



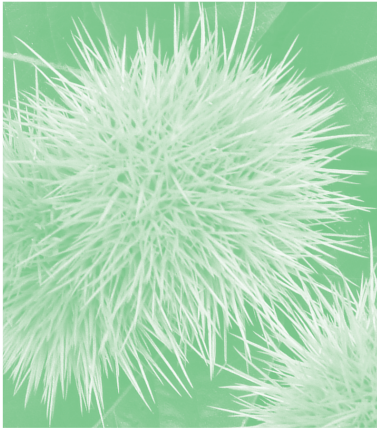
The Kew

Plant Glossary

an illustrated dictionary of plant terms

Henk Beentje

Illustrations by Juliet Williamson



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If language is incorrect, then what is said does not agree with what was meant; and if what is said does not agree with what was meant, what is to be done cannot be completed.

THE ANALECTS OF CONFUCIUS circa 400 BC

Kew

PLANTS PEOPLE
POSSIBILITIES

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INTRODUCTION

Every other author may aspire to praise; the lexicographer can only hope to escape reproach, and even this negative recompense has been yet granted to very few. I have, notwithstanding this discouragement, attempted yet another glossary of botanical terms.

These two sentences (with a slightly altered ending) have of course been lifted from the famous lexicographer¹ Samuel Johnson; just as this glossary has been compiled from other works, albeit with a personal touch.

Why write yet another glossary? Because the one I find myself using most of all is my favourite edition of the old Jackson glossary of botanical terms (Jackson, 1928); but that is now a little out of date, and does not have pictures. I also enjoyed compiling, with my colleague Martin Cheek, the glossary for the *Flora of Tropical East Africa* (FTEA) (Beentje & Cheek, 2003; 2377 terms). I thought that slim volume was beginning to resemble my vision of an updated Jackson. But by its terms of reference, it was parochial: it had vegetation terms and geomorphological terms particular to East Africa, and included only terms that had been used in that flora. I have now gone through many more floras, monographs, revisions, other glossaries, text books and so on. This current glossary is still based on that original FTEA glossary, but it has been updated from comments made by users of that FTEA glossary; and it has been expanded by terms I have gleaned from a host of botanical works, as well as by specialist terms for various groups contributed by colleagues. It now has 4144 terms; the definitions have been worded by Martin Cheek and me (for about 2000 terms in Beentje & Cheek, 2003) or by me, with the help of many colleagues and experts (for the additional 2100), but obviously based on the works listed in the bibliography. My goals have been clarity, ease of use and indicating where confusion may arise.

And so this glossary is what I would like to have on my desk when writing a flora or monographic work, and it is intended for people who work with plant descriptions, plant identification keys, floras, monographs, revisions and field guides. It does not include terms on habitat or vegetation types, geomorphology or soil science; it includes only a few terms relating to anatomy, palynology and nomenclature. For wider glossaries of such fields see, for instance: Cutler, Botha & Stevenson (2008) for anatomy, the Hoen website mentioned under 'websites used' for palynology, and McVaugh, Ross & Stafleu (1968) for nomenclatural terms.

The format is as follows:

The **main glossary** includes all descriptive terms used in floras, plant field guides, monographs and revisions, including vague or strange ones (but indicating them as such). It indicates which term is preferred in cases where there are several terms for one definition; of course, these are personal opinions, but I have tried to base them on general usage. I also feel that a plurality of meanings for a single term is not a good thing, because it leads to confusion. The series of articles by Rickett in the *Bulletin of the Torrey Botanical Club* illustrates this point admirably (Rickett 1954, 1955, 1956). Rickett cites the example of his discovering a paper by the German author B. M. Schulze who used definitions

¹ Johnson defined a lexicographer as "a writer of dictionaries; a harmless drudge that busies himself in tracing the original, and detailing the signification of words".

for terms such as elliptic, ovate and oblong completely differently from Rickett himself. “Which raises the interesting question: to what extent are (Americans) able to understand current descriptions in German or by Germans?”. And, of course, *vice versa*.

After the main glossary, I have included several treatments by **subject**, with full-page plates. The main text is complete in its own right, but these end pages combine terms within various categories, for ease of comparison and cross-reference. A much more thorough treatment of many more such morphological subject groups, beautifully illustrated, can be found in Bell (2008).

I have **omitted the following terms**:

- Terms that are both colloquial and very specific, such as acorn or rose-hip.
- Many of the very specialised terms for fruit types of Spjut (1994), many of the very specialised terms for hair types and attributes used by Payne (1978) and many of the terms used in Ellis *et al.* (2009).
- The Greek or Latin roots of words; for these, one may refer to Radcliffe-Smith (1998). I indicate when a word is Latin in special nomenclatural terms such as *nomen novum* or *auct.*, but not in Latinised terms such as archeonium.
- Terms that are not in current use and have not been used in the past, say, 50 years; there are many older terms that are no longer used but that appear in old publications. I would advise the reader to use the admirable Jackson (1928) to research these terms. When there are multiple meanings for a single term, though, I do include older ones, as these might otherwise lead to confusion.

It has been suggested to me that I should indicate which terms are ‘**recommended terms**’. That is not really for me to say! I have indicated which terms I think should not be used, because there are better and simpler terms for them (e.g. adenophorous, monoclinous), and I have omitted terms that I have found in other recent botanical dictionaries but that I thought were hardly ever used these days (e.g. machaerantheroid). The images, plus the block of image plates at the end of this glossary, come close to what I would call ‘recommended terms’ – but only a forum of botanists from many countries could draw up a list of properly agreed-on recommended terms. Some people hate ‘lanceolate’, because it can be ambiguous, others think it is a useful descriptive term; I have indicated and illustrated the different uses, and I indicate what is the current general use.

I would appreciate **feedback**, for use in possible future editions: additions, suggestions and even criticism; for the latter, I join Kiger and Porter (2001) in asking that you restrict yourself to “constructive criticism — that based on logical analysis, not merely uncritical dedication to parochial quirks or hoary tradition”. Though I do like to mention parochially quirky and hoary terms, to show terms that are used for more than one interpretation!

It should be noted that for many terms, a **precise definition** is not really possible. This sounds exceedingly tiresome, and it is. However, plant variation forms a continuum, and in many cases, all we can do with our terms is to indicate reference points on this continuum. Intermediate forms exist, and the difference between, for instance, puberulous, pubescent and tomentose, is a gradual rather than an absolute one. This goes for indumentum terms, for leaf shapes, for many concepts in this book. It is not all hopeless, however; there is a real difference between puberulous and tomentose, and the fact that intermediates between such terms exist should not stop us from *trying* to be accurate! I hope this publication will be useful in such endeavours.

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- <http://www.bio.uu.nl/~palaeo/glossary/glos-int.htm>** Peter Hoen's glossary of palynology on the University of Utrecht's website; encompasses many more terms than I have included here. This is based on the excellent Punt *et al.* (2007). Consulted July 2008.

kleptotype, (stolen) fragment of type [unofficial term]

km, abbreviation for kilometre

knee root, breathing root or pneumatophore, where the horizontal root forms a loop that emerges at low tide

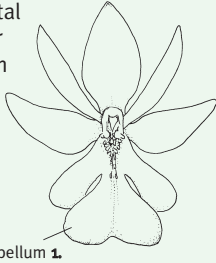


L

label, a piece of paper glued to a herbarium sheet, on which are written or printed details of the collector and place and date of collection, and a description of the dried plant in its original state; sometimes local names and uses are included

labelliform, lip-shaped

labellum, **1.** the lowest petal of an orchid, usually larger and different in shape from the two lateral petals; **2.** the larger of the three petaloid stamens in the flowers of Cannaceae



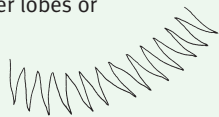
labiate, with lips, i.e. when a calyx or corolla is divided into two major parts, an upper and a lower

labium, **1.** the lip of a labiate corolla; **2.** (in *Isoetes*) a flap of tissue on the inner surface of the leaves above the sporangium, often covering the base of the ligule

lacerate, irregularly lobed at the margin, as if torn



lacinate, cut into slender lobes or drawn-out teeth



lacinula, tiny lobe

lacrymiform, tear-shaped, i.e. ovoid with a narrowing apex [obscure term]

lactiferous, latex-bearing; the preferred spelling is laticiferous

lacunate, **lacunose**, perforated with holes [unusual terms]

laesura, the arm of a fissure or scar of a spore

laevigate, (of a surface) smooth, as if polished

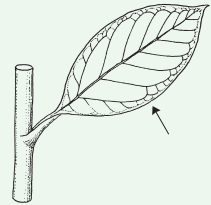
lageniform, bottle-shaped, urn-shaped

lamella (plural **lamellae**), thin plate, membrane

lamelliform, with thin plates stacked on top of or next to each other

lamellose, with thin plates stacked on top of or next to each other

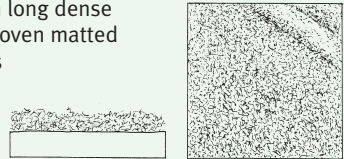
lamina, expanded part or blade of leaves or petals



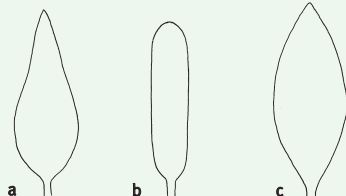
laminated, (in leaves) with an expanded blade (as opposed to with a grass-like leaf)

laminula, tiny blade

lanate, with long dense curly interwoven matted woolly hairs



lanceolate, narrowly ovate and tapering to a point at the apex. (This term has been interpreted in several ways; some 60 years ago German and Dutch authors used it to denote what we now call oblancheolate. In the illustration, **a** depicts the current interpretation, **b** Linnaeus' and **c** Lindley's)



lanose, woolly, with interwoven long woolly hairs;
= **lanate**, which is the more common term

lanuginose, woolly, with long and inter-woven hairs;
= **lanate**, which is the more common term

lanulose, minutely woolly

latent, resting, dormant, non-active

lateral, on or at the side or margin; for example, lateral leaflets, those flanking the central leaflet, or lateral sepals in Orchidaceae



laterally, on or at the side or margin

latex, milky juice, often sticky

laticiferous, latex-bearing

latiseptose, with broad partitions

latrorse, **1.** (of anthers) opening sideways or laterally, not inwards; **2.** (general) turned sideways, i.e. not towards or away from the axis

latrorsely, towards or along the sides

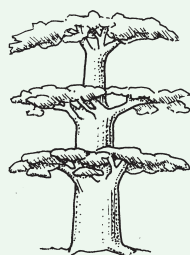
Laurasia, supercontinent combining northern continents, formed as a result of the breakup of Pangaea about 200 million years ago

lax, loose, open, distinct from each other.

OPPOSITE: **congested**

layer, **1.** ecological term denoting the horizontal divisions of a high vegetation structure (e.g. tree layer, shrub layer, field layer (herb layer), ground layer (mosses and liverwort layer)); **2.** also an anatomical term, but outside the scope of this glossary

layered, (of crown) with several parallel whorls or layers of branches

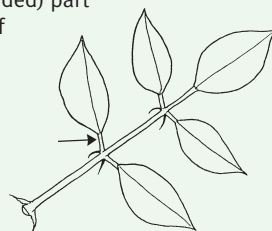


l.c., from the Latin *loco citato* meaning 'in the place mentioned'

leaf, chlorophyll-bearing lateral outgrowth from stem

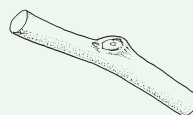
leafless, without leaves

leaflet, one (expanded) part of a compound leaf

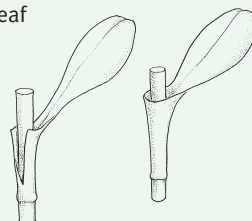


leaf litter, layer of dead leaves on the ground

leaf scar, mark on twig or branch where a leaf has fallen off



leaf sheath, part of leaf stalk that envelops the stem and runs concurrently with it for some distance



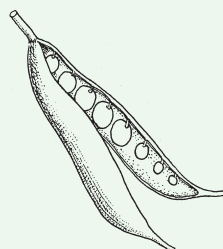
least concern, IUCN Red List term for plants that are in no particular danger of extinction; for precise definition, see IUCN definitions

lecto., **lectotype**, (in nomenclature) the type chosen by a later author when the protologue indicates no holotype; a lectotype must be chosen from among the specimens mentioned in the protologue

leg., from the Latin '*legit*', 'collected by' (to be followed by name of collector)

legitimate, (in nomenclature) name or epithet that is validly published and in accordance with the **I.C.B.N.**

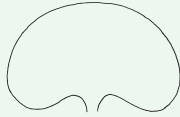
legume, **1.** the fruit pod of the Leguminosae/Fabaceae, derived from a single carpel, usually (though with many exceptions) opening along a suture into two halves, usually dry; **2.** colloquial term used by botanists for any member of the Leguminosae/Fabaceae



remote-ligular, germination type in which the shoot apex is carried out of the seed in the elongated ligule of the cotyledon (specialist term used in Palmae, see Dransfield, 1986)

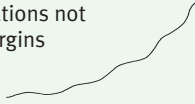
remote-tubular, germination type in which the shoot apex is carried out of the seed in the elongated sheath of the cotyledon (specialist term used in Palmae, see Dransfield, 1986)

reniform, kidney-shaped



reophyte, plant adapted to fast-flowing water; **rheophyte** is the preferred spelling

repand, when the margin is uneven or wavy, with shallow undulations not so deep as for sinuate margins



replicate, (of leaf bud) with the leaf margin is folded back in bud (as in *Galanthus*)

replum, **1.** a frame-like placenta from which the valves fall away in dehiscence (e.g. the persistent sutures of the **craspedium** in *Mimosa*); **2.** (in Cruciferae/Brassicaceae) partition between the locules of fruits

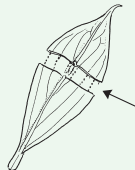


reproduction, increase; **1.** asexually, from one individual; **2.** sexually, from two individuals

reproductive, (of parts) concerned in reproduction, in sexual increase

resin, hardened exudate from wounded stem or leaves that is soluble in alcohol but not in water

resin thread, elastic, sticky threads apparent upon breaking a leaf or petiole and pulled between the broken parts

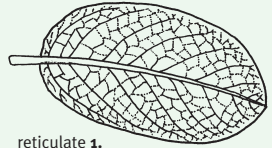


resinous, with the scent or consistency of resin

resupinate, (of flowers) upside down, or seemingly so

retained, (in nomenclature) name or epithet whose use is continued

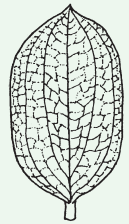
reticulate, **1.** net-veined, when the smallest veins of a leaf are inter-connected like the meshes of a net; **2.** (taxonomic relationship) complex and many-stranded; **3.** (in pollen) with a network of ridges and empty spaces in between



reticulate 1.

reticulation, network

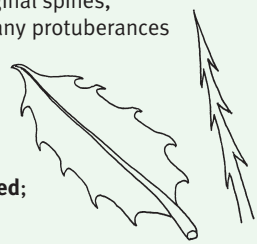
reticulodromous, (of venation) with a single main vein, the secondary veins running towards the margin, branching again and again and becoming minute, indistinct and net-veined near the margin; like **cladodromous**, but with the veins less distinct near the margin



reticulum, network of veins

retinacle, **retinaculum**, **1.** (in Apocynaceae) the zone by which the anthers adhere to the style head or stigma; **2.** (in Orchidaceae) the gland attached to the pollinia (more correctly called the viscidium); **3.** outgrowth of seed funicle which holds the seed to the fruit (as in Acanthaceae)

retorse, said of marginal spines, barbs, stem hairs or any protuberances that are bent abruptly backward or point towards the proximal part of the organ; = pointed downwards or **recurved**; OPPOSITE: **antrorse**



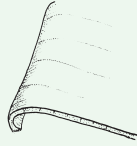
retrorsely, turned backward, turned downward

retuse, notched, with a rounded indentation (usually said of an apex); see also **emarginate**, with a sharp notch



revision, a taxonomic study of a group of taxa

revolute, rolled or curled over backwards, towards the abaxial surface. OPPOSITE: **involute**



rhachides, plural of rhachis; **rachides** is the preferred spelling

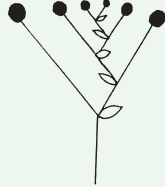
rhachilla, axis of grass spikelet; **rachilla** is the preferred spelling

rhachis, see **rachis**, which is the preferred spelling

rhaphe, ridge of tissue connecting the base of the nucellus with the placenta; **raphe** is the preferred spelling

rheophyte, plant adapted to fast-flowing water, usually with long slender leaves

rhipidium, sub-umbellate cluster, fan-shaped cyme, the lateral branches developing in one plane, alternately in opposite directions, with the main axis appearing zig-zag (mainly in Iridaceae)



rhizobium (plural **rhizobia**), soil bacterium that fixes nitrogen

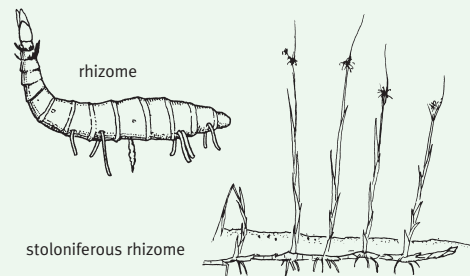
rhizocarpic, plant with roots that are perennial but stems or shoots that are annual [unusual term]

rhizogenic, producing roots [unusual term]

rhizoid, **1.** a hair (often branched) serving as a root; **2.** thread-like rootlets in pteridophytes; **3.** small root-like organs (e.g. coming from the base of the inflorescence in *Utricularia*)

rhizomatous, possessing an underground stem

rhizome, underground stem, distinguished from root by its nodes, buds or scale-like leaves

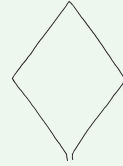


rhizophore, specialised part of the stem bearing rhizoids (as in *Selaginella*)

rhizosphere, the rootball, the root system with its immediate surrounding substrate

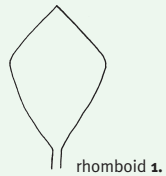
rhizotaxy, the arrangement of roots on a plant [unusual term]

rhombic, (of plane shapes) in the shape of an equilateral parallelogram (generally excluding the square), lozenge-shaped



rhomboid, **rhomboidiform**,

1. (of leaf shape) rhombic-like, nearly square with the petiole near one of the acute angles; **2.** (of 3-dimensional shape) 4-angular, with the angles obtuse



rhytidome, layer of dead bark external to the living bark (which is called **periderm**)

ridged, with a ridge or elevated line

rigid, stiff

rim, margin, edge

rimose, (of bark) full of cracks, crevices or fissures

rind, outer layer, implying a thick and tough layer

ringent, (in a 2-lipped corolla) with the lips gaping and widely separate [unusual term]

riparian, of river banks or lake shores

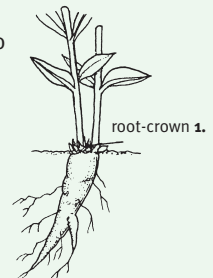
ripe, mature, complete for its function

rivulose, marked with narrow, wavy, irregular lines

robust, strong, thick, vigorous

root boss, (in palms) swelling at the base of stem from which the roots arise

root-crown, **1.** the place where the root changes into the stem at ground level; **2.** sometimes the hairy or bracteate apical part of the perennial rootstock where the annual shoots are burned or grazed off



GROUPED TERMS

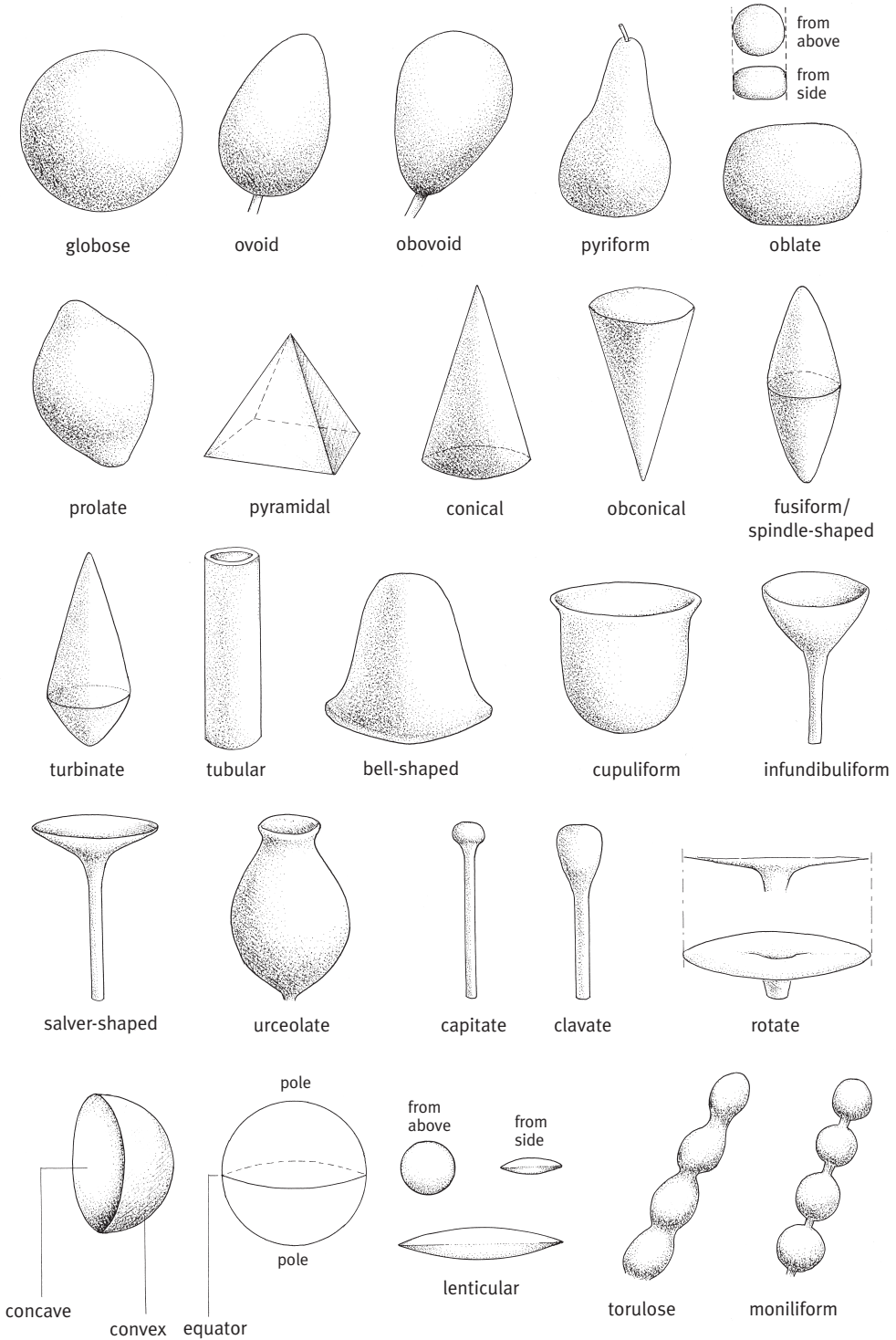
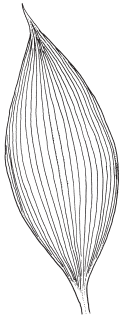
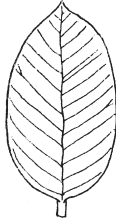


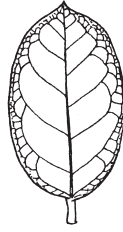
Plate 1. Three-dimensional shapes



parallel-veined



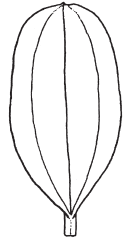
pinnately veined/
penninerved



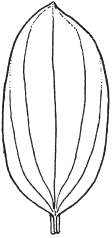
anastomosing



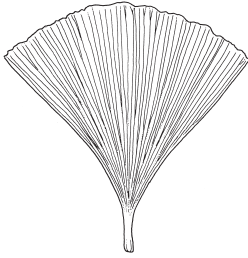
anastomosing
and reticulate



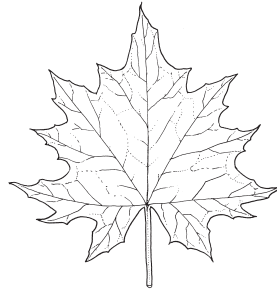
3-veined
from base



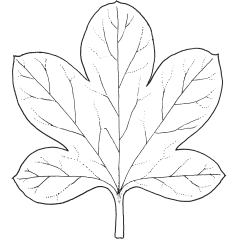
palmately veined



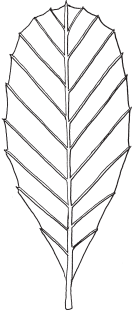
flabellate



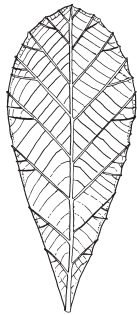
pedate



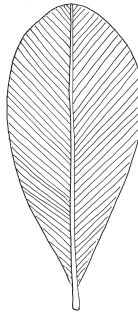
palmate



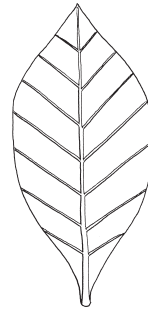
rectipinnate



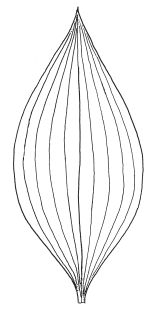
compound
rectipinnate



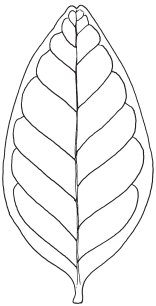
paxillate



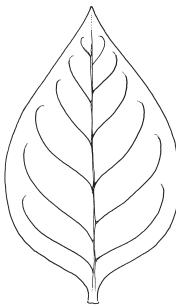
craspedodromous



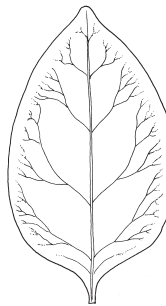
acrodromous/
campylodromous/
parallelodromous



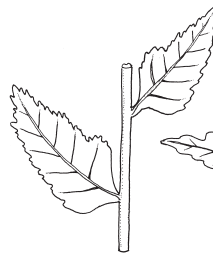
brochidodromous



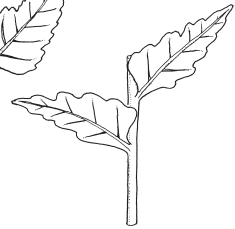
camptodromous



cladodromous



catadromous



anadromous

Plate 17. Leaves: venation