

R.J.LINCOLN G.A.BOXSHALL P.F.CLARK

A dictionary of ecology, evolution and systematics

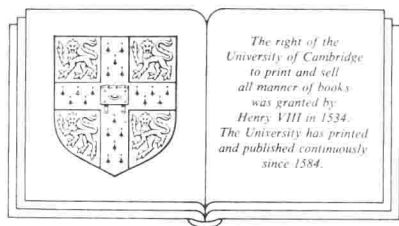


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A DICTIONARY OF ECOLOGY, EVOLUTION AND SYSTEMATICS

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'The psychosemanticists will specialize in the havoc wrought by verbal artillery upon the fortress of reason. Their job will be to cope with the psychic trauma caused by linguistic meaninglessness, to prevent the language from degenerating into gibberish, and to save the sanity of persons threatened by the onset of polysyllabic monstrositis'

James Thurber

'The Psychosemanticist Will See You Now, Mr Thurber.'

PREFACE

We selected the terms Ecology, Evolution and Systematics for our title because we felt they would indicate three focal points within the overall coverage of this dictionary to potential users. Biology, in common with the whole of Science is structured into a plethora of sub-disciplines exhibiting varying degrees of specialization, that often tend to inhibit or obscure a broadly based understanding. Our three major disciplines are in practice integrated by large areas of overlap into a modern biological science that has been called Evolutionary Biology, but might equally well be viewed as contemporary Natural History. The special emphasis is placed on the dynamics of the biosphere – change through time. Ecologists look especially at populations, communities, and their interrelationships with the physical environment. Evolutionists look at organisms and groups but explore in particular the mechanisms that produce or influence variation, adaptation and change. The trend towards more frequent intercourse between workers from traditionally separate disciplines in search of a better understanding of the causal explanations for observed biological phenomena has brought ecological and evolutionary studies into closer contact. The effect on the student or researcher is to open up a vast new literature with the inevitable plague of specialized terms which although relevant may be quite unfamiliar to the reader as they have their origins in other disciplines. Just such a situation exists in Natural History and provided the initial impetus for the compilation of an index of terms that led eventually to the preparation of this book. The ultimate choice of which terms to include and which to omit was our own, founded on personal research experience as well as on advice from colleagues at the British Museum (Natural History). There are few natural discontinuities in biology or biological

terminology so our decisions concerning peripheral material were necessarily subjective. Our aim throughout has been to provide short working definitions of those terms that come within the routine reading matter of ecologists, taxonomists and the like.

The language of taxonomy, or systematics, has been given thorough coverage because, despite its reputation as a specialized cul-de-sac, it is a subject that underpins many ecological and evolutionary studies. Indeed, many ecologists at first disinterested in taxonomic practice have found themselves reluctantly recruited into the discipline when confounded by the twin obstacles of identification and species recognition. The application of statistics to ecology has also been covered – with biology becoming an ever more rigorous science a basic understanding of statistics is a necessity.

Special attention has been given to principles, processes and classifications. We have deliberately omitted basic morphological and anatomical terms since these can be tracked down fairly easily in relevant descriptive textbooks and, more to the point perhaps, any such list of structural terminology would be so immense as to swamp the present text and expand the work into several volumes. Individual entries are brief, with the emphasis on a working definition rather than an encyclopaedic or discursive essay. We aim to provide an indication of modern usage and have not attempted to impose a rigid definition where one does not exist as this can often be quite misleading. Where terms have been employed in several subtly different ways by different authors we have opted for a definition closest to the original use or to the etymological derivation of the word. The latter usually enables a term to be understood even when read in a context not covered directly by our source material. Where substantial divergences in the use of

a term exist we have given separate definitions. We have no desire to stimulate the introduction of unnecessary new terms which although they may serve to classify or qualify particular events or assemblages can actually hinder efficient communication. As we have become increasingly aware the literature already carries a heavy burden of redundant words, synonyms, partial synonyms and cumbersome neologisms. Such terminological monstrosities as bathyplanktohyponeuston do little to facilitate communication.

The final section of the book is devoted to

21 Appendices in the form of maps, diagrams, tables and lists that have been used to summarize groups of associated terms or concepts.

We gratefully acknowledge the help of our colleagues in the Departments of Zoology, Botany, Entomology, Palaeontology and Central Services of the British Museum (Natural History). Without the benefit of their experience and expertise this work would be impoverished both in scope and interpretation.

September 1981

R.J.L., G.A.B., P.F.C.

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A

a. Abbreviation of the Latin *annum*, meaning year.

a- Prefix meaning without; **an-**.

a posteriori Used of a method of reasoning, commencing with effect or experience to establish cause or general rule; *cf.* *a priori*.

a posteriori weighting The method of attaching different importance values to taxonomic characters already established as providing acceptable classifications; *cf.* *a priori* weighting.

a priori Used of a method of reasoning, commencing with theory or cause to establish fact or effect; *cf.* *a posteriori*.

a priori weighting The method of attaching different importance values to taxonomic characters on the basis of preconceived criteria; *cf.* *a posteriori* weighting.

ab. Abbreviation of the Latin *aberratio*, meaning aberration; aberrant individual.

ab- Prefix meaning from, away from.

abbreviation 1: Shortening, curtailment. 2: The successive shortening of ontogeny through loss of developmental stages.

abduct To move away from the midline; **abduction**; *cf.* *adduct*.

aberrant 1: Not conforming to type. 2: An individual variant exhibiting atypical characters due usually to external environmental influences rather than to genetic factors; **aberration**.

abience Withdrawal or retraction from a stimulus; an avoidance reaction; **abient**; *cf.* *adience*.

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

abiogenesis Spontaneous generation; the concept that life can arise spontaneously from non-living matter by natural processes without the intervention of supernatural powers; archebiosis; archegensis; autogenesis; nomogenesis; xenogenesis; *cf.* *biogenesis*.

abioseston The non-living component of the total particulate matter suspended in water; tripton; *cf.* *seston*.

abiotic Devoid of life; non-living; *cf.* *biotic*.

abiotic environment The non-living component of an ecosystem; the physical and chemical factors of the environment; *cf.* *biotic environment*.

abiotic factors Physical, chemical and other non-living environmental factors; *cf.* *biotic factors*.

ablation 1: The surgical removal of body tissue or organs. 2: The removal of a surface layer, as of ice by melting or evaporation.

abnormal soil Azonal soil *q.v.*

aboospore A spore produced from an unfertilized female gamete; azygospore; parthenospore.

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

abort To arrest development; **abortion**, **abortive**.

abortive transduction Transduction *q.v.* in which the genetic material is not integrated or replicated but is otherwise functional.

abrasion The process of erosion by rubbing off or wearing away of surface material; attrition;

abrade, **abrasive**, **abrasiveness**.

abscissa The horizontal axis, or x-axis of a graph; *cf.* *ordinate*.

abscission The natural process by which two parts of an organism separate; **abscise**.

absenteeism The behaviour shown by animals which nest away from their progeny but visit them from time to time with food, providing minimal parental care.

absolute abundance The precise number of individuals of a taxon in a given area, volume, population or community; *cf.* *relative abundance*.

absolute affinity The relationship established only when the suite of characters exhibited by a specimen matches to a predetermined degree that of only one other taxon; *cf.* *relative affinity*.

absolute age The precise geological age of a fossil or rock, usually calculated by means of radiometric dating; absolute date; *cf.* *relative age*.

absolute character species A characteristic species *q.v.* that has a geographical distribution more or less coincident with that of the vegetation unit to which it belongs.

absolute chronology Absolute dating *q.v.*

absolute dating A method of geological dating employing isotope decay, that gives a direct measure of the amount of time that has elapsed since formation of the rocks; absolute chronology; radiometric dating; *cf.* *relative dating*.

absolute growth rate The actual increase in size of an individual or population per unit time under known or specified conditions; *cf.* *relative growth rate*.

absolute humidity The actual amount of water vapour present in a unit mass of air, expressed in grams per cubic metre; *cf.* *relative humidity*.

absolute pollen frequency An estimate of the actual amount of pollen deposited in a given area

per unit time; obtained by correcting the pollen content of a sediment for differences in the rate of sedimentation.

absolute ranking The assignment of formal rank to monophyletic groups, based on the criterion of age of origin rather than degree of divergence; *cf.* relative ranking.

absolute synonyms Homotypic synonyms *q.v.*

absolute tautonymy In nomenclature, the identical spelling of a generic name and epithet of one of the species or subspecies originally included in the genus; *cf.* virtual tautonymy.

absorption 1: The process by which one substance (the absorbate) is taken into and incorporated in another substance (the absorbent); **absorb**,

absorbency. 2: In ecological energetics, that part of consumption *q.v.* not voided as egesta *q.v.*

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

abundismus Incomplete melanism, produced by a relative increase in the number of black pigment spots within the non-black areas of the colour pattern.

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; hypobenthic; abysmal; **abyss**; see Appendix 7.

abyssal plain The more or less flat ocean floor below 4000 m, excluding ocean trenches, having a slope of less than 1 in 1000; see Appendix 7.

abyssobenthic Living on or in the ocean floor in the abyssal zone; abyssalbenthic; see Appendix 7.

abyssopelagic Living in the oceanic water column at depths between 4000 and 6000 m, away from the ocean floor; abyssal pelagic; see Appendix 7.

acarology The study of mites and ticks;

acarological.

acarophilous Thriving in association with mites; **acarophile**, **acarophily**.

acarophytism Symbiosis between plants and mites; acarophytium.

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.

acceleration 1: Increase in velocity. 2: Increase in the speed of ontogenetic development so that a character appears earlier in the ontogeny of a descendant than in that of the ancestor; *cf.* retardation.

acceleration, law of The theory that the sequence of development of organs and structures in ontogeny is directly related to their importance to the organism.

acceptance region In statistics, the region of sample space containing all outcomes for which the null hypothesis is accepted; *cf.* critical region.

accepted name A name adopted by an author as the correct name for a taxon.

accessibilité A phytosociological concept of the totality of conditions prevailing at a given site that may influence the possibility of a propagule reaching that site.

accessory chromosome Any chromosome differing from the normal A-chromosomes, including B-chromosome *q.v.*, m-chromosome *q.v.* and sex chromosome *q.v.*

accessory species A plant species with a moderate degree of fidelity *q.v.* in a given community or association.

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

accidental parasite A parasite found associated with an organism which is not its normal host.

acclimation Phenotypic adaptation to environmental fluctuations; the gradual and reversible adjustment of physiology or morphology as a result of changing environmental conditions; often used with reference to an individual organism in an artificial or experimentally manipulated environment; habituation; *cf.* acclimatization, accommodation.

acclimatization Phenotypic adaptation to environmental fluctuations; the gradual and reversible adjustment of physiology and morphology to changing natural environmental conditions; often used to refer to the changes observed in a species over a number of generations; *cf.* acclimation, accommodation.

acclivous Having a gentle upward slope.

accommodation 1: The capacity of a plant to adapt to changes in the environment. 2: A decrease in response or sensation as a result of repetitive stimulation; *cf.* acclimation, acclimatization.

acrescent Increasing in size with age; used of plants that continue to grow after flowering.

accretion 1: Increase in size by the external addition of new material. 2: Deposition of material by sedimentation.

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 a percentage.

accumulation, zone of The B-horizon of the soil profile, the upper subsoil horizon.

accumulator organism Any organism that actively concentrates a particular element or compound in its tissues.

accuracy In statistics, the degree to which a measured quantity approaches the true value of what is being measured; *cf.* precision.

-aceae The ending of a name of a family in botanical nomenclature.

acellular Not composed of cells; *cf.* cellular.

acentric Used of a chromosome or chromosome fragment lacking a centromere; *akinetic*; *cf.* centric.

achiasmate meiosis Meiosis *q.v.* occurring without the formation of chiasmata; in species in which crossing over is limited to one sex, the achiasmate meiosis generally occurs in the heterogametic sex *q.v.*

achromatic Without colour; unpigmented; **achromic**.

A-chromosome Any of the normal chromosomes of a eukaryotic organism.

achroous Without colour, unpigmented; **achromatic**.

aciculilignosa Evergreen and deciduous needle leaved forest vegetation.

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

acidic habitat A habitat of low pH, typically poor in nutrients.

acidobiontic Living in an acidic habitat.

acidophilic Thriving in an acidic environment; **acidophilous**; **aciduric**; **oxyphilous**; **acidophile**, **acidophily**; *cf.* **acidophobic**.

acidophobic Intolerant of acidic environments.

acidophobe, **acidophobia**; *cf.* **acidophilic**.

acidotrophic Feeding on acidic food or acidic substrates.

aciduric Acidophilic *q.v.*

acme A period of maximum vigour; the highest point attained in phylogenetic or ontogenetic development; *cf.* **epacme**, **paracme**.

acme-zone A biostratigraphic unit *q.v.* characterized by the abundance of particular fossil form or forms.

acmic Pertaining to the acme *q.v.*, or to periods of seasonal change in populations.

acoustics The study of sound; **acoustic**.

acquired characters, inheritance of 1: Lamarckism; that changes in use or disuse of an organ result in changes in size and functional capacity and that these modified characters are transmitted to the offspring. 2: Neo-Lamarckism; that

characters acquired by organisms as a response to environmental factors are assimilated into the genome and transmitted to the offspring.

acquired trait A character or trait which is a result of direct environmental influences; **acquired character**.

acre A secondary fps unit of area equal to 4840 square yards or 4.046×10^3 square metres; see Appendix 13.

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.

acidophagous Feeding on grasshoppers;

acidophage, **acidophagy**.

acrobryous Growing at the apex only.

acrocentric Used of a chromosome having the centromere located at one end; *cf.* **metacentric**.

acrodendrophilous Thriving in tree top habitats,

acrodendrophile, **acrodendrophily**.

acrophytia Plant communities of alpine regions; **acrophyta**.

acropoleustophyte A large aquatic plant floating freely at the water surface.

acrotropism An orientation response resulting in the continued growth of a plant in the direction in which growth originally commenced;

acrotropic.

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

actinobiology The study of the effects of radiation on living organisms; **actinology**.

action system A behaviour pattern in an organism.

actium A rocky shore community.

active chamaephyte A chamaephyte *q.v.* subtype in which the horizontal vegetative shoots persist through unfavourable seasons in a procumbent position.

active immunity Resistance to disease effected by the production of antibodies by an organism in response to antigens derived from a pathogen or disease organism.

active process Any process requiring the expenditure of metabolic energy; *cf.* **passive process**.

active space The space within which a pheromone *q.v.* is above threshold concentration.

active uptake The absorption of ions by processes requiring the expenditure of metabolic energy; *cf.* **passive uptake**.

actophilous Thriving on rocky seashores;

actophile, **actophily**.

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; *cf.* catastrophism.

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.

actuopalaeontology Palaeontology based on the philosophy of actualism.

acute Severe, often lethal; of short duration; undergoing rapid development; *cf.* chronic.

acyclic parthenogenesis Reproduction by parthenogenesis *q.v.* alone, in which the sexual phase of an alternation of generations cycle has been lost; anholocyclic parthenogenesis; *cf.* parthenogenesis.

ad- Prefix meaning to, on the side of.

ad int. Abbreviation of the Latin *ad interim*, meaning for the present, provisionally.

Adansonian taxonomy An early method of classification advocating the grouping of organisms on the basis of many equally-weighted attributes, a principle adopted in modern numerical taxonomy to avoid the subjectivity of classical taxonomic methodology; Adansonism.

adaptability The potential for adaptation *q.v.*; adaptable.

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, developmental or behavioural character that enhances survival and reproductive success of an organism; **adaptation**; **adaptive**.

adaptedness The extent of adaptation to environment.

adaptogenesis The production of new adaptations.

adaption Adaptation *q.v.*

adaptive capacity The genetically determined physiological tolerance of an organism.

adaptive gap Nonadaptive zone *q.v.*

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 norm The more or less stable complex of genetic diversity within a well adapted population.

adaptive peak A peak on an adaptive landscape *q.v.*

adaptive radiation The evolutionary diversification of a taxon (adaptive type) into a number of different ecological roles or modes of life (adaptive zones), usually over a relatively short period of time and leading to the appearance of a variety of new forms.

adaptive selection Selection producing phenotypic similarity as a result of adaptation to environment.

adaptive strategy The sum total of the adaptations to environment of a species.

adaptive valley A valley in an adaptive landscape *q.v.*

adaptive value The comparative fitness *q.v.* of different genotypes in a given environment; the survival and reproductive value of one genotype relative to the other genotypes in the population.

adaptive zone A concept in evolutionary biology of the ecological pathways along which taxa evolve; the way of life and organizational level of a higher taxonomic group; at the species level, essentially similar to the fundamental niche *q.v.*; *cf.* nonadaptive zone, transitional adaptive zone.

additive factor Any of a group of non-allelic genes affecting the same phenotypic character, each enhancing the expression of the other in the phenotype.

additive hypothesis That there is a value corresponding to each link on any phylogenetic tree, and that the observed distance between each pair of contemporary taxonomic categories is equal to the sum of the values for the links connecting the pair of taxonomic categories.

adduct To move towards the midline; **adduction**; *cf.* abduct.

adeciduate Not falling off, or coming away.

adelfotype A topotype *q.v.* collected in the original collection of a species but not part of the original type series; isocotype.

adelphogamy Fertilization between two different individuals derived vegetatively from the same parent plant; sib mating; sib pollination.

adelphoparasite An organism parasitic on a closely related host organism; *cf.* alloparasite.

adelphophagy The fusion of two gametes of the same sex; **adelphophagia**.

adelphotaxy The mutual attraction between spores after extrusion.

adenotrophic viviparity A type of viviparity *q.v.* in some insects in which the larva is retained within the uterus until ready to pupate.

adhesion 1: Firm attachment. 2: The attraction of molecules in the walls of the interstices of a sediment, for water molecules.

adiabatic Pertaining to a thermodynamic process

in which heat is neither lost nor gained; *cf.* non-adiabatic.

adichogamy Simultaneous maturation of male and female reproductive organs of a flower or hermaphroditic organism; homogamy; **adichogamous**; *cf.* dichogamy.

adience Movement towards a stimulus; an approaching reaction; *cf.* abience.

adjacently sympatric Parapatric *q.v.*; 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.

adjustment Acclimation *q.v.*; the functional response of an organism to stimuli.

admissible In taxonomy, the form of a name which can be validly published and the use of a name or epithet in accordance with the provisions of the Code *q.v.*

adnate Closely applied to; growing on; attached along the entire length.

adsere That stage of an ecological succession that precedes its transformation into the subclimax *q.v.*

adsorption The adhesion of molecules as an ultra-thin layer on the surface of solids or fluids; **adsorb.**

adspersed Widely distributed; scattered.

adtidal Living immediately below low tide level.

adulation The appearance, by acceleration *q.v.*, of adult ancestral characters in the larval stages of descendants; *cf.* recapitulation.

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

advena (*adv.*) Latin, meaning alien, introduced.

adventitious Accidental; occurring at an unusual site; secondary; extraordinary.

adventitious embryony The production of an embryonic sporophyte by mitotic divisions from tissues of another sporophyte without an intervening gametophyte generation; seed production without a sexual process.

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

adynamandrous 1: Having non-functioning male reproductive organs; **adynamandry**; *cf.* adynamogynous. 2: Incapable of self-fertilization.

adynamogynous Having non-functioning female reproductive organs; apogynous; **adynamogyny**; *cf.* adynamandrous.

aedeotype The original specimen of a species to have its genitalia examined; also the actual slide preparation of the genitalia.

aegricorpus The single manifestation of the

specific genetic interactions in and between a host and pathogen.

aeoliation Erosion of a land surface by wind-blown sand and dust; **aeoliation**.

aeolian Pertaining to the action or effect of the wind; **eoian**.

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

aeon An indefinitely long period of time; **eon**.

aer- Prefix meaning air, atmosphere.

aerial Occurring in the air; airborne.

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**; *cf.* anaerobic. 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**.

aerogenic Gas producing; **aerogenesis**; *cf.* anaerogenic.

aerohygrophilous Thriving in high atmospheric humidity; **aerohygrophile**, **aerohygrophily**; *cf.* aerohygrophobous.

aerohygrophobous Intolerant of high atmospheric humidity; **aerohygrophobe**, **aerohygrophoby**; *cf.* aerohygrophilous.

aeromorphosis A structural change resulting from exposure to air or wind; **aeromorphic**.

aerophilous 1: Pollinated by wind; fertilized by airborne pollen. 2: Thriving in exposed windy habitats; **aerophile**, **aerophily**. 3: Disseminated by wind; aerochorous.

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

aerophytobiota The aerobic soil flora; **aerophytobiont**; *cf.* anaerophytobiota.

aeroplankton Those organisms freely suspended in the air and dispersed by wind; aerial plankton.

aeroscepsy The perception of airborne sound or chemical stimuli.

aerotaxis The directed movement of a motile organism towards (positive) or away from (negative) an air-liquid interface, or a concentration gradient of dissolved oxygen; **aerotactic**.

aerotolerant Used of anaerobic organisms having the capacity to grow to a limited extent under aerobic conditions.

aerotropism An orientation response to a gaseous stimulus; **aerotropic**.

aestatifruticeta A deciduous bush community; a subgroup of aestilignosa *q.v.*

aestatisilvae A deciduous woodland community; a subgroup of aestilignosa *q.v.*

aesthesia Sensibility; **aesthesia**; *cf.* anaesthesia.

aestidurilignosa A mixed evergreen deciduous hardwood forest community.

aestilignosa Broad leaved deciduous bush (aestatifruticeta) and woodland (aestatisilvae) vegetation of temperate regions that experiences alternating periods of mild, damp and cold, dry climate.

aestival Pertaining to the early summer season; *cf.* hibernal, vernal.

aestivation 1: Passing the 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.

aethogametism Asynethogametism *q.v.*

aetiologic agent Causal agent *q.v.*

aetiology 1: The branch of science dealing with the study of origins or causes. 2: The demonstrated cause of a disease or trait; causation; **etiology**; **aetiological**.

AFDW Abbreviation of ash-free dry weight.

affinis (aff.) Latin, meaning akin to, having an affinity but not identical.

affinity 1: The degree of relationship or causal connection; *cf.* absolute affinity, relative affinity. 2: Preference.

affinity index A measure of the similarity in species composition between communities *A* and *B*; calculated as $A = c/(a \times b)^{1/2}$, where *a* and *b* are the numbers of species occurring only in communities *A* and *B* respectively and *c* is the number of species common to both.

affix A sequence of letters forming part of a derived compound word.

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

African subkingdom A subdivision of the Palaeotropical kingdom; see Appendix 4.

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

Aftonian interglacial An interglacial period of the Quaternary Ice Age in North America; see Appendix 2.

agad A beach plant.

agamandroecious Used of a plant having male and neuter flowers in the same inflorescence; *cf.* agamogynoecious, agamohermaphrodite.

ageameon A species comprising only non-sexually

reproducing individuals; agamospecies; binom.

agamete A mature reproductive cell which does not fuse with another to form a zygote; a non-copulating germ cell; *cf.* gamete.

agamic Without gametes; used of complexes of organisms in which all individuals reproduce asexually.

agamobium The asexual phase in an alternation of generations; *cf.* gamobium.

agamodeme A local interbreeding population of predominantly asexually reproducing (apomictic) individuals; *cf.* deme.

agamogenesis Asexual reproduction; agamogony.

agamogony Asexual reproduction by development of a new individual from a single cell, following binary or multiple fission, or budding.

agamogynoecious Used of a plant having female and neuter flowers in the same inflorescence; *cf.* agamandroecious, agamohermaphrodite.

agamohermaphrodite Used of a plant having hermaphrodite and neuter flowers in the same inflorescence; *cf.* agamandroecious, agamogynoecious.

agamont The asexual individual or generation producing agametes *q.v.*

agamospecies A species or population comprising only asexually reproducing (apomictic) individuals; ageameon.

agamospermy Apomixis *q.v.* in which embryos and seeds are formed asexually, but not including vegetative reproduction;

agamospermous.

agamotropic Used of flowers that do not close again once they have opened; *cf.* gamotropic, hemigamotropic.

agaricolous Living on mushrooms and toadstools; **agaricole**.

age 1: To become old; to attain maturity. 2: The period of time a group or organism has existed. 3: The length of geological time since the formation of a rock either by solidification from a molten state (igneous) or by sedimentation (sedimentary). 4: A period of geological history characterized by a dominant life form, such as the age of fishes. 5: The position of an event or organism in the geological time scale. 6: A geological time unit shorter than an epoch.

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

age class A category comprising individuals of a given age within a population; cohort.

age distribution The number or percentage of individuals in each age class of a population; age composition; age structure.

age of amphibians That period of the Earth's

history dominated by amphibians; the Carboniferous and Permian periods.

age of cycads That period of the Earth's history dominated by cycads; the Jurassic period.

age of fishes That period of the Earth's history dominated by fishes; the Silurian and Devonian periods.

age of gymnosperms That period of the Earth's history dominated by gymnosperms; the Mesozoic era.

age of mammals That period of the Earth's history dominated by mammals; the Cenozoic era.

age of man That period of the Earth's history dominated by man; the Quaternary period.

age of marine invertebrates That period of the Earth's history dominated by marine invertebrates; the Ordovician and Cambrian periods.

age of reptiles That period of the Earth's history dominated by reptiles; the Mesozoic era.

age polyethism The adoption of different labour roles by members of a colony of social insects according to age; temporal polyethism; *cf.* caste polyethism.

age specific death rate The death rate for a given cohort or age class of a population; calculated as the number dying in age class x divided by the number that attain age class x .

age specific fecundity rate The average number of eggs or young produced per unit time by an individual of specified age.

age specific survival rate The number or percentage of individuals surviving to a specified age from an initial cohort of individuals.

age structure The number or percentage of individuals in each age class of a population; age distribution; age composition.

ageing The process of irreversible decline of bodily function and adaptability with time or increasing age; the increasing force of mortality with time.

ageotropism 1: Apogeotropism *q.v.* 2: The absence of orientation movements in response to gravity; **ageotropic**.

agg. Abbreviation of **aggregate**; used to denote a group of species or hybrids which are morphologically similar and difficult to distinguish from one another; species aggregate.

agglomerative Used of a method of constructing hierarchies by the successive linking together of smaller units into larger, higher ranking units; agglomerative classification; *cf.* divisive.

agglutinate To clump together; often used with reference to blood cells, pollen grains or bacteria; **agglutination**.

aggradation The natural building up of a surface

or filling up of a channel by sediment deposition; **aggrade**.

aggregate 1: Species aggregate *q.v.* 2: Aggregation *q.v.*

aggregated distribution Contagious distribution *q.v.*

aggregation A society or group of conspecific organisms which have a social structure and consist of repeated members or modular units but with a low level of coordination, integration or genotypic relatedness.

aggression A hostile act or threat made to protect territory, the family group or offspring, or to establish dominance.

aggressive mimicry Mimicry *q.v.* in which a predator mimics a non-predatory model in order to deceive the operator, its prey; Peckhamian mimicry.

agium A beach community; aigialium.

amatoploidy An increase in chromosome number due to fragmentation of holocentric chromosomes.

Agnotozoic Proterozoic *q.v.*

agonistic behaviour Social interaction between members of a species, involving aggression or threat and conciliation or retreat; **agonist**.

agonistic buffering The use of infants by adults to inhibit the aggressive behaviour of other adults.

agrod A cultivated plant.

agrarian Pertaining to cultivation or cultivated plants.

agrestal Growing on arable land.

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

agriotype The wild type; ancestral type.

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.

agroecotype An edaphic ecotype adapted to cultivated soils.

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

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

agrophilous Thriving in cultivated soils; **agrophile**, **agrophily**.

agrostology The study of grasses; graminology.

agrotype An agricultural variety or race.

Agulhas current A warm surface ocean current that flows south off the coast of South Africa, derived in part as an extension of the Mozambique current and Indian South Equatorial current; see Appendix 6.

aheliotropism Apheliotropism *q.v.*

ahermatypic 1: Pertaining to a non-colonial assemblage, or to an individual organism. 2: Used of a coral that lacks symbiotic algae; **ahermatypic**.

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; see Appendix 12.

aigialium A beach community; agium.

aigialophilus Thriving in beach habitats; **aigialophile**, **aigialophily**.

aigialophyte A beach plant.

aigicolous Living in beach habitats; **aigicole**.

aiphyllophilus Thriving in evergreen woodland; **aiphyllophile**, **aiphyllophily**.

aiphyllus Evergreen; **aiophyllus**.

air capacity That volume of air remaining in a soil after saturation with water; air content.

air plant Aerophyte *q.v.*

air porosity The ratio of the volume of air in a given mass of soil to its total volume.

aithallium An evergreen thicket community.

aithalophilus Thriving in evergreen thickets; **aithalophile**, **aithalophily**.

aithalophyte A plant occurring in evergreen thickets.

aitiogenic Used of a movement or reaction induced by an external stimulus; paratonic; aitionomic; aitionomous; **aitiogenous**.

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

aitiotropism Any tropism resulting from an exogenous stimulus; **aitiotropic**.

akaryotic Lacking a discrete nucleus; non-nucleated; acaryotic; **akaryote**; *cf.* eukaryotic, prokaryotic.

akinesis Absence or cessation of movement.

akinetetic Acentric *q.v.*

akineton Non-motile planktonic organisms or propagules.

aktological Pertaining to shallow inshore environments and communities.

aktology The study of shallow inshore ecosystems.

al. Abbreviation of the Latin *alii*, meaning others.

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.

Alaska current Aleutian current *q.v.*; see Appendix 6.

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.

albinism The absence or deficiency of pigmentation in animals; partial albinism in plants is termed variegation.

-ales The ending of a name of an order in botanical nomenclature.

aletophilous Thriving on roadside verges and beside railway tracks; **aletophile**, **aletophily**.

aletophyte A plant growing in a mesic habitat or on roadside verges.

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; see Appendix 6.

algal bloom An explosive increase in the density of phytoplankton within an area; bloom.

algal line The highest continuous line on the shore along which any particular algal species occurs; *cf.* tang line.

algal wash Shoreline drift, comprising mainly filamentous algae.

algeny Genetic engineering; the experimental manipulation of the genetic composition of an organism or cell.

algiculous Living on algae; **algicole**.

algology The study of algae; phycology; **algological**.

Algonkian Proterozoic *q.v.*

algophagous Feeding on algae; **algophage**, **algophagy**.

Algophytic Archaeophytic *q.v.*

algorithm A finite series of logical steps or instructions by which a particular type of numerical or algebraic problem can be solved; *cf.* branch swapping algorithm, Fitch algorithm.

alien Non-native; a species occurring in an area to which it is not native.

alien addition, **monosomic** A genotype comprising the characteristic complement of chromosomes plus a single chromosome from another species.

alienation, **coefficient of** A measure of the information loss during transcription of data from a matrix to a dendrogram.

alii (*al.*) Latin, meaning others.

alimentation 1: Feeding, taking-in nourishment, 2: Those processes, including precipitation, sublimation and refreezing, that serve to increase the mass of a glacier or snowfield.

aliquot An integral portion of a whole; an integral sample.

alkaline Pertaining to habitats or substances having a pH greater than 7; basic; *cf.* acidic.

alkalinity 1: The properties of an alkali. 2: A measure of the pH of sea water, calculated as the number of milliequivalents of hydrogen ion that is neutralized by one litre of sea water at 20° C.

alkaliphilic Thriving in alkaline habitats;

alkalophilic, alkaliphile, alkaliphily, alkalophile, alkalophily; *cf.* alkaliphobic.

alkaliphobic Intolerant of alkaline habitats or conditions; **alkaliphobe, alkaliphoby;** *cf.* alkaliphilic.

alkaloduric Extremely tolerant of high pH (alkaline) conditions.

alkaloid A nitrogenous organic compound, produced especially by flowering plants; many alkaloids have a pronounced physiological activity in animals, such as nicotine, caffeine, morphine.

allaesthetic Used of characters effective only when perceived by another organism; **allesthetic.**

allautogamy Autoallogamy *q.v.*

Allee's principle That the density of a population varies according to the spatial distribution of the individuals (degree of aggregation) and that both overcrowding and undercrowding may be suboptimal; Allee's law.

Alleghany subregion A subdivision of the Nearctic region; Eastern subregion; see Appendix 3.

allelarkean society An independent, dense, non-nomadic and civilized human society; *cf.* autarkean society.

allele Any of the different forms of a gene occupying the same locus *q.v.* on homologous chromosomes, and which undergo meiotic pairing *q.v.* and can mutate one to another; allelomorph; allelomorphic series; **allelic, allelism.**

allele frequency Gene frequency *q.v.*

allelo- Prefix meaning one another.

allelochemic A secondary substance produced by an organism that has the effect of modifying the growth, behaviour or population dynamics of other species, often having an inhibitory or regulatory effect (allelopathic substance); **allelochemical.**

allelogenic Producing offspring in broods that are entirely of one sex; **allelogenous, allelogeny;** *cf.* amphogenic, arrhenogenic, monogenic, thelygenic.

allelomimetic behaviour Imitative behaviour exhibited by two or more animals as a result of mutual stimulation.

allelomorph Allele *q.v.*

allelopathic substance An allelochemic; a waste

product, excretory product or metabolite having an inhibitory or regulatory effect on other organisms.

allelopathy Biogenic toxicity; the chemical inhibition of one organism by another; antibiosis.

Allen's law The generalization that the extremities (ears and tails for example) of mammals tend to be relatively shorter in colder climates than in warmer ones; proportion rule; Allen's rule.

alliance A ranked category in the classification of vegetation, comprising one or more closely related associations *q.v.*, equivalent in rank to a federation; the first word of an alliance name has the ending *-ion*.

allogenesis Alloigenesis *q.v.*

allo- Prefix meaning other.

allobiosphere That part of the eubiosphere *q.v.* in which heterotrophic organisms occur but into which organic food material must be transported as primary production does not take place; subdivided into hyperallobiosphere and hypoallobiosphere; *cf.* autobiosphere.

allocheiral Having reversed symmetry.

allochemic Any secondary compound produced by plants as part of their defence mechanism against herbivores; acting either as a toxin or digestibility reducer.

allochoric Occurring in two or more communities within a given geographical region; **allochorous, allochore.**

allochroic 1: Exhibiting colour variation. 2: Having the ability to change colour.

allochronic Not contemporary; existing at different times; used of populations or species living, growing or reproducing during different seasons of the year; *cf.* synchronic.

allochronic speciation 1: Speciation without geographical separation through the acquisition of different breeding seasons or patterns. 2: Speciation occurring by the sequential replacement of species through time.

allochronic species Species not occurring in the same time horizon.

allochthonous Exogenous; originating outside and transported into a given system or area; non-native; xenogenous; ectogenous; **allochthone, allochthony;** *cf.* autochthonous.

allochtone 1: Exogenous food material transported into a cave from outside. 2: A non-native organism; *cf.* autochtone.

allocryptic Used of organisms that conceal themselves under a covering of other material, living or non-living.

allodiploid A hybrid diploid in which one or more chromosome pairs are derived from different species.

allogamy Cross fertilization; **allogamous**.
allogene A recessive allele; *cf.* protogene.
allogenic plankton Planktonic organisms transported into an area by movement of the medium, but normally living and reproducing elsewhere; expatriated plankton.
allogenic 1: Used of factors acting from outside the system, or of material transported into an area from outside; allochthonous. 2: Having different sets of genes; **allogeneic**, **allogeneous**, **allogenic**; **allogeneous**; *cf.* syngenetic.
allogenic succession The replacement of one community by another as a result of extrinsic changes in the environment; *cf.* autogenic succession.
allogeneous detritus Detritus carried into an area from outside.
allograft A tissue transplant from one individual to another of the same species; homoplastic graft.
allogrooming Grooming by one individual of another; *cf.* self-grooming.
alloheteroploid An aneuploid *q.v.* hybrid derived from two different species; *cf.* autoheteroploid.
allohomoeotype A homoeotype of the same sex as the allotype *q.v.* or the allolectotype *q.v.*; allohomoiotype.
allohospitalic Used of two or more parasite species occurring on different host species only; *cf.* synhospitalic.
alloiogenesis Alternation of generations; an alternation between sexual and asexual phases in a life cycle; **alliogenesis**.
alloiometron A measurable change of proportion or intensity of development within a species or race.
allokinesis Passive or involuntary movement; drifting; planktonic transport; **allokinetic**.
allolectotype A type specimen of opposite sex to the lectotype and chosen from the type series subsequent to the original description; lectallotype.
allomaternal A female alloparent *q.v.*
allometric coefficient The ratio of relative growth rates.
allometric growth Differential growth of body parts (*x* and *y*), expressed by the equation $y = bx^a$, where *a* and *b* are fitted constants; change of shape or proportion with increase in size; heterauxesis, heterogony; **allometry**; *cf.* isometric growth.
allometric variability Variation in body proportions exhibited by individuals of different size in species which undergo allometric growth.
allometry Allometric growth *q.v.*
allomixis Cross fertilization; **allomictic**.

allomone A chemical substance produced and released by one species in order to communicate with another species; *cf.* pheromone.
allomorphosis 1: The condition of having individual, racial, specific or phylogenetic heterogeneity in allometric growth rates. 2: Evolution characterized by a rapid increase in structural specialization; evolutionary allometry; idio-adaptation; *cf.* aromorphosis.
alloparalectotype A paralectotype *q.v.* of opposite sex to the lectotype; *cf.* holoparalectotype.
allo-parapatric speciation Speciation in which initial segregation and differentiation of the diverging populations takes place in disjunction but complete reproductive isolation is attained after range adjustment so that the populations become separate but contiguous.
alloparasite An organism parasitic on an unrelated host organism; *cf.* adelphoparasite.
alloparatype A paratype *q.v.* of the same sex as the allotype; parallotype; *cf.* holoparatype.
alloparent An individual that assists a parent in the care of its young, either male (allopaternal) or female (allomaternal).
allopaternal A male alloparent *q.v.*
allopatric Used of populations, species or taxa occupying different and disjunct geographical areas; **allopatry** *cf.* dichopatric, parapatric, sympatric.
allopatric introgression The production of a new genotype by introgression *q.v.* which exists then in separate populations from the original genotype.
allopatric speciation The differentiation of, and attainment of complete reproductive isolation of, populations that are completely geographically separated.
allopatry Spatial separation; disjunction; **allopatric**.
allopelagic Used of organisms occurring at any depth in the pelagic zone; *cf.* autopelagic.
allophene An abnormal phenotype, usually of a particular tissue, not produced by mutation, which will develop a normal phenotype if transplanted to a wild-type host; *cf.* autophene.
allophilous Pollinated by non-adapted agencies; used of a plant that lacks morphological adaptations for attracting and guiding pollinators; **allophily**; *cf.* euphilous.
alloplesiotype A plesiotype *q.v.* of the same sex as the allotype; *cf.* holoplesiotype.
alloploideon A species derived by allopolyploidy *q.v.*
alloploidy Allopolyploidy *q.v.*; **alloplloid**.
allopolyploid A polyploid hybrid having