, and hominid remains from at least two individuals, including a young female attributed to **Homo sapiens**. Of 30 crates of animal bones excavated, about 30% of all prey appear to have been reindeer. Aka Pataud.

**Abri Suard:** archaeological site found in 1870 in the La Chaise cave area, western France, dated to 200–100 kya; contains hominid remains from several individuals including an incomplete 1050 cm<sup>3</sup> **calotte** assigned to the archaic **Neanderthal** group. Aka Suard.

**Abri do Lagar Velho rockshelter:** archaeological site found in 1998 in the Lapedo Valley, north of Lisbon, Portugal, dated to 24.5 kya (radiocarbon), that contains **Gravettian** artifacts. The fossil hominid remains include a nearly complete skeleton of a child (**Lagar Velho 1**) attributed to either **Homo sapiens** or **H. neanderthalensis**. Among the artifacts collected were charcoal, stone tools, pierced deer canines and fossilized red deer bones and horse teeth. Aka Lagar Velho. This find has been interpreted by some as indicative of gene flow between Neandertals and **AMHs**, and in support of the **multiregional continuity model**. See **pierced mammal teeth** and **last of the Neandertals**. Cf. **Mezmaiskaya Cave**.

**abris:** French for **shelter**; rockshelter is 'abris sous roche'.

## acculturation

**Absarokius** **Matthew, 1915:** poorly known tarsiiform belonging to the subfamily **Anaptomorphinae**, family **Omomyidae**. Found in early to middle **Eocene** deposits from the Rocky Mountain region of North America. Three to seven species, two of which may be in an ancestor – descendant relationship; **Tetonius homunculus** is suggested as an ancestor for at least one species. Dental formula: 2.1.3.3/2.1.3.3 or 2.1.3.3/2.1.2.3, depending on the species. *Absarokius* differs from other anaptomorphines in the enlargement of the third and fourth premolars and in thickening of the **mandible**, suggesting a diet of hard morsels. Body mass estimates range from 130 to 500 g. Synonym for **Anaptomorphus**. See Appendix 1 for taxonomy.

**abscess:** localized collection of pus in a cavity due to the accumulation of **white blood cells**; often due to infections caused by *Staphylococcus bacteria* in skin and other tissues.

‡ **absolute dating (technique):** any of the methods that provide an estimate of a specific date or age in solar years, subject to probabilistic limits, from material recovered from an archaeological or paleontological site. Common absolute techniques include **dendrochronology**, **radiocarbon dating** (see **carbon 14**), and **potassium – argon dating**. Aka chronometric dating. See **dating techniques**.

**absolute geological time:** scale established by geophysicists that is defined by time in years ago, thousands of years ago (**kya**), and millions of years ago (**mya**); the time scale is derived by using **absolute dating techniques** that depend upon the regular decay of unstable elements into stable daughter products. The absolute geological time scale of the earth currently extends back over 4.5 billion years (**by**) of earth history. Aka the **geological time scale**. See Appendix 4.

**absolute risk:** probability that an organism will experience a certain event, such as a disease; risk is calculated on the basis of test results and/or the occurrence of the event in relatives.

**absorption:** process by which a substance passively enters a body membrane.

**acatalasia:** genetic disorder marked by deficiency of the enzyme catalase; manifestations range from mild (ulcers in tooth sockets) to severe (recession of tooth sockets with gangrene of the gums). Two principle forms of acatalasia have been identified: (a) Japanese type, and (b) Swiss type. Aka acalalesmia.

**acaudate:** without a tail, as in the great apes; acaudal.

**accelerating differentiation:** after isolation of populations due to differences accrued at a few loci, the rapid increase of differentiation at many loci resulting in broad geographic radiation.

**accelerator mass spectrometry (AMS):** method of counting single radiocarbon atoms that is much

more accurate than counting radioactive decay (conventional **radiocarbon dating**); AMS allows dating based upon very small samples (such as a speck of wood), and also extends the useful range of the technique back to almost 100 kya.

**acceptor stem:** that region of a **tRNA** molecule to which a specific **amino acid** is attached in an enzymatic reaction, which loads the tRNA prior to the **genetic translation** step of polypeptide synthesis.

**accessory olfaction system (AOS):** special sensory cells in the vomeronasal organ of the nose plus their connections to the brain. The AOS is distinct from the sense of smell, which is part of the main olfactory system. The AOS receives social and sexual signals in the form of pheromones from other members of the same species.

‡ **acclimation:** short-term **plasticity** of individual phenotype; **somatic** physiological response by individuals to environmental pressures. See **developmental acclimation**. Not to be confused with **evolution** or **genetic adaptation**. Cf. **acclimatization**.

‡ **acclimatization:** phenotypic **plasticity** in an organism that enables it to make physiologic changes that reduce the strain caused by stresses from environmental factors. Acclimatization may be short-term (see **acclimation**) or long-term (see **developmental plasticity**). It has been suggested that the ability to respond physiologically to the environment is partly genetic but requires environmental interaction to be expressed. Verb: acclimatize.

**accommodation:** 1. responses by an organism to environmental stress that are not wholly successful because, even though they favor survival of the individual, they also result in significant losses in some important functions. 2. alteration in the convexity of the lens of the eye to increase visual acuity.

**accretion model:** scheme in which fossil hominids formerly termed **archaic** or **transitional form** are further segregated into Stage 1, the early pre-Neandertals (e.g. **Mauer** and **Petralona**); Stage 2, the pre-Neandertals (e.g. **Steinheim**, **Swanscombe**, and **Atapuerca**); Saale – Eem Stage 3, the early Neandertals (e.g. **Biache**); and Weichsel Stage 4, the ‘classic’ Neandertals (e.g. **La Chapelle** and **La Ferrassie**). This model is assumed by some to represent a temporal series of a single isolated gene pool.

**accretionary growth:** multiplication of components in an organ or tissue without qualitative functional change.

**acculturation:** nearly symmetrical increase in the similarity of two autonomous cultural systems, and the lessening of culture distance between them; one of the possible outcomes set in motion by the meeting of the two systems. Cf. **assimilation**.

## acromegaly

**acculturation model:** proposal advanced to explain the 10 ky temporal overlap of **Neandertals** and **Cro-Magnons** in central and southern Europe in which transitional tool industries such as the **Châtelperronian** result from the interaction between Neandertals and anatomically modern 'invaders' bearing an **Aurignacian tool tradition**. According to this model, the development and use of decorated bone objects and body ornaments by Neandertals was the result of borrowed or mimicked culture rather than of independent invention.

‡ **accuracy:** 1. freedom from error. 2. degree of conformity of a measured quantity to the true value of what is being measured, where the true value is represented by a standard.

**acentric chromosome:** chromosome fragment that lacks a centromere.

**acentric primate group:** terrestrial primates that flee into trees when confronted with danger. Cf. **centripedal primate group**.

**acetabulocristal buttress:** thickening of the hip bone between the **acetabulum** and the iliac crest. Found in bipedal **hominids** but not in pongids. One of the necessary modifications that led to **habitual bipedalism**.

**acetabulum:** cup-shaped socket formed from the junction of the **ilium**, **ischium**, and **pubis** on the **coxal bone**. The acetabulum is on the lateral surface and receives the head of the femur with which it forms a **ball-and-socket joint**. In female humans this structure is often oriented anteriorly, whereas in males it is more lateral. Adjective: acetabular.

**acetylcholine:** ubiquitous **neurotransmitter** that is involved in the transmission of signals at nerve **synapses**.

**Aché:** foragers or hunter-gatherers in modern-day Paraguay who have survived with a subsistence lifestyle in small-scale societies into the twenty-first century.

‡ **Acheulean tool tradition:** stone-tool technology characterized by large, pointed, almond-shaped bifacial tools called **hand-axes** and **cleavers**, whose exact purpose is unknown. Smaller **flake tools** were also present, but in lesser numbers. Acheulean tools range in time from 1.5 mya to 200 kya; widespread in the Old World. The Acheulean industry gets its name from **St. Acheul**, a site in France. In African sites, where Acheulean tools are often found at sites with **Developed Oldowan** tools at the same level, the hand-axes are usually found near sources of water such as stream channels.

**Achilles tendon:** see **calcaneal tendon**.

**achondroplasia (ACH):** a congenital, **autosomal dominant** form of dwarfism that results from a failure of cartilage to be converted into bone in the epiphyseal disks. ACH affects mainly the long bones by

causing rhizomelic shortening, but may also cause trident hand, frontal bossing and mid-face hypoplasia; the cranial base may distend, causing the cranium to become enlarged. The defective gene is a fibroblast growth factor receptor. Cf. **hGH-resistant dwarfism** and **pituitary dwarfism**.

**achromatopsia:** see **color blindness**.

**acidic protein:** any of certain classes of protein that coat a **DNA** molecule, binding to specific regions, and involved in **genetic regulation**.

**acidity:** 1. the quality or state of being acid measured as the concentration of free, unbound hydrogen ions in a solution. The higher the  $H^+$  concentration, the greater the acidity and the lower the pH; an acid has a pH less than 7.0. 2. the acid content of a fluid.

**acquire:** to develop after birth. Adjective: acquired. Cf. **congenital**, **hereditary**.

‡ **acquired characteristic:** refers to the outdated Lamarckian concept of **transformism**, in which phenotypic modifications arise solely through environmental influences on the developmental processes of an organism; some proponents believe that such characters can be passed on to the next generation, now largely discredited. Aka use inheritance, use – disuse, and **soft inheritance**. See **adaptation**, **Baldwin effect**, **evolution**, **Lamarckism**, and **Lysenkoism**.

**Acquired Immune Deficiency Syndrome:** see **AIDS**.

**acquired immunity:** immunity to a specific pathogen acquired after birth owing to exposure by either natural or artificial means. Immunity results from the activation of specific B cells or T cells exposed to the pathogen's antigens. This exposure results in the production of antibodies and memory cells. Aka acquired defense.

‡ **acrocentric chromosome:** chromosome in which the **centromere** is very near one end so that the short arm is very small or minute and the long arm is much longer.

**acrocephaly:** condition of being high-headed, such that the height of the skull is at least 98% of the breadth.

**acrocranic index:** in reference to the **cranial breadth – height index**, with an index of 98.00 or greater; such an individual is considered to have a high skull.

**acrodont:** having rootless teeth attached to the **alveolar ridge** of the jaws, e.g. human **deciduous dentition**.

**acromegaly:** form of gigantism often confused with several similar disorders of which acromegaly is a feature; it is genetically heterogenous. Familial acromegaly is characterized by continued growth after a normal adolescent growth spurt, resulting in coarseness of features, and is due to overproduction of human growth hormone (hGH) secondary in the majority of cases to an hGH-secreting pituitary



**ad interim**

- adenoma (aka familial somatotrophinoma). This condition is also obvious in skeletal remains; see **paleopathology**. Cf. **gigantism**.
- acromelic shortening**: congenital condition in which the most distal portions of a limb, i.e. the hands or the feet, are shortened. Cf. **rhizomelic shortening**, **mesomelic shortening**.
- acromial**: pertaining to the shoulder region.
- acromio-cristal index**: **bicristal breadth** multiplied by 100 and divided by the **biacromial breadth**.
- acromion**: tip of shoulder that results from the lateral extension of the scapular spine.
- acromion process**: dorsal platelike extension of the scapular spine that articulates with the clavicle; the acromion process provides sites for attachment of the muscles of the upper limb and chest.
- acrosome**: dense structure covering the anterior half of the head of a spermatozoon that contains hyaluronidase, an enzyme that aids the penetration of the **zona pellucida** by the sperm during fertilization. See **capacitation**.
- Acrossia lovei Bown, 1979**: **anaptomorphine** from middle **Eocene** of North America. Not recognized by all authorities; some include *Acrossia* in *Absarokius*. Most notable features are enlarged central incisors and relatively reduced size of the canines forming a scooplike arrangement suggestive of a **gummivorous** adaptation, although the cheek teeth are suggestive of **frugivory**. See Appendix 1 for taxonomy.
- ACTH**: abbreviation for **adrenocorticotrophic hormone**.
- actinic ray**: short-wavelength light that produces photochemical effects, such as **ultraviolet light**.
- actinomycosis**: disease in humans characterized by systemic soft tissue lesions and drainage sinuses, but that may progress to cartilage and bone. Affects males twice as often as females. Caused by two types of bacillus, *Actinomyces israelii* and *Arachnia propionica*. This condition is of interest to osteologists because it leaves its signature on the vertebral column, the coxals, and bones of the hand.
- action**: 1. movement by the whole body. 2. particular effect of a specific **skeletal muscle** or muscle group when it contracts. 3. performance or function of any organ or part.
- active**: capable of functioning or changing; requiring energy. Cf. **passive**.
- active immunity**: resistance to infection acquired by contact with microorganisms, their toxins, or other antigenic material such as by **inoculation**. Cf. **acquired immunity**.
- active metabolism**: any metabolic activity that generates additional heat as a byproduct of the additional energy requirements of muscular work.
- active site**: that portion of a protein that is required for normal function, such as the substrate-binding region of an enzyme or antigen-binding part of an antibody.
- activity**: 1. condition of being active. 2. release of energy by nerve tissue. 3. intensity of a radioactive element.
- activity budget**: amount of energy available for foraging and feeding, movement, reproduction, and other activity beyond **basal metabolism**. Primates on a low-quality diet, such as **folivores**, are typically not very active owing to the lack of energy for their activity budgets.
- activity period**: time of day when an animal is most active, especially in terms of **foraging**; e.g. **diurnal**, **nocturnal**, **crepuscular**.
- actual extinction**: physical extinguishment of a species or germ line; actual extinctions occur during episodes of **mass extinction**, or when a species is competitively excluded from a niche, etc. See **pseudoextinction**.
- actualistic study**: in archaeology, the study of the products and processes of present cultures as a key to the past.
- acuity**: sharpness, clarity, or distinctiveness, usually in reference to a sense.
- acute**: sudden; often severe, and short-lived; e.g. an acute illness.
- acute mountain sickness**: condition caused by exposure to high altitude in which symptoms appear in a few hours that include fatigue, dizziness, breathlessness, headache, nausea, vomiting, insomnia, impairment of mental capacity and judgment, and prostration. Not persistent; during **acclimation** the body makes several physiological adjustments in breathing rate and red cell mass, and these symptoms abate. Cf. **altitude sickness**, **chronic mountain sickness**.
- acute promyelocytic leukemia (APL)**: malignant proliferation of white blood cell precursors; see **leukemia**. APL is due to the abnormal transcription of a fusion protein precipitated by a characteristic **translocation** of chromosomes 15 and 17 (t15;17) that causes a **position effect** when the gene for the retinoic acid receptor is located near an **oncogene**.
- acute radiation**: certain amount of radiation received within a brief period. Cf. **chronic radiation**.
- AD**: 1. abbreviation for the (Latin) phrase **anno Domini**; since the birth of Christ. Used to indicate that a time division falls within the Christian era. Replaced by **CE** in some academic contexts. Cf. **BC** and **BCE**. 2. abbreviation for **autosomal dominant**.
- Ad Dabtiyah**: archaeological site found in 1987 in Saudi Arabia, faunal remains from which date to 17–16 mya. **Hominoid** remains include fragments of *Heliopithecus* (cf. *Afropithecus*).
- ad interim** (ad. int.): (Latin) term used taxonomically to mean provisionally or temporarily; e.g. a new

## adaptive

fossil may be classified *Homo habilis ad int.*, meaning that it appears that this fossil best fits into *Homo habilis*, but it may later be put into another or a new species.

**ad libitum** (ad lib.): (Latin) at pleasure; applied in science when no constraints are placed on the experimental subject. In *ad libitum* sampling there are no set procedures as to what is recorded or when it is recorded. In primate behavior studies in which no constraints are placed upon when or what is recorded, the observer records any relevant behavior that is visible during observation. This technique is prone to bias in favor of conspicuous behavior or individuals. Aka haphazard sampling, convenience sampling. Cf. **behavior**, **focal sampling**, **scan sampling**.

**ADA**: acronym for **adenosine deaminase**.

‡ **Adapidae**: family of prosimians known from the Eocene and early Oligocene of Europe and Asia; systematics in flux, but currently about five adapid genera are recognized; origins and phylogenetic relationships uncertain. Adjectives: adapid, adapoid. Earlier taxonomies included the notharctids (**Notharctidae**) (as a subfamily) within the adapids, which was a much larger group. See **Adapinae** and Appendix 1 for taxonomy.

**Adapiformes**: **infraorder** of primates proposed by Szalay and Eric Delson that would include all of the lemur-like primates of the **Eocene**.

**Adapinae**: subfamily of prosimians belonging to the adapoid family **Adapidae**. Adjective: adapine. Known from the late Eocene to early Oligocene; five genera and twelve species. Recent revision of the adapoids has resulted in this subfamily being reduced in size as well as becoming the only subfamily of the adapids. All members are characterized by a molarized fourth premolar that is equipped with shearing crests. Dental formula variable over time. Unlike modern prosimians, the mandible is fused. Body mass estimated to range between 600g and 4 kg for the included genera. Analysis of the limb bones led some workers to suggest that the adapids employed a slow methodical climbing locomotion similar to extant lorisoidea (**Lorisoidea**), but others think that there was more diversity of locomotor behavior in this group. See Appendix 1 for taxonomy.

**Adapis Cuvier, 1821**: well-known genus of primate from the late Eocene to early Oligocene of western Europe and China belonging to the adapoid subfamily **Adapinae**; four to five species; first fossil primate described (by G. Cuvier, 1821), although its affinities were not recognized at the time. Possesses some lemurlike characteristics, which include an inflated **auditory bulla** with a free tympanic ring and some dental similarities; however, unlike modern lemurs,

*Adapis* has a fused mandible. Estimated body size of the species around 1.5 kg. Small orbits suggest diurnality. Dental formula: 2.1.4.3/2.1.4.3; shearing crests on cheek teeth suggests **folivory**. Appears to have become extinct during the **Grande Coupure** (c. 38 mya). According to Gingerich, *Adapis* shows evidence of sexual dimorphism; if so, this would be the earliest appearance of this characteristic among the primates. See **Leptadapis** and Appendix 1 for taxonomy.

**Adapoidea**: superfamily of prosimians that consists of the families **Adapidae**, **Notharctidae**, and **Sivaladapidae** that are found from the Eocene to the Miocene. Adapoids are considered the most primitive **euprimates**.

**Adapoides troglodytes** Beard, Qi, Dawson, and Li, 1994: adapoid **prosimian** from the Eocene of China assigned to the adapid subfamily **Adapinae**; **monotypic**. Prior to the recovery of this fossil, adapids were known only from Europe, although there is no evidence that they originated there; the discovery of *Adapoides* suggests to some workers that the adapids migrated to Europe from Asia. Body mass estimated at 500g. See Appendix 1 for taxonomy.

**adaptation**: 1. adjustment. 2. any alteration in structure or function by which an organism becomes better fitted to survive and reproduce in a given environment. See **biological adaptation**, **behavioral adaptation**, **functional adaptation**, **genetic adaptation**, **insulative adaptation**, **metabolic adaptation**, and **sociocultural adaptation**. Cf. **preadaptation** and **postadaptation**.

**adaptationist classification**: proposed classification of organisms using shared **adaptations** as data, rather than cladistic or phenetic similarity. Mayr proposed the use of such a method to define **paraphyletic** higher taxonomic groups, such as birds, which evolved rapidly from a common ancestor after achieving an **adaptive breakthrough**.

**adaptationist program**: perspective among some evolutionary biologists in which all characters are viewed as being optimized in adapting a species to its environment. Researchers using this approach attempt to determine the adaptive significance of species characters. The term was introduced in a discussion by Gould and Lewontin in 1979. See W. D. Hamilton, G. C. Williams, E. O. Wilson, and R. Dawkins.

**adaptedness**: state of the current **fitness** or functional superiority of one phenotype or genotype over another, as a result of past selection.

**adaptive**: describes any trait that has arisen by the evolutionary process of adaptation; the trait may be anatomical, physiological, or behavioral.

## adeno-associated virus

**Adaptive Behavior Scale:** index of the range of adaptive behavior patterns measured in an organism or society.

**adaptive breakthrough:** evolution of a way of life radically different from that of a recent common ancestor, which sometimes results in a perceived **paraphyletic** higher taxonomic group, such as birds, which then evolved rapidly from a common ancestor after achieving flight. The phrase could apply as well to certain **hominids** which, because of increased **encephalization**, are classified in the genus *Homo* rather than as **australopithecines**.

**adaptive capacity:** environmental tolerance of an organism as determined by its genetic endowment.

**adaptive complex:** suite of biological traits (including behaviors) that enable a phylogenetic lineage to occupy a particular **ecological niche**.

**adaptive evolution:** see **adaptation**.

**adaptive hormone:** any substance secreted within the body during adaptation to unusual circumstances, e.g. **adrenocorticotrophic hormone** or the **corticoids**.

**adaptive immunity:** immune response that develops after exposure to a foreign antigen.

**adaptive landscape:** sinuous topographical graph of the average fitnesses of small, subdivided, and isolated populations in relation to the frequencies of the genotypes residing in it. Peaks in such a landscape (**multiple-peaked fitness surfaces**) correspond to genotypic frequencies at which the average fitness is high; valleys to genotypic frequencies at which the average fitness is low. Proposed by Sewall **Wright**. Aka adaptive topography, fitness surface, surface of selective value. See **shifting balance theory**.

**adaptive mechanism:** any device, idea or process that increases an organism's chances for survival, e.g. **mechanisms of culture change** and **mechanisms of evolution**.

**adaptive niche:** see **ecological niche**.

**adaptive prediction:** theoretical relationship between certain morphs and environmental variables; if a trait is an adaptation to an external condition, then the value of that condition should predict morphology. **Bergmann's rule**, predicts, for example, that organisms with adaptations for high average annual temperature should be found nearer to the equator than organisms with adaptations to low temperatures.

‡ **adaptive radiation:** biologic evolution in a group of related species that is characterized by spreading into different environments and by **divergence** of structure, e.g. the 14 species of finch in the **Galápagos archipelago**, and hundreds of Hawaiian fruit fly species (the 'Hawaiian radiation').

**adaptive strategy:** 1. totality of mechanisms possessed by a taxon that help it survive in an environment. 2. technological, ecological, demographic and

economic factors that define human behavior from a research perspective.

**adaptive trait:** see **adaptation** and **adaptive**.

**adaptive value:** reproductive success of an individual as measured by the mean value of its offspring with respect to a particular character. See **fitness**.

**adaptive zone:** environment of previously unexploited **ecological niches** that becomes available to evolutionary opportunistic taxa; often results in an **adaptive radiation**.

**additive:** 1. effect of any element in a summation. 2. substance added to another material. 3. synergistic effect.

**additive genetic effect:** contribution an allele makes to the phenotype independent of the identity of other alleles at the same or different loci. Aka additive effect. See **heritability**.

**additive genetic variation** ( $V_{ga}$ ): proportion of the **total phenotypic variance** of a quantitative trait due to genes that will actually be inherited in offspring. See **heritability**.

**additive genotype fitness:** hypothetical case where fitness is the sum of a number of factors, such as the activities of the members of a family of digestive enzymes.

**additive hypothesis:** in molecular taxonomy, a proposal that parallelisms and convergences are randomly distributed among the taxa in any analysis.

**additive model:** model of **heritability** in which the **total phenotypic variance** of a quantitative trait is partitioned into several genetic and environmental subcomponents.

**additive technology:** processes in which manufactured artifacts take form by the addition of materials to the original mass, such as ceramic production or basket making. Cf. **subtractive technology**.

**adductor:** muscle that moves a limb or structure toward the mid-line; aka depressor. Cf. **abductor**.

**adductor pollicis:** **intrinsic muscle** of the hand; originates from the **trapezium**, **trapezoid**, **capitate**, and **metacarpals** II–IV, and inserts into the medial surface of proximal **phalanx** I. Its action is to adduct and oppose the thumb; one of the thenar group of muscles.

‡ **adenine** (A): one of the **purine** nitrogenous bases that composes **DNA** and **RNA**; composed of two carbon–nitrogen rings. Adenine bonds with thymine in DNA and with uracil in RNA (see **base pairing rule**); it is also a major component of other molecules such as **adenosine triphosphate**.

**adeno-associated virus** (AAV): any one of a group of defective spherical DNA viruses frequently isolated from tonsillar tissue that can replicate only in the presence of **adenoviruses**. No disease has been associated with AAV in humans. When not replicating it

## adrenal

is integrated into the host chromosome. AAV is most notable as a proposed vector for human gene transfer experiments.

**adenohypophysis:** anterior portion of the **pituitary gland**, and which secretes most of its **hormones**, including **growth hormone**. See **pituitary gonadotropic hormones**. Cf. **neurohypophysis**.

**adenoma:** tumor or growth located in glandular tissue.

**adenomatous polyposis of the colon, familial (FAP):** one of the two most common forms of hereditary colorectal cancer. FAP is an autosomal dominant found in adolescents who present with abdominal pain, diarrhea and rectal bleeding. A carpet of pre-cancerous growths, usually in the colon, progresses to colorectal **cancer**. The mutant gene is adenomatous polyposis coli (APC); about 740 different mutations in this gene have been identified with simultaneous **loss of heterozygosity** or mutation to the **p53 tumor suppressor** gene. There is some evidence for a **paternal age effect**. Aka familial polyposis of the colon (FPC). Cf. **colon cancer**, **hereditary nonpolyposis**.

**adenosine deaminase (ADA):** an enzyme that converts adenosine to inosine in the purine salvage pathway, and is essential to the production of T cells and B cells in the immune system. The ADA gene is located on **HSA 20q13.1**. Some 95% of the ADA **cistron** consists of introns; the 12 exons have a final translation length of 1500 base pairs. Cf. **purine nucleoside phosphorylase**.

**adenosine deaminase deficiency:** an autosomal dominant condition, one of the primary immunodeficiency diseases (PIDs) characterized by skeletal and neurological abnormalities; frequent infections, fatal if untreated. Death usually occurs by the age of 7 months owing to infection. ADA deficiency accounts for about 15% of all **severe combined immune deficiency (SCID)** cases. There are no T cells, and B cells do not produce antibodies. An ADA-deficient SCID girl was selected as the first person with a genetic disorder to be treated by **somatic gene therapy**, using a viral vector, in September 1990. Cf. **agammaglobulinemia**.

**adenosine triphosphate:** see **ATP**.

**adenovirus (AV):** any member of a group of spherical DNA viruses that infect several mammalian species, including humans; some are oncogenic.

**adenylate kinase (AK):** an enzyme that releases energy within cells; in humans, two common alleles are known, AK-1 and AK-2. AK is of historical significance because it is linked to both the ABO blood group locus and the Nail Patella locus; this linkage group is one of the first discovered, now known to reside on chromosome 9q.

**adiacritic:** pertaining to the condition in which no member of a race or breed is recognizable as such by an expert. Cf. **typology**, **microdiacritic**, and **mesodiacritic**.

**adipocyte:** fat cell.

**adipometer:** anthropometric instrument used for measuring skinfold thickness in order to estimate the amount of subcutaneous fat.

**adipose tissue:** specialized connective tissue that stores **fat**; in humans much of this tissue is found in the **subcutaneous layer** of the skin. It is also found in spaces between muscles, behind the eyes, around the kidneys, in some abdominal membranes, on the surface of the heart, and around certain joints.

**adiposis:** corpulence or **obesity**; an excessive accumulation of body fat.

**adiposity:** amount of body fat; state of being fat. Often used in reference to excessive **obesity**, esp. in medicine.

**adjustment:** physiological or behavioral response of an organism to change in its environment, without regard to whether the change is beneficial to the organism. See **accommodation**.

**admixture:** term used for interbreeding between races; in humans, **miscegenation**; in evolutionary terms, **gene flow**.

**adolescence:** another term for the **adolescent stage**.

**adolescent:** see **adolescence**. Cf. **juvenile** and **adult**.

‡ **adolescent growth spurt (AGS):** a rapid increase in **stature** during **adolescence**. It occurs at the same developmental stage in all primates regardless of the age of the individual in years. See **hypertrophy**, **hyperplasia** and **life-history variable**.

‡ **adolescent stage (or period):** interval in the human **life cycle** preceeding **adulthood** that is characterized by the **adolescent growth spurt** in height and body mass, fusion of the epiphyses of the long bones, development of secondary sexual characteristics, continuation or completion of adult tooth eruption, sociosexual maturation, and intensification of interest in and practice of adult social roles. The stage commences at **puberty** and lasts five to eight years; aka adolescence.

**adolescent sterility:** physiological state in adolescent females that begins with menarche and ends with the onset of regular ovulatory cycles.

**adontia:** lack of tooth bud development; see **ectodermal dysplasia**. See also **hyperdontia**, **hypodontia**.

**adoption:** shared welfare of offspring by individuals other than biological parents; a behavior found in many species. Contrasts with strict biological or genetic modes of defining human relationships.

**adrenal:** 1. located near the kidney. 2. pertaining to the **adrenal gland**; adrenogenic.



## adulthood

**adrenal cortex:** outer layer of the **adrenal gland**; secretes mainly **cortisol** and other **glucocorticoids**, **aldosterone**, and **androgens**.

**adrenal gland:** paired **endocrine gland** located superior to each kidney in most vertebrates; a composite organ that consists of the **adrenal medulla** and the **adrenal cortex** of differing embryonic origin that function to secrete several 'stress' **hormones**. Aka suprarenal gland, epinephric gland, third gonad.

**adrenal hypoplasia, primary:** heritable disease characterized by delay or absence of puberty, possible mental retardation, and possible death at puberty without hormonal supplementation. Caused by mutations in genes that disrupt the adrenal glands and by hormone deficiencies.

**adrenaline:** alternative name for the hormone and neurotransmitter **epinephrine**; produced by the adrenal **medulla** of the kidney. Adrenaline initiates actions similar to those initiated by sympathetic nervous system stimulation (adrenergic stimulation) in the heart, bronchioles and blood vessels.

**adrenal medulla:** soft center of the **adrenal gland**; secretes mainly **epinephrine** and **norepinephrine**.

**adrenarche:** period when secretion of the adrenal androgen hormones begins; has been suggested to be involved with the mid-growth spurt that occurs in children between the ages of six and eight. See **androgen** and **mid-growth spurt**.

**adrenergic:** pertaining to nerve fibers of the sympathetic nervous system that, upon stimulation, release the chemical transmitter norepinephrine (and possibly epinephrine) at their post-ganglionic endings; any compound that acts like norepinephrine or epinephrine.

**adrenocortical hormones:** steroids produced by the adrenal cortex, including **estrogens**, **androgens**, **progesterone**, and the **glucocorticoids**.

**adrenocorticotrophic hormone (ACTH):** a polypeptide secreted by the anterior **pituitary gland**; it controls secretion of certain **hormones** called adrenal **androgens** (e.g. **cortisol**) that originate in the **adrenal cortex**, and assist in the breakdown of fats. Aka adrenocorticotropin, corticotropin.

**adrenocorticotropin:** see **adrenocorticotrophic hormone**.

**adrenogenital syndrome:** condition resulting from a hereditary defect in the **adrenal glands** in which a nonfunctioning enzyme in a metabolic pathway is produced, causing the accumulation of testosterone-like breakdown products that cause affected females to exhibit masculine characteristics and to develop rudimentary male sex organs.

**adrenoleukodystrophy (ALD):** characterized by dementia, seizures, paralysis, loss of speech, deafness, and blindness; neonatal death is usual, and

inevitable by age 3. Variable symptoms: the X-linked form is less severe than the neonatal autosomal recessive form. The defect is in the ALD membrane transport protein; adrenal insufficiency causes an excess of long-chain fatty acids. Maps to Xq 28. The condition is associated with **HLA DR3** and increases the relative risk of ALD to 6.3×. ALD is rare, incidence 1:100 000. Aka Addison disease.

**adrenomegaly:** enlargement of the adrenal glands.

**adrenosterone:** androgenic **steroid** present in the **adrenal cortex**. See **androgen**.

**adrenotropin:** 1. see **adrenocorticotrophic hormone**.  
 2. see **corticotropin**. Also spelled adrenotrophin.

**adulation:** transfer of the appearance of a trait from a late to an earlier stage of development. Cf. **neoteny**.

**adult:** in mammals, including humans, an individual that has reached full growth in height or length; note that reproductive **adulthood** can occur before full body size is reached. Cf. **adolescent**.

**adult body size:** mass or dimension of an organism during maturity. Cf. **body size**.

**adult dentition:** set of teeth in mammals that replaces the **deciduous dentition**; in most mammals the adult set consists of incisors, canines, premolars, and molars. The larger adult dentition fits the growing adolescent, and later adult, jaw. Aka permanent teeth, **replacement dentition**, adult teeth.

**adult form:** in genetics and physiology, the form of a molecule that is present in the adult, as opposed to forms present in the embryo, fetus, or other developmental stage. The **hemoglobin** molecule, for example, is found in three forms during the corresponding stages of development: embryonic, fetal, and **adult hemoglobin**.

**adult hemoglobin:** umbrella term for three forms of **hemoglobin** found in the **erythrocytes** of adult humans that are metabolically active in the late fetal stages of development through adulthood. The majority consists of **hemoglobin A** (aka the major fraction) and about 2% is **hemoglobin A<sub>2</sub>**, the minor fraction; a very small percentage consists of the so-called fetal fraction, which, however, is not quite identical to **fetal hemoglobin** in that the fraction circulating in normal adults has an amino acid substitution at position 136 in the  $\gamma$  chain compared with the normal fetal form. Cf. **embryonic hemoglobin**.

**adult polycystic kidney disease:** see **polycystic kidney disease, adult**.

**adulthood:** interval of maturity that commences at about age 20 years. The stage in the human **life cycle** between **adolescence** and **senescence**; the prime of adulthood lasts until the end of child-bearing years and is a period of homeostasis in physiology, behavior and cognition. Cf. **middle age**.

### ‡ **affiliative**

**adult teeth:** see **adult dentition**.

**advanced:** see **derived**.

**advanced age:** state of living into post-reproductive life; living after the majority of one's birth cohort has already expired. See **maturity**, **senility**.

**advanced parental age effect(s):** increase in the frequency of a human trait when either the mother is over about 35 years of age (see **Down syndrome** and **dizygotic twins**), or the father is over about 50 years of age (see **Marfan syndrome** and other **collagen diseases**). See **maternal age effect** and **paternal age effect**.

**adventive:** in reference to an organism not native to a particular region. Aka **exotic**; **alien**; **introduced**.

**Aedes:** genus of mosquito (family **Culicidae**) that contains over 700 species and that is a potential vector of yellow fever and malaria; e.g. *Aedes aegypti*.

‡ **Aegyptopithecus** Simons, 1965: extinct genus of largest and best known of the **haplorhines** of the **Oligocene epoch** (c. 34–33 mya); recovered from the **Fayum Depression**, Egypt; member of family **Propliopithecidae**. Completely **anthropoid** in characteristics such as closed **orbits**, fusion of frontal and mandibular bones. Highly **sexually dimorphic**; **sagittal crest** and long canines present in males. Small orbits indicate **diurnal** habits. Brain size about 30 cm<sup>3</sup>, and comparable with that of extant prosimians. Elongated maxilla; dental formula: 2.1.2.3; dentition suggests **frugivory**. Estimated body mass 6–8 kg. **Monotypic**; the only known species is *A. zeuxis*, which has affinities with both monkeys and apes; it could be ancestral to one or both of these groups. Some authorities now include *Aegyptopithecus* in **Propliopithecus**. See Appendix 1 for taxonomy.

**aeolian:** alternative spelling of **eolian**.

**Aeolopithecus** Simons, 1965: genus of the fossil primate family **Propliopithecidae**, an **anthropoid** from the **Oligocene epoch**. Synonym: **Propliopithecus**, which is accepted now by most authorities. Recent considerations of **sexual dimorphism** within *P. chirobates* has removed this genus as a valid taxon. See **Propliopithecus**; See Appendix 1 for taxonomy.

**aerobic capacity:** highest rate at which an individual is capable of utilizing **oxygen**. See **aerobic endurance**.

**aerobic endurance:** length of time that an organ, particularly muscle tissue, can continue to use **oxygen** in metabolic pathways. See **aerobic capacity**.

**aerobic power:** **aerobic capacity** divided by body mass.

**aestivation:** see **estivation**.

**Aethiopian:** early ethnic term, dating from antiquity, meaning 'person with a burnt face'. Used by Homer, Xenophanes, Scylax of Caryanda, and Herodotus. See **Ethiopian**.

**aetiology:** see **etiology**.

**Afalou man:** **AMH** fossil found in North Africa, and similar to **Cro-Magnon**.

**Afalou-Bou-Rhommel:** Upper Pleistocene rockshelter found in 1928 near Bugia in Algeria, dated to 15–8 kya, that contains artifacts identified as **Oranian** (= **Capsian**) and closely related to **Aurignacian**. Hominid remains include at least 50 skeletons comparable in morphology to **Cro-Magnon** in Europe (i.e. *Homo sapiens*). All the individuals had experienced dental mutilation. Aka **Afalou-Bou-Rhummel**, **Mechta-el-Arbi**. The artifacts are aka **Ibero-Maurusien**.

**Afar depression:** region in Ethiopia; the west central Afar sedimentary basin contains several hominid-bearing sites (e.g. **Hadar**, **Belohdelie**, **Maka**) that date to earlier than 2.9 mya, and possibly as far back as 3.6 mya.

**Afar hominids:** see entries beginning with **NME**.

**Afar Locality (AL):** any site located in the Afar Depression of Ethiopia. Thus AL-288 is the specification for the site where the **australopithecine** known as 'Lucy' was found (field number **NME AL-288-1**) in 1974, **NME AL-333** where the 'first family' was found in 1975, and so forth.

**Afar triangle** or **Afar region:** see **Afar depression**.

**afarensis nomen debate:** difference of opinions concerning the attribution of fossils found at **Laetoli** and **Hadar**; one group (led by Mary **Leakey**) felt that these early pre-habilines should be placed in the genus *Homo*, while another (**Johanson**, **White**, and others) erected the taxon *Australopithecus afarensis* for these specimens. The first group felt that the new taxon contained more than one species and that, as the **holotype** had come from **Laetoli** and not the **Afar triangle**, the selection of the specific nomen was itself inappropriate. **Tobias** had suggested sub-specific taxa to resolve the issue (*A. africanus aethiopicus* for **Johanson's** Ethiopian fossils, and *A. A. tanzaniensis* for **Leakey's**), but **Johanson** presented his description first, thus establishing priority.

**affection:** expression of emotions, feelings or mood indicating tenderness, one of the emotions mediated by the **limbic system**.

**affective disorder:** any of a group of similar behavioral disorders pertaining to feelings; alternation between manic and depressive behavior is called **bipolar affective disorder**, whereas the experience of depressive bouts alone is called **unipolar disorder**. See **psychiatric disorder**.

**afferent:** towards a reference point; for example, afferent nerves conduct impulses towards the **central nervous system**.

‡ **affiliative:** pertaining to persistent amicable relations between individuals.