MODERN DICTIONARY

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PREFACE

Earth, the planet we inhabit, is a single, living, pulsating entity and the human race an interlocking extended family. The land, waters and atmosphere which constitute its environment support some 0.36 million species of plants and more than a million species of animals. The unprecedented human interference into the environment has upset the delicate ecological balance of our planet. Ruthless exploitation of non-renewable natural resources has created havoc and if allowed to continue can result in a series of major ecological disasters that can disrupt life on this planet. Some of the most dramatic cases of tampering with the environment are-man made fires, slash and burn agriculture, mineral mining, dumping of sewage and industrial wastes, introduction of new transport systems into natural areas, persistence of nuclear testing and the disposal of nuclear wastes, the dangers of global warming and the attenuation of our ozone shield, the menace of deforestation leading to destruction of many species of flora and fauna, devastation of landscape by herbicides, introduction of pests into new areas, overpopulation, overgrazing coupled with drought, extensive air and water pollution, and the poisoning of the food chain, the malign underworld of drugs and the alarming spread of communicable diseases.

All these are problems which the human race shares in common, and in order to solve them people must try to attain as complete understanding of their environment as possible, so that the environment can be enriched for the welfare of generations yet unborn.

A century ago, the word environment was hardly known to a few people, we have now reached a stage where the environment is not only the concern of biologists but people from all walks of life down from children, farmers, social workers, spiritual leaders to politicians. There is, therefore, a crying need to know various terms, concepts and developments concerned with environment.

An attempt has been made, in this dictionary, to give a thorough coverage to vocabulary used in ecology, geology, hydrobiology, pedology, climatology, geography and several other fields associated with environmental studies and planning. A brief description has been given for each entry together with the relevant synonyms, grammatic alterations and orthographic variants. Where ever necessary, reference to the related words, expansion of common abbreviations and their explanation has been included. Mention has also been made of several important processes, developments, sites of environmental tragedies and their causes, as also the ill effects of environmental deterioration. We hope that this information would be useful to all having concern for our environment, especially for those pursuing environmental studies at various levels.

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A

Aa lava. A rough, blocky, extrusive lava flow ; a name given by Hawaiians to lava flow of basalt on their islands that is a jumbled pile of black rocks ; pronounced ah-ah.

Abatement. Reduction or lessening of pollution through reuse or waste treatment.

Abience. Withdrawal or retraction from a stimulus ; an avoidance reaction ; abient.

Abiocoen. The non-biotic component of an ecosystem or habitat.

Abiogenesis. The doctrine that life can be generated from non-living material.

Abioseston. The non-living component of the total particulate matter suspended in water ; tripton.

Abiotic environment. The non-living component of an ecosystem ; the physical and chemical factors of the environment.

Abiotic factors. Physical, chemical and other non-living environmental factors.

Ablation. The removal of a surface layer, as of glacier or ice by melting, evaporation or sublimation.

Abney level. An instrument used for measuring angles in the vertical plane from which height of an object may be calculated.

Aborigine. The original or indigenous biota of a geographical region ; aboriginal.

Abrasion. The wearing away of rocks and other earth materials by the scraping motion of moving particles carried by streams, ocean waves, glaciers, and winds ; attrition ; abrade, abrasive, abrasiveness.

Abrasion platform. The relatively flat area at the base of a sea cliff, also termed a wave-cut bench.

Absolute abundance. The precise number of individuals of a taxon in a given area, volume, population or community.

Absolute age. The age of a rock, mineral or fossil in years. It is determined as a radiometric age or by counting varves. Radiometric dating involves experimental errors, so such dates are usually expressed with plus or minus error.

Absolute humidity. The actual amount of water vapour present in a unit volume of air, expressed in grams per cubic metre.

Absorption. The process by which one substance (the absorbate) is taken into and incorporated in another substance (the absorbent) ; absorb.

Absorption coefficient. When a surface is exposed to a field of sound, it refers to the ratio of the sound energy absorbed by the surface to the total sound energy that strikes it. An absorption coefficient of 1 would imply that all of the sound energy was absorbed.

Absorption tower. A structure usually found in chemical works. In this a liquid is made to absorb a gas, as in the production of sulphuric acid from sulphur dioxide/trioxide and water.

Abundance. The total number of individuals of a taxon or taxa in an area, volume, population or community often measured as cover in plants ; absolute abundance.

Abyssal. Pertaining to great depths within the earth, or to zones of great depth in the oceans or lakes into which light does not penetrate ; in oceanography occasionally restricted to depths below 2000 m but more usually used of depths between 4000 and 6000 m ; hypobenthile ; abysmal ; abyss.

Abyssal plain. The more or less flat ocean floor below 4000 m, excluding ocean trenches, having a slope of less than 1 in 1000.

Abyssobenthic. Living on or in the ocean floor in the abyssal zone ; abyssalbenthic.

Abyssopelagic. Living in the oceanic water column at depths between 4000 and 6000 m, away from the ocean floor ; abyssal pelagic.

Acanthite. A major ore mineral of silver, Ag_2S. It occurs in hydrothermal deposits, characteristically with lead, zinc, and copper minerals, which also contain silver by atomic substitution. Acanthite is also found in supergene deposits.

Accelerated erosion. A marked increase in the natural rate of erosion as the result of the activities of animals or man, or to changes in vegetation cover or soil conditions.

Accessory mineral. A mineral which is found in small amounts in rock and disregarded in the classification of that rock (which is based on essential minerals). Accessory minerals can provide evidence about the origin of the rock (e.g., the presence of metamorphic minerals in a sandstone reveals a provenance, at least in part, from a metamorphic belt).

Accidental. 1: Not normally occurring in a particular community or habitat. 2: Used of a plant species with a low degree of fidelity in a given community or association.

Acclimation. Adaptation to changed or new environment ; the gradual and reversible adjustment of physiology or morphology as a result of changing environmental conditions ; acclimatization ; accomodation.

Acclimatization. *See* acclimation.

Acclivous. Having a gentle upward slope.

Accumulation, degree of. A measure of the biological concentration of heavy metals or minerals in plants, calculated as the ratio of the mineral concentration in plants on contaminated soils to that of plants on normal soils expressed as percentage.

Accumulation, zone of. 1: In glaciers, the upper portion of a glacier where falling snow accumulates. 2: In soils, the layer beneath the topsoil which gathers nutrients brought down by gravitational water movement from above ; the B-horizon of soil profile.

Acid generating cations. Aluminium ion: Al^{3+} and hydrogen ion: H^+ whose presence in substantial proportions results in an acidic soil condition.

Acidic. Pertaining to habitat media having a pH less than 7 ; *cf.* alkaline.

Acid lava. A mass of molten igneous material flowing slowly from a volcanic vent, stiff and viscous, rich in silica, and with a high melting point (about 850°C).

Acid mine drainage. Acid water resulting when ground water emerges from abandoned mines, as well as soil water percolating through strip-mine spoil banks. The acid water thus formed can have adverse effect upon animal life. It can also cause corrosion of boats and piers.

Acid mine waste. One of the principal pollutants arising from mining operations. Acid water forms when water contacts exposed mine wastes and sulphur containing ores.

Acidotrophic. Feeding on acidic food or acidic substrates.

Acid rain. Precipitation with pH $\leq$ 5.6 formed by contact of atmospheric moisture with sulphur and nitrogen oxides in aerosols.

Acid soot. Particles of carbon, held together by water that is acidic through combination with sulphur trioxide. The carbon particles are emitted during combustion, and the soot particles are roughly 1 to 3 mm in diameter. Where oil burning installations have metal chimneys, acid soot can acquire iron sulphate, which makes brown stains on materials and damages paintwork. Acid soot emissions can be reduced by using low-sulphur fuels, by reducing the air flow to minimise sulphur trioxide formation, by making flues airtight, by insulating chimneys, by raising the temperature, etc ; acid smut.

Acmic. Pertaining to period of maximum vigour, or to periods of seasonal change in populations.

Acoustic reflex. The mechanism by which the mammalian ear is able to protect itself against sounds that are too loud, by adjusting the connecting muscles that regulate the relative positions of the ossicles.

Acre. A fps unit (foot-pound-second system or the British system) of area equal to 4840 square yards or 4.046×10^3 square metres.

Acre-foot. The quantity of water sufficient to cover one acre to a depth of one foot ; used as a measure of irrigation capacity or runoff volume.

Actic. Pertaining to rocky shores; often used of the zone between high and low tides; littoral; intertidal.

Actinometer. An instrument for measuring the intensity of radiation, especially from the sun.

Action system. A behaviour pattern in an organism.

Activated alumina. Granular, porous form of aluminium oxide which is capable of absorbing water, oil, vapour or certain other substances from gases or liquids. It is used in pollution control, chromatographic analysis, and as a catalyst.

Activated carbon. A highly porous form of carbon made by destructively distilling carbon-rich materials to eliminate the volatile portions, followed by high-temperature treatment of the carbon with steam or carbon dioxide. The product may have an internal surface area ranging from 420 to almost 1700 square metres per gram. This enables it to strongly adsorb molecules of gases and vapours or colloidally suspended particles from liquids. Nut shells are used as a carbon source for material of the smallest pore size, which is used for gas adsorption ; coal, wood, and similar materials are the basis for carbons used for adsorption from liquids. Activated carbon (sometimes called activated charcoal) is used to deodorize gases, to reclaim solvents from the vapour phase, and to decolourize liquids ; it also can effectively remove toxic contaminants from air, as in gas masks.

Activated sludge. The active material, having largely protozoa and bacteria, used to purify sewage. When mixed with aerated

sewage, the sludge organisms break down the organic matter in the sewage, using it as food, and multiply, thus producing more activated sludge.

Activation products. Radioactive isotopes produced by exposure of non fuel material to radiation from fuels. The coolant liquids used in nuclear power plants may be activated along with structural materials surrounding the fuels.

Active fault. a fault-line along which repeated earth movements are currently in progress.

Active pool. An area or location of biosphere, where materials are in forms and places easily accessible to life processes.

Actualism. The theory that seeks to explain the evolution of the earth in terms of relatively small scale natural fluctuations or events that have been operative throughout the entire geological history of the earth and have thus produced changes of great magnitude ; uniformitarianism.

Actualistic palaeontology. The study of living animals and present day environments as representing the source material for the fossils of the future ; equivalent to neontology.

Adaptation. 1: The process of adjustment of an individual organism to environmental stress ; adaptability. 2: Process of evolutionary modification which results in improved survival and reproductive efficiency. 3: Any morphological, physiological, developments or behavioural character that enhances survival and reproductive success of an organism ; adaption ; adaptive.

Adaptiogenesis. The production of new adaptations.

Adaptive capacity. The genetically determined physiological tolerance of an organism.

Adaptive landscape. The figurative representation of the fitness of organisms in the form of a topographical map, on which those fit genotypes (species) able to occupy particular ecological niches are depicted as adaptive peaks separated by adaptive valleys representing unfit gene combinations ; adaptive surface ; adaptive topography.

Adaptive peak. A peak on an adaptive landscape.

Adiabatic. Pertaining to a thermodynamic process in which heat is neither lost nor gained. In adiabatic processes, the changes of temperature occur within a gaseous or air mass that is ascending or descending to different elevations but the mass does not lose or gain any heat energy from outside environment.

Adiabatic cooling. The decline in the temperature of a gas or air mass, due to the expansion of the molecules within the mass as it rises to higher elevations.

Adiabatic heating. The increase in the temperature of a gas or air mass, due to the compression of the molecules, as the gas or air mass descends to lower elevations.

Adjacently sympatric. Used of populations that are geographically separated but whose boundaries are in contact at some point so that gene flow between them is possible ; neighbouring sympatric.

Adsorption. Settling or adhesion of a substance on the surface of another substance, usually at very small particle or ionic levels.

Adtidal. Living immediately below low tide level.

Advanced gas cooled reactor (Agr). Nuclear reactor which is using enriched uranium dioxide as a fuel, gaseous carbon dioxide as coolant, and graphite as a moderator. Operating temperatures have been found to be higher than those in the earlier Magnox reactor being about 675°C.

Advanced waste treatment. Refers to any process for the treatment of wastewater that follows other physical, chemical or biological treatments and aims to improve the quality of effluent prior to re-use or discharge. The term is often applicable to the removal of nitrate and phosphate plant nutrients. *See* eutrophication, primary treatment, secondary treatment.

Advection. The process of transfer by virtue of motion ; the transfer of heat or matter by horizontal movement of water masses.

Advection fog. A fog layer created when a warm moist air mass moves across a layer of colder air, land, or water and the underside is chilled to the point where dew point is reached and condensation occurs.

Adventive. Not native ; an organism transported into a new habitat, whether by natural means or by agency of man.

Aeolation. Erosion of a land surface by wind-blown sand and dust ; eolation.

Aeolian. Pertaining to the action or effect of the wind ; eolian.

Aeolian deposit. Wind borne soil deposit ; *cf.* alluvial deposit, colluvial deposit.

Aerated lagoon. A natural or artificial wastewater treatment lagoon (generally from 1 to 4 m deep) in which mechanical or diffused-air aeration is used to supplement the oxygen supply. It can be used for treatment of combined sewer overflows.

Aerial water. All forms of atmospheric water, as distinct from terrestrial water.

Aerobic. 1: Growing or occurring only in the presence of molecular oxygen; oxybiotic; *aerobe, aerobiosis*. 2: Used of an environment in which the partial pressure of oxygen is similar to normal atmospheric levels; oxygenated.

Aerobiology. The study of airborne organisms.

Aerochorous. Disseminated by wind; anemochorous; aerophilous; *aerochore, aerochory*.

Aerodynamic drag. The force required to move a solid body through air. At low speeds, when flow is laminar, the drag is viscous and proportional to the speed.

Aerodynamic roughness. The aerodynamic roughness of a surface depends on the size of the roughness elements.

Aerogenerator. Machine having fast-moving, wind-driven rotor blades which are used to generate mechanical power.

Aerogenic. Gas producing ; aerogenesis.

Aeronomists. Scientists who study the upper levels of the earth atmosphere.

Aerophyte. An epiphyte growing on a terrestrial plant and lacking direct contact with soil or water; air plant, aerial plant.

Aeroplankton. The organism freely suspended in the air and dispersed by wind ; aerial plankton.

Aerosol. Gas mixture or air in which tiny droplets of liquid or fine particles are dispersed. These originate from crustal weathering, the oceans, and such human activities as detergent use and sewage processing. Aerosols are released into outer atmosphere by exhausts of jet aircraft.

Aestivation. 1: Passing of summer or dry season in a dormant or torpid state ; estivation ; aestivate ; *cf.* hibernation. 2: The manner in which plant structures are folded prior to expansion or opening.

AFDW. Ash-free dry weight.

Afforestation. The process of establishing a forest in a non-forested area ; *cf.* reforestation.

Afghanets winds. Hot, drying winds that sweep down the leeward sides of mountains and are heated by compression. *See* also adiabatic heating.

Afro-Brasilian bridge. The proposed land-bridge between Africa and South America following the breakup of Gondwanaland, persisting possibly until the Palaeocene ; Atlanto-equatorial bridge ; Inabresis.

Agad. A beach plant.

Age and area hypothesis. That the area occupied by a species is proportional to its evolutionary age.

Ageotropism. An orientation movement against gravity ; negative geotropism, apogeotropism.

Agglomeration. Refers to the gathering together of particles (e.g., smoke particles in air under the influence of ultrasonic radiation).

Aggradation. The natural building up of a surface or filling up of a channel by sediment deposition ; aggrade.

Aging of water. The process of accumulation of more and more solutes by stream water as it comes in contact with rocks and parent material.

Agonistic. Combative or competitive ; specifically, in aggressive encounters between individuals.

Agrestal. Growing on arable land.

Agric. A depositional B-horizon of clay and humus in a soil profile, formed as a result of cultivation.

Agrium. A community on cultivated land or land subject to influence by the activities of man ; culture community.

Agroclimatology. The study of climate in relation to the productivity of plants and animals of agricultural importance.

Agro-ecosystem. An agricultural ecosystem.

Agrology. The branch of agriculture dealing with the study of soils.

Agronomy. The theory and practice of agricultural management, crop production and husbandry.

Agrostology. The study of grasses ; graminology.

A-horizon. The dark coloured upper mineral horizon of a soil profile, immediately below the O-horizon and comprising some humified organic material as a result of biological activity or cultivation. On plowing the horizon becomes distorted and designated Ap layer.

Aigicolous. Living in beach habitats ; aigicole.

Air. The mixture of gases that envelops the earth's crust ; the atmosphere. Its composition varies with the altitude at which a sample is taken. At sea level the composition is (in percent by volume) : nitrogen 78, oxygen 20.9, argon 0.94, and carbon dioxide 0.03. There are also trace amounts of other gases, as well as varying proportions of water vapour. A low percentage of dissolved air is present in ocean water. The density of dry air is 1.29 grams per litre. Air can be liquefied by compression and cooling. Nitrogen, oxygen, and argon for industrial use are separated from air by distillation. Most of the oxygen is due to photosynthesis, and the carbon dioxide to combustion and degradation of organic matter.

The nitrogen of air is not available to animals and man metabolically, but is used by plants to synthesize proteins. A method of using it to synthesize ammonia was discovered in Germany about 1912 by Haber. Air is used as such in the manufacture of blown

asphalt and castor oil and in whipped food products. It is also used as a means of classifying particulate solids such as clays (air floatation). *See* also atmosphere ; nitrogen fixation.

Air capacity. Volume of air remaining in a soil after saturation with air ; air content.

Air drainage. The movement of cool air down a slope.

Airglow. The faint light of the night sky, even when moonless.

Air lock. A device which gives access from one region or enclosed space to another without direct contact of the fluids in those regions. It is used in control of radioactive contamination and for air/water transitions

Air mass. A relatively large body of air that is relatively uniform as to temperature and moisture content. The differing characteristics of the earth's variety of air masses are determined by the region (land or sea) and the latitude over which the air mass forms.

Air pollution (atmospheric pollution). Introduction into the atmosphere of substances that are not normally present therein and that have a harmful effect on man, animals, or plant life. Important among these are sulphur dioxide, which forms sulphuric acid on contact with water vapour ; automotive exhaust emission products (carbon monoxide, lead compounds, polynuclear hydrocarbons, nitrogen oxides) ; toxic metal dusts from smelters, coal smoke, and other particulates ; formaldehyde and acrolein ; and radioactive emanations. Control of these is exercised by the Environmental Protection Agency. As conventionally used, the term does not apply to interior air spaces such as industrial workrooms. Tolerances for the latter are established by the American Conference of Governmental and Industrial Hygienists (ACGIH). *See* threshold limit value.

Air pollution standards. Limits of concentration of various pollutants set by Environmental protection agencies especially for various industrial and automobile exhausts.

Air pressure. The weight of a column or mass of air. If the air is cooling and descending it becomes heavier, thus creating a high pressure area. If it is warm and rising a low pressure area is created.

Air temperature inversion. Temperature change during a night with clear sky when air near the ground becomes cooler and shows a temperature increase (rather than fall) upto about 300 m where thermal belt is located and above which the temperature lapse is encountered as during the day.

Aitionomic. Used of growth patterns and other phenomena imposed by the environment.

Aitken counter. Device which causes rapid condensation of droplets in air by rapid adiabatic expansion. It makes possible the counting of the number of condensation nuclei present in a unit volume by means of a microscope. The Aitken nuclei are those which produce a droplet during the expansion and correspond to those naturally available for cloud formation in rising air or fog. In a slow expansion only some of the Aitken nuclei form droplets. Named after the physicist John Aitken, of Edinburgh.

Aktology. The study of shallow inshore ecosystems.

Alarm call. A sound produced by an animal when danger threatens, but is still a significant distance away ; protective call.

Alarm pheromone. A chemical substance exchanged by members of a group, that induces a state of alarm or alertness.

Alarm reaction. The sum of all non-specific responses to the sudden exposure to stimuli to which the organism is not adapted.

Albedo. A measure of surface reflectivity ; that fraction of incident electromagnetic radiation that is reflected by a body or surface, usually expressed as a percentage.

Albic horizon. Name given to A_2 horizon of soil which is light coloured as compared to A_1 horizon.

Aldrin. Persistent organochlorine pesticide similar to dieldrin. Its use is now very restricted. It is effective against many insects but poisonous to vertebrates.

Aleutian current. A warm surface ocean current that flows north and west off the coast of Alaska, derived as a deflection of the North Pacific Gyre ; Alaska current.