Glossary

These are brief explanations for some of the botanical terms used in this volume. For further explanations, the reader is advised to consult one of the many biological or botanical dictionaries now available, or one of the standard botanical text books.

Abaxial — The side of a leaf facing away from the stem or main axis. In most leaves, this is the lower surface.

Abscission — The controlled shedding of a leaf, branch, fructification or other organ.

Actinostele —Stele with star-shaped cross-section. Adaxial — The side of a leaf facing the stem or main axis. In most leaves, this is the upper surface.

Adventitious —A structure that arises in an unusual way. Usually applied to masses of small roots that never secondarily thicken.

Angiosperms —Flowering plants.

Annular thickenings —Rings of secondary thickening in walls of vessels and tracheids.

Annulus —A cluster, band or ring of thick-walled cells in the sporangial walls of many ferns. The annulus, in drying out, causes tension in the sporangial wall, which eventually ruptures at the stomium.

Antheridium —The male sex-organ which produces the motile male gametes.

Arborescent —Tree-like.

Archegonium —The female sex-organ which produces the egg cell.

Axil — The upper angle between a stem and a lateral branch or leaf. Structures growing out of that angle (tubercles, branches, sporangia etc.) are said to be axillary.

Bifurcate —Division into two branches.

Bipartite fronds —Fronds that have a dichotomy of the main rachis near the base, dividing the distal part of the frond in two halves. Occurs typically in a range of Palaeozoic pteridosperm fronds.

Bisporangiate —Bearing both megasporangia and microsporangia.

Bract —A leaf-like structure.

Bryophytes —Non-vascular land plants known as mosses, liverworts and hornworts.

Cambium —Meristematic tissue in stems and roots which gives rise to secondary growth.

Campylotropous —Description of seeds and ovules where the chalaza and lagenostome are close together.

Central plug —A parenchymatous structure within the lagenostome/salpinx of an ovule.

Centrarch —Description of a protostele in which the protoxylem is central.

Chalaza — Base of the nucellus where the integuments are attached.

Charcoal —Carbonized remains of plant tissue burnt at very high temperatures, in which some internal structure of the plant may be still preserved.

Circinate —A type of leaf development in which the young leaf is inrolled with its apex central. When the leaf starts to unroll, it forms a crozier, as seen in many living ferns.

Cortex — Zone of tissue outside the stele.

Cupule —Cup-shaped protective structure containing one or more seeds or ovules.

Cuticle —Outer protective 'skin' covering the aerial parts of most land plants.

Cydocytic —Stomata where the guard cells are surrounded by a ring of subsidiary cells.

Decorticated —A stem which has had the epidermis and all or part of the cortex removed prior to fossilization.

Dehiscence —Splitting. Here, generally used to refer to the splitting open of a sporangium to release the spores.

Dichotomous —A type of branching where an axis divides into two equal branches.

Disseminule —A part of the plant, such as a seed, that is released from the parent to achieve propagation.

Distichous —Leaves or branches arranged in two vertical rows on opposite sides of the stem. The leaves or branches may be alternate or as opposite pairs on the stem.

Dorsiventral —A flattened structure, such as a leaf, showing differences in structure between the upper and lower sides.

Dwarf shoot —A lateral branch, of limited growth, arising in a bract axil in the cones of early conifers.

Eligulate —Having no ligule.

Embryo sac —The megaspore in gymnosperms and angiosperms, containing the female gam-etophyte.

Endarch —Description of a vascular strand, in which the metaxylem develops to the outside of the protoxylem.

Endosporal gametophyte —A gametophyte that develops within the protective wall of the spore. The archegonia or antheridia are exposed by the opening of the spore wall.

Epidermis —Outermost cells of a plant, usually (but not always) in a single layer.

Exarch —Description of a vascular strand, in which the metaxylem develops to the inside of the protoxylem.

Exine — The protective outer layer of a spore or pollen grain.

Frond — A leaf, especially of ferns and some primitive gymnosperms.

Funicle —Stalk of an ovule.

Fusain —See Charcoal.

Gametangiophore —An upright, extension from the gametophyte, bearing archegonia or an-theridia.

Gametes —Sexual reproductive cells, equivalent to the eggs and sperm of animals.

Gametophyte —The sexual, gamete-forming phase (or generation) of the life-cycle of a plant.

Guard cells —Usually a pair of cells surrounding the pore of a stomata, that controls the size of the aperture and thus the movement of moisture and gases in and out of the plant.

Gymnosperms —Plants that reproduce by 'naked' seeds (i.e. seeds not enclosed in a carpel).

Heterospory —The production of two typesof spore by a plant — larger megaspores that each produce a female gametophyte, and smaller microspores that each produce a male gametophyte.

Holotype —When a taxon (species, genus, etc.) is first established, the holotype is the one fixed specimen of that taxon. It must always belong to that taxon, no matter what subsequent systematic revisions occur. If the holotype is unavailable, a replacement lectotype must be selected from the original collection. If the original collection is unavailable, then a neo-type must be selected from another collection.

Homospory —The production of only one type of spore by a plant.

Hydroid —An elongate water-conducting cell found in the stems of bryophytes. It is similar in function to the xylem of vascular plants.

Infrafoliar bladders —Spongy tissue connected to the parichnos in certain lycopsids, which is thought to be part of an aerating system.

Integuments —Protective structures enclosing the nucellus in ovules.

Intercellular flange —A cutinized ridge on the inner surface of the cuticle, marking the junction between adjacent epidermal cells.

Lagenostome —An apical projection of the nucel-lus that assisted fertilization in primitive ovules. When it is very prominent, it is sometimes known as a salpinx.

Leaf cushion —The swollen basal part of the leaf, especially in lycopsids. It usually remains attached to the stem after the leaf lamina has become detached.

Leaf scar —An abscission mark left on the stem or leaf cushion after a leaf has become detached.

Leaf trace —The vascular strand that enters the base of the leaf.

Lianescent —Vine-like.

Lignin —A complex polymer deposited in the walls of vessels, tracheids and fibres to increase their strength.

Ligule —A small flap of tissue on the upper surface of the leaf in some lycopsids.

Lumen — Central cavity of a cell.

Medulla — See Pith.

Megaphyll — A large, usually planated, leaf with veins that may be parallel, radiating or meshed.

Megasporangium — A spore case producing megaspores.

Megaspore — A spore that produces a female gametophyte.

Meristem — A zone of actively dividing cells, producing new growth.

Mesarch — A description of a vascular strand, in which the older, smaller xylem cells (prow-xylem) are in the middle of the strand.

Mesophyll — Internal photosynthetic tissue in leaves.

Metaxylem — Primary xylem formed after the protoxylem.

Microphyll — A small leaf with just a single, or in some cases a pair of veins running along its length.

Micropyle — A small pore remaining from the incomplete closure of the integuments in an ovule, through which a pollen grain or pollen tube has to pass to effect fertilization.

Microsporangium — A spore case producing microspores.

Microspore — A spore that produces a male gametophyte.

Monopodial — A style of branching where a main axis produces lateral, subsidiary branches.

Mycorrhiza — An association of fungi with the roots of a plant.

Neighbour cells — Cells surrounding the stomatal guard cells, which are morphologically indistinguishable from the other epidermal cells (contrast with subsidiary cells).

Nucellus — Tissue surrounding the embryo sac in an ovule. It is equivalent to a pteridophyte mega-sporangium.

Ontogeny — Growth and development through the life of an individual organism.

Ovule — A female reproductive structure in gymnosperms and angiosperms, which contains an embryo sac surrounded by the nucellus and integuments. It is known as a seed after fertilization.

Papilla — Small 'bump' on the plant surface.

Paracytic — Stomata where subsidiary cells lie with their long-axes parallel to the guard ceps.

Parenchyma — Tissue of thin-walled, unspecialized cells that often make up a large part of non-woody plants and plant-organs.

Parichnos — A zone of loosely arranged parenchyma that extended from the cortex to the leaf in many lycopsids, which is thought to have had an aerating function. Can often be recognized in leaf scars as a pair of small marks on either side of the vascular trace.

Pedicel — A short stalk to which a flower or synan-gium is attached. Also sometimes used for the short stalk at the base of a pinnule in some fronds.

Pericyde — The outermost cells of the stele, consisting mainly of parenchyma. In roots, the peri-cycle initiates lateral root formation.

Petiole — The stalk of a leaf.

Phloem — Conducting tissue responsible for the movement of sugars and other nutrients throughout a plant.

Photosynthesis — The process whereby green plants trap light in chlorophyll and use it to synthesize carbohydrates from carbon dioxide and water.

Phyllophore — A leaf-bearing organ.

Phyllotaxy — The pattern of arrangement of leaves on a stem.

Pinna — A subdivision of a compound leaf or frond. Pinnule — The ultimate division of a compound leaf or frond.

Pith — A zone of central parenchyma within the stele of a stem or root.

Platyspermic — Ovules and seeds with a flattened, bilateral symmetry.

Plinth — The apical part of the nucellus, below the salpinx.

Pollen — The microspores of angiosperms and certain groups of gymnosperm.

Pollen drop — Fluid exuded from the distal part of some gymnosperm ovules to capture pollen. **Polystele** — Vascular system consisting of more than one stele.

Pre-pollen — Pteridophyte-like microspores of some primitive gymnosperms.

Progymnosperm — An extinct group of plants thought to be ancestral to the true gymnosperms. They had gymnosperm-like woody stems and pteridophyte-like spores.

Propagule — Any part of a plant capable of growing into a new individual, e.g. seeds and spores.

Protostele — The simplest type of stele consisting of a solid strand of xylem, surrounded by a cylinder of phloem and pericycle.

Protoxylem — The older, first-formed xylem in a vascular strand. In cross-section, it can usually be recognized by the smaller diameter of the cells.

Pseudomonopodial — A variation on dichotomous branching, where one branch is more prominent than the other.

Pseudoparenchyma — Tissue found in some fungi and algae, consisting of an interwoven mass of fine tubes.

Pteridophytes — A generalized term used for vascular plants, including ferns, horsetails and club mosses, that reproduce by spores.

Pteridosperm — A heterogeneous group of, mainly Palaeozoic, gymnosperms with large dissected leaves which superficially resemble fern fronds.

Rachis — The supporting axis of a compound leaf or frond, to which the leaflets or pinnules are attached.

Radiospermic — Seeds and ovules that are radially symmetrical.

Rays — Radially arranged lines of parenchyma cells in vascular tissue.

Rhizome — A horizontal stem, usually underground, that facilitates vegetative propagation. **Rhizomorph** — Creeping 'stems' of certain algae and fungi.

Salpinx — A trumpet-shaped extension of the nucellus that aided pollen-capture.

Saprophyte — Plants and fungi that grow on the decaying remains of dead organisms.

Scalariform thickenings — Interlocking bands of secondary wall thickenings in vessels and tracheids, forming ladder-like' rows.

Sclerenchyma — Tissue with strengthened, usually lignified, cell walls.

Sclerotic — Thickened with lignin.

Secondary growth — The increase in girth of a plant by cell divisions in the cambium. Secondary wood in particular is an important means of increasing the girth of many plants, especially in gymnosperms and angiosperms.

Seed — A reproductive structure formed from a fertilized ovule.

Sessile — Unstalked.

Sexine — The outermost part of the protective coat of a spore.

Siphonostele — A stele consisting of a vascular cylinder with a central core or pith.

Sparganum — Cortex in which there are radiating bands of vertically-aligned fibrous cells.

Sporangiophore — A structure bearing one or more sporangia.

Sporangium — A spore case or capsule that produces spores.

Spore — A reproductive unit of one or more cells, produced by plants, protozoa and bacteria. **Sporophyll** — A modified leaf, usually in a strobilus, on which a sporangium is borne.

Sporophyte — The spore-producing, non-sexual phase (or generation) in the life-cycle of a plant.

Stele — Sometimes known as the vascular cylinder, consisting of xylem and phloem.

Sterome — Outer zone of thick-walled cells in the stems of some non-vascular plants (e.g. certain mosses), which assisted with support of the plant.

Stomata — Small pores with guard cells in the epidermis, which facilitate the movement of moisture and gases in and out of the plant (singular — stoma).

Stomium — An area of thin-walled cells on a sporangium wall, where rupture takes place.

Strobilus — A well-defined, terminal, spike of fertile appendages with sporangia.

Subsidiary cells — Cells surrounding the stomatal guard cells, which are morphologically distinct from the other epidermal cells.

Sympodium — A discrete, axial vascular bundle, from which leaf traces are emitted at intervals.

Synangium —A fused cluster of elongate sporangia.

Taphonomy — The study of the process of fossilization.

Terete — Smooth, cylindrical and tapering.

Thallus — A plant body that is not differentiated into leaves, stems, root, etc.

Tracheids — Discrete, elongated, water-conducting xylem cells, joined by pits and open ends.

Trichomes — Epidermal hairs, that may have a protective function. In some cases, a gland occurs at the trichome tip from which an exu-dant may be produced.

Trifurcate — The production of three branches at one place.

Trilete mark — A 'Y'-shaped mark on a spore, formed through the development of the spores in tetrahedrally symmetrical groups.

Tubercle — A wart-like projection.

Vascular plants — Plants with conducting tissue (xylem and phloem) in the roots, stems and usually the foliage.

Venation — The pattern of veins on a leaf or pin-nule.

Vernation — The way in which a young leaf or shoot is folded when in the bud.

Vessel — A series of open-ended cells, arranged end-to-end, to form an elongate tube, found in the xylem of many angiosperms, and in some ferns and gymnosperms.

Xylem — Woody conducting tissue responsible for the movement of water and solutes around a plant.

Zygote — The product of the sexual fusion of two gametes. In bryophytes and vascular plants, it forms the embryo from which develops the sporophyte.

References