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KEY TO THE ORDERS

OF

FLOWERING-PLANTS.

ANALYTICAL KEY

TO THE

NATURAL ORDERS

OF

FLOWERING-PLANTS

BY

FRANZ THONNER



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PREFACE.

EXOTIC FLORAS usually contain artificial keys to the determination of genera, sometimes even of species, whereas for the orders or families a general summary is at the most given. Those who do not possess an extensive knowledge of systematic botany will, therefore, find it difficult to ascertain the name of the order to which the plant under examination belongs, though this is necessarily the first step in every investigation. In some botanical manuals, it is true, short keys to the determination of the orders are to be found, but they are too short to be accurate, and most of them are somewhat antiquated. To supply this want I, in 1891, published a somewhat elaborate key, entitled "*Anleitung zum Bestimmen der Familien der Phanerogamen,*" which was afterwards, in an abbreviated form, translated into Japanese by Professor Ikeno. This key, however, was rather too detailed, and, for a work especially destined for exotic plants, the use of English was evidently preferable. I, therefore, determined to rewrite it completely, in the hope that it would better fulfil its purpose in the new form, in which I now present it to the public. From the above-mentioned tables,

SEP 20 1929

published by other writers, this book differs mainly in two respects: in the first place, by the choice of the distinctive characters, of which those were preferred which are visible to the naked eye at the time of flowering, whilst the characters of the fruit and seeds were only used in the absence of others; in the second place, by being more accurate, since less important aberrations from the normal type of the order (excluding, however, quite rare ones) were also taken into consideration. The number, denomination, and description of the natural orders is exactly the same as in Bentham and Hooker's "*Genera Plantarum*." Readers not yet familiarised with the technical terms used in botany will find them concisely explained in Bentham's "*Outlines of Elementary Botany*;" they are reprinted in several colonial floras. Having found the name of the order, it will afford no difficulty to ascertain the name of the genus with the help of the above-named manual or a flora of the country in question. I hope, therefore, that this little work may in some degree contribute to a more extended knowledge of exotic plants, and may be of some use to their friends.

FRANZ THONNER.

DRESDEN, *July*, 1895.

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KEY TO THE ORDERS
OF
FLOWERING PLANTS.

PHANEROGAMAE.

- 1 (a) Ovules naked, *i.e.*, not enclosed in an ovary, inserted upon open carpellary leaves which bear no stigma, or without carpellary leaves upon the summit of a branch. Trees or shrubs, with unisexual flowers without a perianth, rarely with a simple perianth. *Gymnospermeae.*
- (b) Ovules enclosed in the ovary, which is formed by the lower part of stigmatiferous carpellary leaves. (Angiospermeae.) 2.
- 2 (a) Vascular bundles of the stem isolated. Leaves usually parallel-veined, rarely wanting or net-veined (in the latter case flowers upon a spadix or trimerous

with 6 perianth-leaves*), usually entire and narrow and sessile with a broad base. Flowers usually 3-merous. Embryo with a single cotyledon, rarely undivided. *Monocotyledons.*

(b) Vascular bundles of the stem nearly always collected into a cylinder. Leaves usually net-veined, rarely rudimentary or wanting, very rarely parallel-veined, seldom sessile with a broad base and at the same time entire. Flowers usually 4-5-merous. Embryo with 2 cotyledons, rarely one of them rudimentary or the embryo undivided. (Dicotyledons.) 3.

3 (a) Perianth-leaves wanting or resembling each other (especially in texture and colour), rarely somewhat unequal but not more than 5. *Monochlamydeae.*

(b) Perianth-leaves separated in sepals and petals, rarely almost equal but together more than 5. 4.

4 (a) Petals distinct throughout, rarely coherent above, but distinct below. *Polypetalae.*

(b) Petals united below (at least at the base) or rarely throughout. *Gamopetalae.*

* The former in Aroideae, the latter in Dioscoreaceae, Taccaceae and Liliaceae.

GYMNOSPERMEAE.

- 1 (a) Leaves pinnate or pinnatifid, large, crowded at the top of the stem. Cotyledons connate. Juice gummy. Perianth wanting. *Cycadaceae.*
- (b) Leaves entire or rarely dentate or lobed, small or middle-sized, scattered along the branches of the stem, or wanting (very rarely leaves only 2, large, entire at first, but splitting up lengthwise when old). Cotyledons distinct, very rarely connate at the apex. 2
- 2 (a) Perianth tubular or bilobed. Juice not resinous. Leaves not needle-like. Stem usually jointed. *Gnetaceae.*
- (b) Perianth wanting. Juice usually resinous; if not, leaves needle-like. Stem usually continuous. *Coniferae.*

MONOCOTYLEDONS.

- 1 (a) Ovary superior or naked. 2.
(b) Ovary inferior. 34.
- 2 (a) Perianth-leaves sepaloid or wanting. 3.
(b) Perianth-leaves petaloid, or the inner
petaloid, the outer sepaloid.* Leaves
undivided. 19.
- 3 (a) Minute aquatic plants, showing no distinction into stem and leaves, but merely consisting of a disc-like or almost globular thallus, which sometimes gives off shoots of a similar shape, roots, and 1-3 flowers. Stamen 1. Ovary 1-celled.
Lemnaceae.
- (b) Plants with a stem and leaves; both or either distinctly evolved. 4.
- 4 (a) Leaves plaited in the bud, afterwards more or less deeply divided. 5.

* Compare *Palmae*, the perianth-leaves of which are sometimes nearly petaloid, or separated in sepals and petals by shape and connection, but equal in colour and texture. They have pinnately or palmately divided leaves.

(b) Leaves not plaited, rarely plaited but not divided. 6.

5 (a) Perianth-segments 6. Ovules 1-7. Trees or shrubs. Leaves pinnately or palmately divided. Inflorescence spadiciform or paniculate, enclosed by a spathe.

Palmae.

(b) Perianth-segments 4, many, or none. Ovules numerous. Herbs or shrubs. Leaves palmate, 2-fid or 2-4-partite. Inflorescence spadiciform with several spathes. Flowers monœcious; male and female flowers upon the same spadix, alternating several times. Stamens 6 or more. Ovary 1-celled. Tropical America.

Cyclanthaceae.

6 (a) Inflorescence of the female or of all flowers a spadix. 7.

(b) Inflorescence no spadix. 10.

7 (a) Ovaries several, distinct, nearly always enclosed by a perianth, rarely marine, grass-like plants with only 1 ovary. Water plants. *Najadaceae.*

(b) Ovary 1. Land, marsh, or fresh-water plants. 8.

8 (a) Flowers usually hermaphrodite or monœcious, in the latter case male and female

flowers on the same spadix (but sometimes separated by a flowerless interval) and without a perianth, rarely flowers dioecious, in this case leaves broad and divided and anthers dehiscing at the top. Leaves usually broad. *Aroideae*.

- (b) Flowers dioecious, more rarely monoecious, in the latter case male and female flowers on different spadices (which, however, sometimes touch one another, but are separated by their spathes, at least when young), and provided with a perianth of several scales or hairs. Leaves narrow, sessile, undivided, parallel-veined. Anthers dehiscing by longitudinal slits. 9.

- 9 (a) Herbs with an erect or floating stem. Margin of the leaves entire, without prickles. Perianth consisting of scales or hairs. Ovules 1-2, pendulous. Embryo large. *Typhaceae*.

- (b) Shrubs or trees, rarely stemless or creeping herbs. Margin of the leaves nearly always serrate or prickly. Perianth and bracts wanting. Ovules solitary and ascending or numerous. Embryo very small. Flowers dioecious. *Pandaneae*.

- 10 (a) Ovary 1, 1-celled, with a single ovule, or ovaries several, distinct (but the styles sometimes connate at the base). 11.
- (b) Ovary 1, 1-celled, with two or more ovules, or 2-3-celled. 15.
- 11 (a) Ovaries several, collateral, distinct or connate at the base only, rarely ovary 1; in this case either marine grasses or the male flowers with a tubular perianth and a single stamen. Seeds exalbuminous. Water- or marsh-plants. Flowers usually provided with a perianth. *Najadaceae*.
- (b) Ovaries several, superposed on a stalk-like receptacle, or ovary 1. Land, marsh, or fresh-water grasses. Stamens 2 or more, less frequently only 1, but then perianth reduced to scales or wanting. Seeds albuminous. Flowers in spikelets, rarely solitary. 12.
- 12 (a) Ovule pendulous, orthotropous. Anthers dehiscing by 1 longitudinal slit. 13.
- (b) Ovule erect or ascending, anatropous. Anthers dehiscing by 2 longitudinal slits. 14.
- 13 (a) Flowers hermaphrodite or polygamous. Perianth wanting, but sometimes 1-3

bracteoles present beneath the flower. Stamen 1. Grass-like herbs. Fruit capsular. Australia and South-east Asia. *Centrolepideae.*

- (b) Flowers unisexual. Perianth consisting of 3-6 segments, rarely in the female flowers wanting. Stamens 2-3. Grass-like herbs. Sheaths of the leaves split. Ovary 1. Southern hemisphere.

Restiaceae.

- 14 (a) Sheaths of the cauline and inner radical leaves closed. Embryo enclosed in the base of the albumen. Testa free from the pericarp. Stem usually triangular, solid, and without nodes. Leaves usually tristichous and without a ligule. Herbs. Ovary 1. Fruit indehiscent. *Cyperaceae.*

- (b) Sheaths of the leaves split. Embryo outside the base of the albumen. Testa usually adnate to the pericarp. Stem terete or compressed, nodose, between the nodes usually hollow. Leaves most frequently distichous and with a ligule at the base of the blade. Perianth wanting, or reduced to 2-3 scales. Ovary 1. Fruit indehiscent. *Gramineae.*

- 15 (a) Anthers 1-celled. Stamens 3, opposite to

the inner segments of the perianth. Male flowers in spikelets, females sometimes solitary. Leaves reduced to sheaths or wanting. Ovary 2-3-celled. Ovule in each cell 1, pendulous, orthotropous. South Africa, Australia, New Zealand.

Restiaceae.

(b) Anthers 2-celled. Stamens 6, more rarely fewer, but then flowers not in spikelets. Leaves usually perfect (but often very narrow), more rarely reduced to sheaths, in the latter case ovules in each cell of the ovary more than 2. 16.

16 (a) Flowers monœcious, capitate. Ovules orthotropous, pendulous, only 1 in each of the 2 or 3 cells of the ovary. Style 2-6 fid. Embryo remote from the hilum. Herbs with grass-like leaves. Fruit capsular.

Eriocaulaceae.

(b) Flowers diœcious or hermaphrodite. Ovules anatropous or nearly so, usually 2 or more in each cell of the ovary, more rarely only 1, but then style entire or wanting, and flowers very seldom capitate. Embryo near the hilum. 17.

17 (a) Albumen mealy. Embryo outside of it. Ovary 3-celled with 1 ovule in each cell.

Stigmas 3. Anthers attached by their base. Flowers hermaphrodite, rarely dioecious, with a rudimentary ovary in the male flowers. Stem leafy. Leaves with numerous veins. Flowers paniced. Fruit a drupe or berry. Tropics of the Old World. *Flagellariaceae.*

(b) Albumen fleshy or horny. Embryo enclosed by it. Ovary 1-celled, with 3 or more ovules, or 3-celled, with 2 or more ovules in each cell, more rarely with only 1 ovule, but then stigma 1, or anthers attached at their back, or flowers dioecious, without a rudimentary ovary. 18.

18 (a) Style simple with 3 thread-like stigmas, more rarely simple with 1 stigma or 3-partite, in this case only 1 ovule in each cell of the ovary. Leaves linear, parallel-veined, sometimes reduced to sheaths. Perianth more or less scarious. Fruit capsular. *Juncaceae.*

(b) Style simple, with 3 short or broad stigmas, or with 1 stigma, or 3-partite. Ovules in each cell of the ovary 2 or more, rarely 1, but then leaves oblong or oval, and net-veined. Perianth more or less herbaceous. *Liliaceae.*

- 19 (a) Perianth consisting only of petaloid segments.
 (2) 20.
- (b) Perianth consisting of inner petaloid and outer sepaloid segments. 26.
- 20 (a) Perianth-segments 4. Stamens 1 or 4. 21.
- (b) Perianth-segments 1-3 or 5-8. Stamens 2, 3, 5, or more. 22.
- 21 (a) Leaves sessile, linear or ensiform. Flowers irregular. Perianth-segments unequal in size, the inner much smaller than the outer. Stamen 1. Ovary 1-celled, with parietal ovules, or 3-celled. Style filiform. Capsule 3-valved. Australia, Polynesia, South-east Asia.

Philydraceae.

- (b) Leaves stalked, lanceolate or cordiform. Flowers regular. Perianth - segments nearly equal in size. Stamens 4. Ovary 1-celled, with basal or apical ovules. Style wanting. Capsule 2-valved. Australia, South - east Asia, Florida.

Roxburghiaceae.

- 22 (a) Ovaries several, distinct (and with distinct styles). 23.
- (b) Ovary 1, entire or lobed. 24.
- 23 (a) Saprophytic plants destitute of green

colour and of leaves. Carpels numerous. Flowers racemose or corymbose, unisexual or polygamous. Perianth valvate in bud. Filaments very short. Anthers dehiscent by a transversal slit. Ovule 1. South America, South-east Asia, Polynesia. *Triurideae.*

- (b) Water- or marsh-plants, coloured green, and provided with leaves. Carpels 3-6. Flowers spicate or racemose. Stamens 6 or more. Seeds exalbuminous.

Najadaceae.

- 24 (a) Albumen mealy.* Inflorescence provided with a spathe at the base, spicate, racemose, paniculate, or fasciculate. Water- or less frequently marsh-plants. Embryo central. Leaves stalked. Style undivided. *Pontederiaceae.*

- (b) Albumen fleshy, cartilaginous or horny. Inflorescence without a spathe, or umbellate with a spathe. Land- or less frequently marsh-plants. 25.

- 25 (a) Embryo at the edge of the albumen (but sometimes intruded into it). Herbs.

* So also some *Commelinaceae*, land-plants with a coloured calyx and the embryo at the edge of the albumen.

Leaves parallel-veined. Inflorescence terminal, not umbellate. Flowers hermaphrodite. Ovary broadly sessile. Style undivided. *Haemodoraceae*.

(b) Embryo enclosed by the albumen.

Liliaceae.

26 (a) Stamens 1-3.* Flowers hermaphrodite or polygamous. 27.

(b) Stamens 4 or more. 29.

27 (a) Sepals 2 or 3, the third much larger than the other two, and petaloid. Anthers attached at their back. Stigmas 3. Flowers capitate. Stem erect. Leaves radical, linear. Flowers hermaphrodite. Corolla gamopetalous. Ovary 1-celled, with numerous ovules. *Xyrideae*.

(b) Sepals 3, equal, or nearly equal, in size. Anthers attached at their base. Stigma 1, entire or lobed. Flowers solitary, umbellate, or cymose. 28.

28 (a) Ovary 1-celled. Flowers solitary or umbellate. Stem creeping or floating.

* Compare *Eriocaruleae* and *Restiaceae*, the perianth-segments of which are sometimes separated in sepals and petals by form and connection, but equal in texture and colour. Both have unisexual flowers—the former in heads, the latter in spikelets.

- Leaves cauline, linear. Flowers hermaphrodite. Petals free. Ovules numerous. America. *Mayaceae*.
- (b) Ovary 2-3-celled. Flowers cymose. *Commelinaceae*.
- 29 (a) Ovaries and styles 6 or more, distinct. Seeds exalbuminous. Water- or marsh-plants. Leaves stalked. Flowers usually whorled. *Alismaceae*
- (b) Ovary 1. Styles 1-5. Seeds albuminous. 30.
- 30 (a) Ovules in each cell of the ovary 1-10. Stigma 1, entire or lobed, more rarely 2-4, in this case flowers unisexual. Fruit a loculicidal capsule, rarely an achene or nut.* Flowers hermaphrodite, polygamous, or dioecious. 31.
- (b) Ovules in each cell of the ovary numerous. Stigmas 3-5, sometimes twisted together. Flowers hermaphrodite. Fruit a septicidal capsule or a berry. 33.
- 31 (a) Anthers attached by their back. Albumen fleshy or cartilaginous. Leaves

* So also some *Eriocaulaceae* with monœcious flowers, the perianth-leaves of which are equal in colour and consistence, but separated in calyx and corolla by shape and cohesion.

linear. Anthers dehiscing by two longitudinal slits. Ovules anatropous.

Juncaceae.

(b) Anthers attached by their base. Albumen mealy. 32.

32 (a) Anthers dehiscing by 1 pore or short slit at the apex. Ovules anatropous. Corolla gamopetalous. Herbs with an unbranched scape and radical leaves. Flowers capitate (very rarely spicate or umbellate), regular, hermaphrodite. Stigma entire. South America.

Rapateaceae.

(b) Anthers dehiscing by 2 pores or slits. Ovules orthotropous. Corolla usually polypetalous, more rarely gamopetalous, but then herbs with a branched stem. Flowers usually cymose.

Commelinaceae.

33 (a) Albumen fleshy. Leaves scattered on an erect stem, rarely only three net-veined leaves at the summit of the stem. Flowers solitary, or in few-flowered inflorescences. Petals free. Anthers attached at the base, dehiscing by two longitudinal slits. Ovules anatropous.

Liliaceae.

- (b) Albumen mealy. Leaves parallel-veined, crowded at the base or summit of the stem, more rarely scattered on a pendulous stem. Inflorescence usually many-flowered. Mostly plants growing upon trees or rocks. Flowers regular. Anthers dehiscing by two longitudinal slits. Ovules anatropous. America.

Bromeliaceae.

- 34 (a) Fertile stamens 1, 2, or 5, usually adnate
 (1) to the style. Flowers irregular. 35.
- (b) Fertile stamens 3, 6, or more, free from the style. Flowers usually regular. 36.
- 35 (a) Androecium consisting of 1 fertile stamen without staminodes, or with 2 small (not petaloid) staminodes, or of 2 fertile stamens with 1 staminode. Ovules numerous. Style partially or wholly adnate to the stamens. Seeds without albumen. Veins of the leaves usually springing from their base. *Orchideae.*
- (b) Androecium consisting of 1 fertile stamen and 1-5 at least partially petaloid staminodes, or of 5 fertile stamens with 1 or without a staminode; if staminodes 2, then only 1 ovule in each cell of the ovary. Style free or partially adnate to

the stamens. Seeds with copious albumen. Veins of the leaves springing from the midrib. *Scitamineae.*

36 (a) Ovary 1-celled (sometimes incompletely 6-celled). 37.

(b) Ovary 3-celled. 40.

37 (a) Flowers in spadices. Perianth-segments 4 or many. Stigmas 1 or 4. Leaves stalked, fan-shaped, plaited in the bud. Flowers monœcious. Perianth herbaceous. Seeds albuminous. Tropical America. *Cyclanthaceae.*

(b) Flowers solitary, cymose, or umbellate. Perianth-segments 3 or 6. Stigmas 3, 6, or more. 38.

38 (a) Aquatic plants. Flowers unisexual or polygamous, very rarely hermaphrodite, in the latter case styles 6. Perianth-segments usually distinctly separated in sepals and petals. Branches of the style long and narrow. Green, leafy plants. Flowers solitary or cymose, with a spathe of 1 or 2 leaves. Seeds exalbuminous. *Hydrocharideae.*

(b) Terrestrial plants. Flowers hermaphrodite. Styles 1-3. Perianth-segments nearly equal, all more or less petaloid. Branches

of the style short and thick, or enlarged and petaloid. 39.

- 39 (a) Plants destitute of green colour. Leaves reduced to scales. Flowers solitary or cymose, blue, yellow or white. Stigmas short and thick. Seeds exalbuminous. America, Polynesia, South Asia, Africa.

Burmanniaceae.

- (b) Plants of a green colour. Leaves large, stalked, usually net-veined. Flowers umbellate, of a dark colour. Stigmas broad, bipartite, radiating. Seeds albuminous. Stamens 6. Filaments concave. Tropics. *Taccaceae.*

- 40 (a) Flowers unisexual. Stem climbing or prostrate. Leaves stalked. Ovules in each cell of the ovary 2. Seeds with a fleshy albumen.

Dioscoreaceae.

- (b) Flowers hermaphrodite. 41.
- 41 (a) Stamens 3. 42.
- (b) Stamens 6 or more. 44.
- 42 (a) Stamens opposite to the outer segments of the perianth. Perianth-segments 6. Anthers extrorse, dehiscing longitudinally. Embryo enclosed by a horny albumen. Branches of the style usually

3, filiform or dilated, more rarely short, or only 1. *Trideae.*

- (b) Stamens alternate with the outer or only (3) segments of the perianth. Anthers introrse, dehiscing longitudinally or transversely. Embryo at the edge of a fleshy albumen, or without an albumen.

43.

- 43 (a) Anthers dehiscing longitudinally. Style and stigma entire. Ovules in each cell of the ovary 1-6. Seeds albuminous. Perianth-segments 6, distinct, equal in size, or the outer segments smaller. Africa, America, Australia.

Haemodoraceae.

- (b) Anthers dehiscing transversely. Style shortly 3-fid. Ovules in each cell of the ovary numerous. Seeds exalbuminous.

Burmanniaceae.

- 44 (a) Perianth-segments unequal in texture, the outer sepaloid, the inner petaloid. Albumen mealy. Mostly herbs growing upon trees or rocks. Leaves usually radical, rosulate, and prickly. America.

Bromeliaceae.

- (b) Perianth-segments all more or less petaloid (but often unequal in size). Albu-

men fleshy, cartilaginous, or horn-like.

45.

45 (a) Embryo at the edge of the albumen (but sometimes deeply intruded into it). Perianth-segments usually 1-seriate, or nearly so, most frequently hairy. Stem arising from a rhizome, herbaceous, usually leafy. *Haemodoraceae.*

(b) Embryo enclosed by the albumen. Perianth-segments distinctly 2-seriate. Stem usually leafless, and arising from a bulb.

Amaryllideae.

MONOCHLAMYDEAE.

- | | |
|---|-----|
| 1 (a) Ovary superior, almost superior, or naked. | 2. |
| (b) Ovary inferior, almost inferior, or half-inferior. | 83. |
| 2 (a) Hermaphrodite and female flowers destitute of a perianth.* | 3. |
| (b) Hermaphrodite and female flowers provided with a perianth. | 19. |
| 3 (a) Ovary 1-celled. | 4. |
| (b) Ovary several-celled. | 15. |
| 4 (a) Ovule 1. | 5. |
| (b) Ovules 2 or more. | 12. |
| 5 (a) Male flowers destitute of a perianth, or flowers hermaphrodite.** | 6. |
| (b) Male flowers provided with a perianth.
Flowers unisexual. | 9. |

* Compare *Aroideae*, which belong to Monocotyledons, but have frequently net-veined leaves. They are especially characterised by their spadiceiform inflorescence.

** Compare some *Urticaceae* with a rudimentary perianth. Their flowers are inserted upon spreading or concave receptacles, and their perianth is reduced to 1 segment or adnate to the receptacle.

- 6 (a) Flowers capitate. Leaves palmately-lobed, stipulate, alternate. Trees. Flowers monœcious. Connective peltate. Style long. Stigma entire. Ovule pendulous. Fruit consisting of nuts. Europe, Asia, North America.

Platanaceae.

- (b) Flowers spicate. Leaves entire or dentate, rarely pinnately-lobed, but exstipulate. 7.

- 7 (a) Leaves opposite, stipulate. Stamen 1, or 3 connate in a 3-lobed mass. Ovule pendulous. Embryo enclosed by a fleshy albumen. Stigma entire, sessile or nearly so. Fruit a drupe. Asia and Polynesia.

Chloranthaceae.

- (b) Leaves opposite and exstipulate, or alternate. Stamens 2-16, distinct or connate at the base only. Ovule erect. Embryo in a small sac at the top of a mealy albumen, or destitute of albumen. 8.

- 8 (a) Fruit a drupe. Seed without an albumen. Stigmas 2. Spikes usually sessile. Shrubs or trees. Leaves exstipulate, alternate. Flowers unisexual.

Myricaceae.

- (b) Fruit a berry. Seed with a copious albu-

men. Stigma usually 1 or 3-5, rarely 2. Spikes stalked. Shrubs or trees, with usually stipulate leaves, or herbs.

Piperaceae.

- 9 (a) Plants destitute of green colour. Leaves reduced to scales. Herbs, stem unbranched. Flowers in spadiciform spikes or heads mixed with club-shaped bodies. Perianth of the male flowers valvate. Stamens as many as perianth-segments, and opposite to them, or more. Filaments connate or wanting. Style and stigma entire. Ovule suspended from the top of the cell. Australasia and South Asia.

Balanophoreae.

- (b) Plants of a green colour. Leaves well-developed. 10.

- 10 (a) Leaves stipulate. Ovule suspended from the top of the cell, more rarely erect from its base, in the latter case stigma 1, entire or penicillate. Stamens as many as perianth-segments and opposite to them, or fewer. Filaments free. *Urticaceae.*

- (b) Leaves exstipulate. Ovule erect from the base of the cell, or suspended from a basal funicle. Stigmas in the fertile flowers 2-3, or a 2-3-lobed one. 11.

- 11 (a) Perianth valvate in the bud. Stamens as many as perianth-segments, and alternate with them. Seed exalbuminous, with a straight embryo. Herbs or undershrubs. Flowers monœcious, all or only the male ones in heads. Style undivided in the male flowers, 2-partite or with 2 stigmas in the females.

Compositae.

- (b) Perianth imbricate in the bud. Stamens as many as perianth-segments and opposite to them, or fewer. Seed with an abundant albumen and a curved embryo. Leaves entire or sinuate.

Chenopodiaceae.

- 12 (a) Ovules 2. Trees or shrubs, with whorled scales instead of leaves. Flowers spicate. Male flowers with 1-2 perianth-segments and 1 stamen. Style short, with 2 long stigmas. Tropics and Australia.

Casuarineae.

- (b) Ovules 4 or more. Trees or shrubs, with perfect and alternate leaves, or herbs. 13.
13 (a) Ovules 4. Flowers dioecious; male flowers spicate, females solitary. Fruit drupaceous. Seeds albuminous. Shrubs or trees. Leaves coriaceous, exstipulate.

Perianth wanting, but male flowers with 1 bract, females with several bracts. Stamens 2-12. Styles 2, with 4 long stigmas. Australasia. *Balanopse*

(b) Ovules numerous. Flowers dioecious, spicate (in both sexes), rarely hermaphrodite. Fruit capsular. Seeds exalbuminous. 14.

14 (a) Aquatic herbs, usually of a moss-like appearance. Flowers hermaphrodite or rarely dioecious, in the latter case disc absent and stamen 1. Perianth wanting, but usually replaced by small scales. Stamens 1-3. Styles 2, undivided. *Podostemaceae*.

(b) Shrubs or trees. Flowers dioecious. Disc cupular or reduced to 1 or 2 scales. Stamens 2 or more. Leaves stipulate, entire toothed or lobed. Perianth wanting. Style 1, short, or 0. Stigmas 2-4. Seeds covered by a tuft of hairs.

Salicineae.

15 (a) Ovary 2-celled.* 16.

(³) (b) Ovary 3-4-celled. 17.

* Compare some *Podostemaceae* herbs with hermaphrodite flowers, a perianth reduced to small scales, and more than 2 ovules in each cell.

- 16 (a) Leaves opposite, exstipulate. Flowers
 diœcious or polygamous. Male flowers
 destitute of a perianth. Style simple,
 with a 2-lobed stigma. Ovules in each
 cell 2. Seeds albuminous. Shrubs or
 trees. Stamens 2. *Oleaceae.*
- (b) Leaves alternate, stipulate. Flowers
 monœcious. Male flowers furnished
 with a perianth. Styles 2. Ovules in
 each cell 1. Seeds exalbuminous.
 Shrubs or trees. Extra-tropical regions.
Cupuliferae.
- 17 (a) Ovary 3-celled. Styles 3, or 1 with 3 or
 6 stigmas. Fruit 3-celled, capsular.
 Perianth of the male flowers valvate or
 wanting. Ovule in each cell 1, rarely 2,
 pendulous. *Euphorbiaceae.*
- (b) Ovary 4-celled. Styles 2 or 4, or a bilo-
 bed sessile stigma. Fruit 4-celled, inde-
 hiscent. 18.
- 18 (a) Herbs. Flowers solitary, rarely in spikes
 containing both male and female flowers.
 Perianth of the male flowers 2-4-partite
 and valvate in bud, or wanting. Styles
 2 or 4. Ovule 1, pendulous. Seeds
 albuminous. Leaves opposite, exstipu-
 late. *Haloragaceae.*

- (b) Shrubs. Flowers in cone-like spikes, dioecious. Perianth of the male flowers 2-lobed, imbricate in bud. Stigma sessile, 2-lobed. Ovule 1, erect. Seeds exalbuminous. Leaves opposite, exstipulate. America and Polynesia.

Batideae.

- 19 (a) Ovary 1, 1-celled. 20.
 (2) (b) Ovary 1, several-celled, or ovaries several, distinct. 52.
- 20 (a) Ovule 1. 21.
 (b) Ovules 2 or more. 40.
- 21 (a) Leaves stipulate. 22.
 (b) Leaves exstipulate. 27.
- 22 (a) Leaves compound. Flowers hermaphrodite, more rarely dioecious; in the latter case shrubs with solitary or geminate flowers. Leaves alternate. Perianth 3-7-lobed or -partite. Style undivided. Ovule suspended from the top of the cell. *Rosaceae.*
- (b) Leaves simple, rarely compound, but then trees (rarely herbs) with unisexual, capitate or spicate flowers. 23.
- 23 (a) Styles 2-4, distinct or connate at the base, with terminal, more or less capitate or penicillate stigmas, more rarely 3 with

longitudinal stigmas or 3 sessile stigmas. Stipules usually connate in a tubular sheath. Stamens usually 6-9. Ovule basal or with a basal funicle.

Polygonaceae.

- (b) Style 1, undivided (with 1, 2, or more stigmas), or 2-partite with longitudinal stigmas (on the inner face of the branches), or 1-2 sessile stigmas. 24.
- 24 (a) Flowers hermaphrodite. Herbs or under-shrubs. 25.
- (b) Flowers unisexual, more rarely polygamous, but then shrubs or trees. 26.
- 25 (a) Leaves large, alternate. Flowers racemose. Stamens hypogynous, as many as perianth-leaves (4), or more frequently more numerous. Style lateral or wanting. Stipules small. Stamens inserted upon a small disc. Stigma 1. Ovule erect.

Phytolaccaceae.

- (b) Leaves small, opposite, rarely the uppermost alternate. Flowers solitary or cymose. Stamens perigynous, as many as perianth-leaves (usually 5) or fewer, very seldom more numerous. Style terminal. Stipules scarious. Ovule upon a basal funicle. *Illecebraceae.*

- 26 (a) Stamens more than perianth-leaves. Male flowers provided with a perianth. Anthers dehiscing by 3-4 slits. Shrubs or trees. Leaves alternate. Flowers unisexual, spicate or racemose. Perianth of the male flowers 3-4-lobed, valvate in bud, of the females imbricate or open. Ovule pendulous. *Euphorbiaceae.*
- (b) Stamens as many as perianth-leaves or fewer (very rarely more, but then herbs), or male flowers without a perianth. Anthers dehiscing by 2 longitudinal slits. Fruit indehiscent. *Urticaceae.*
- 27 (a) Perianth imbricate in aestivation. 28.
- (b) Perianth valvate or open in aestivation, or wanting. 33.
- 28 (a) Perianth-segments 6, rarely fewer (usually 4), in this case stamens more than perianth-segments, but not twice as many (usually 6 or 9), and anthers generally dehiscing by valves. Stamens most frequently 9. 29.
- (b) Perianth-segments 2-5. Stamens as many as perianth-segments or fewer or twice as many (1-5, 8, or 10). Anthers dehiscing by longitudinal slits. 30.
- 29 (a) Anthers dehiscing by recurved valves.

Style 1, undivided. Ovule suspended from the top of the cell. Seed without an albumen. *Laurineae.*

- (b) Anthers dehiscing by longitudinal slits. Styles 2-3, distinct or connate below. Ovule basal or upon a basal funicle. Seed with an abundant albumen.

Polygonaceae.

- 30 (a) Ovule suspended from the top of the cell. Embryo straight. Stamens as many as the segments of the perianth and alternate with them or twice as many, rarely half their number (2), perigynous. Style 1, entire. Stigma 1, entire or notched. *Thymelaeaceae.*

- (b) Ovule erect from the base of the cell or attached to a basal funicle. Embryo curved or spiral. Stamens as many as the segments of the perianth and opposite to them, or fewer; if stamens 2 and perianth-segments 4, then either stamens hypogynous or stigmas 2-3; very rarely stamens twice as many as perianth-segments, but then styles 2.

31.

- 31 (a) Stamens distinctly perigynous. Styles 2, free. Leaves opposite. Herbs. Flowers

hermaphrodite, without bracteoles.
 Perianth herbaceous. Europe, West
 Asia, Africa, Australia. *Illecebraceae*.

(*b*) Stamens hypogynous or nearly so, more
 rarely distinctly perigynous, but then
 style 1 or leaves alternate. 32.

32 (*a*) Flowers provided with bracts and gemin-
 ate bracteoles. Seed with a curved or
 annular embryo and a copious mealy
 albumen. Bracts and perianth-leaves
 usually dry. Filaments usually connate.
 Stamens hypogynous or nearly so.

Amarantaceae.

(*b*) Flowers usually destitute of bracts or of
 bracteoles, more rarely provided with
 both, but then seed with a spiral embryo
 and little or no albumen. Bracts and
 perianth-leaves generally herbaceous or
 membranous. Filaments usually free.
 Fruit indehiscent. *Chenopodiaceae*.

33. (*a*) Male flowers destitute of a perianth and
 of bracteoles (but provided with a bract),
 females furnished with a minute perianth,
 open in aestivation.* Style 1, entire. ✕

* Compare *Myricaceae* with 3-4 bracteoles or perianth-
 leaves in the female flowers, with 2 stigmas and a basal
 ovule.

Stigma 1, lateral. Ovule laterally affixed. Shrubs. North America.

Leitneriaceae.

(b) All flowers furnished with a perianth. Perianth with two or more valvate segments, or nearly entire and plaited in bud.* Style 1, undivided, or 0. Stigma 1. 34.

34 (a) Stamens hypogynous, free from the perianth, rarely cohering a little with it; in the latter case herbs with opposite leaves. 35.

(b) Stamens inserted on the perianth or on a perigynous disc. Shrubs or trees, rarely undershrubs with alternate leaves. 38.

35 (a) Submerged aquatic plants. Leaves whorled, dichotomously divided. Perianth-segments 6-12. Ovule pendulous. Seed exalbuminous. Herbs. Stamens 10-20. *Ceratophylleae.*

(b) Terrestrial plants. Leaves alternate or

* Compare some *Compositae*, the female flowers of which are destitute of a perianth, but enclosed by a gamophyllous involucre. They have a 2-partite style, the stamens inserted on the perianth, and usually herbaceous stems.

opposite, undivided. Perianth-segments
2-5. Ovule erect. Seed albuminous.

36.

- 36 (a) Filaments wholly connate. Anthers
dehiscing extrorsely. Embryo minute.
Trees or shrubs. Leaves alternate.
Flowers diœcious. Perianth 2-4-lobed,
valvate in bud. Stamens alternating
with the perianth-lobes or more
numerous. Seed with an aril and a
ruminated albumen. Tropics.

Myristiceae.

- (b) Filaments free or connate at the base.
Anthers dehiscing introrsely or later-
ally. Embryo large. 37.

- 37 (a) Stamens 3-4, equal in number and op-
posite to the lobes of the perianth.
Leaves alternate. Perianth-lobes val-
vate in bud. Flower polygamous or
monœcious. Herbs, very rarely shrubs
or trees. Leaves 3-nerved. *Urticaceae.*

- (b) Stamens usually more numerous or fewer
than the lobes of the perianth, more
rarely equal to them in number, but
then leaves opposite and stamens 5 or
alternate with the perianth-lobes. Peri-
anth induplicate in bud, rarely simply

valvate; in the latter case flowers hermaphrodite or stamens 5-10. Filaments nearly always unequal in length.

Nyctagineae.

- 38 (a) Stamens as many as the segments of the perianth and alternate with them, or more numerous. Testa hard. Plants covered with stellate hairs or scales. Leaves entire. Style present. Seed with little or no albumen. Embryo with an inferior radicle. Europe, Asia, Australia, North America.

Elaeagnaceae.

- (b) Stamens as many as the segments of the perianth and opposite to them, or fewer. Testa membranous, coriaceous, or wanting. 39.

- 39 (a) Ovary immersed at the base into a disc adnate to the perianth. Style wanting. Seed without a testa, with copious albumen. Radicle of the embryo superior. Leaves entire or wanting. Perianth divided down to the disc into 4 or 5 segments. Stamens inserted at their base. Australasia and South Asia.

Santalaceae.

- (b) Ovary free. Style present. Seed pro-

vided with a testa, destitute of albumen.
 Radicle of the embryo inferior or lateral.
 Perianth-segments 4. Anthers adnate.
 Tropics and Southern Hemisphere.

Proteaceae.

40 (a) Ovules 2. 41.

(20) (b) Ovules 3 or more. 44.

41 (a) Flowers unisexual. Styles 3, or 1 sessile
 stigma. Albumen copious. Leaves un-
 divided, stipulate. Perianth imbricate.
 Style terminal or lateral. *Euphorbiaceae.*

(b) Flowers hermaphrodite or polygamous.
 Style 1, entire. Albumen wanting, very
 rarely present, but sparing. 42.

42 (a) Stamens 3-4. Style terminal. Leaves
 exstipulate. Perianth-segments 4, val-
 vate in the bud. Stamens inserted upon,
 and opposite to them, with short fila-
 ments and adnate anthers. Tropics and
 Southern Hemisphere. *Proteaceae.*

(b) Stamens 8 or more, rarely fewer, but then
 style basal. Leaves stipulate, very
 rarely exstipulate; in the latter case
 stamens numerous. Perianth usually
 imbricate in the bud. 43.

43 (a) Style basal, very rarely terminal; in the
 latter case stamens numerous and peri-

anth-segments imbricate in aestivation. Leaves undivided, stipulate. Stamens nearly always distinctly perigynous. Ovules almost invariably ascending. Tropics and Australia. *Rosaceae*.

(*b*) Style terminal or nearly so. Stamens 8-10, rarely more, but then perianth-segments valvate in aestivation. Leaves pinnate, very rarely reduced to phyllodes. Stamens usually hypogynous or nearly so. Ovules descending. *Leguminosae*.

44 (*a*) Ovules attached to a sutural placenta (*i.e.*, to the ventral suture of the ovary). 45.

(*b*) Ovules attached to several parietal placentas or to a basal or central placenta.* Flowers hermaphrodite, rarely dioecious; in the latter case perianth-leaves 3-8, distinct. 46.

45 (*a*) Stamens destitute of filaments, inserted in the concave lamina of the perianth-segments, 4. Perianth-segments 4,

* Compare *Salicineae* with stipulate leaves and dioecious flowers with a disc (or perianth) in the form of a cup or reduced to 1-2 scales, and *Balanopseae* with exstipulate leaves and dioecious flowers with 1 bract in the male and many bracts (or perianth-leaves) in the female flowers.

valvate in bud. Leaves exstipulate. Shrubs or trees. Flowers hermaphrodite. Style and stigma entire. Australasia and South America. *Proteaceae*.

(b) Stamens provided with filaments, inserted on the perianth-tube or free from the perianth, 5 or more, very rarely 3-4, but then perianth-segments imbricate in bud. Leaves compound or reduced to phyllodes, usually stipulate. Style and stigma entire. *Leguminosae*.

46 (a) Ovules attached to a basal or central placenta. Herbs, rarely undershrubs or shrubs. 47.

(b) Ovules attached to 2 or more parietal placentas. Trees or shrubs (or woody climbers). 48.

47 (a) Leaves opposite. Fruit dehiscing longitudinally into valves. Herbs or undershrubs. Stamens 1-10. Styles several, or style 1 with several stigmas.

Caryophylleae.

(b) Leaves alternate. Fruit dehiscing transversely or irregularly, or indehiscent. Perianth 5-partite. Stamens 4-5, connate below. Ovules attached to basal funicles. *Amarantaceae*.

- 48 (a) Stamen 1. Leaves entire, exstipulate.
Flowers spicate. Stigmas 2-3, sessile.
Ovules few. Tropical America.

Lacistemaceae.

- (b) Stamens 4 or more. 49.

- 49 (a) Stamens 4-5, equal in number to the
segments of the perianth, adnate to the
gynophore at their base. Perianth
gamophyllous, with a tubular or fimbri-
ate corona at the base. Ovary stalked.
Styles 3-4, distinct or connate below.
Seeds albuminous, furnished with an
aril.

Passifloreae.

- (b) Stamens 6 or more, more numerous than
the segments of the perianth. 50.

- 50 (a) Ovary upon a long gynophore. Seeds
exalbuminous. Segments of the perianth
4, sometimes connate in the form of a
cap. Stigma 1, sessile or nearly so.
Asia, Africa.

Capparideae.

- (b) Ovary sessile or nearly so. Seeds albu-
minous. 51.

- 51 (a) Stamens perigynous, more rarely hypogy-
nous; in the latter case either staminodes
as many as stamens (usually 6-10) and
alternate with them, or leaves opposite.
Leaves entire or dentate. *Samydaceae.*

- (*b*) Stamens hypogynous, more than 10, some in the outer rows sometimes without anthers, no other staminodes (but usually a disc) being present. Leaves alternate, entire dentate or lobed. Perianth-leaves distinct or nearly so. *Bixineae*.
- 52 (*a*) Ovaries several, distinct. Styles distinct or connate at the top only. 53.
- (¹⁹) (*b*) Ovary 1.* 57.
- 53 (*a*) Stamens with connate filaments, hypogynous. Trees with alternate, stipulate leaves. Flowers unisexual or polygamous. Carpels 3-12. *Sterculiaceae*.
- (*b*) Stamens with separate filaments or without filaments, in the latter case perigynous. Trees with opposite or exstipulate leaves, or shrubs, or herbs. 54.
- 54 (*a*) Perianth-leaves distinct. Woody climbers with opposite leaves, or herbs. Stamens numerous, hypogynous. Seeds albuminous. *Ranunculaceae*.
- (*b*) Perianth-leaves of the hermaphrodite and

* Compare *Aroideae* and *Liliaceae*, belonging to Monocotyledons, but bearing frequently net-veined leaves. The former have hermaphrodite flowers upon a spadix, the latter unisexual umbellate trimerous flowers with 1-2 pendulous orthotropous ovules in each cell of the ovary.

female flowers more or less united, of the male flowers sometimes distinct, but then shrubs with alternate leaves. 55.

- 55 (a) Ovules 2. Leaves opposite or verticillate, stipulate. Trees. Flowers dioecious. Perianth 4-5-partite. Stamens 8-10, slightly perigynous. Carpels 4-5. Seeds albuminous. Tropical America.

Simarubeae.

- (b) Ovule 1. Leaves alternate or exstipulate. 56.

- 56 (a) Leaves stipulate, alternate, nearly always compound. Seeds exalbuminous. Herbs or shrubs. Carpels 2-4. *Rosaceae.*

- (b) Leaves exstipulate, simple and entire or dentate, usually opposite. Seeds albuminous. Shrubs or trees. Stamens perigynous. Filaments short or 0. Anthers adnate. Carpels frequently immersed in the receptacle.

Monimiaceae.

- 57 (a) Ovule in each cell of the ovary 1. 58.
 (b) Ovules in each cell of the ovary 2 or more. 66.
- 58 (a) Flowers hermaphrodite. 59.
 (b) Flowers polygamous or unisexual. 62.
- 59 (a) Stigma 1, entire or bilobed. Seeds exal-

buminous. Leaves exstipulate. Ovules pendulous. 60.

- (b) Stigma 1, trilobed, or stigmas 2-5. Seeds albuminous. Leaves usually stipulate. Ovules usually erect. 61.

60 (a) Herbs or undershrubs. Flowers racemose. Perianth-leaves distinct. Stamens hypogynous, 2, 4, or 6. Embryo curved. Leaves alternate. Perianth-leaves 4, imbricate. *Cruciferae.*

- (b) Shrubs or trees. Flowers capitate, umbellate, or fascicled. Perianth-leaves united below. Stamens perigynous, 5 or 8-12. Embryo straight. Leaves entire. Perianth-lobes 4-5, imbricate. Tropics of the Old World.

Thymelaeaceae.

61 (a) Herbs or undershrubs, rarely low shrubs, in the latter case stamens 8-10. Perianth-segments imbricate in bud. Embryo curved. Albumen mealy. Flowers solitary or cymose. Stigmas 2-5.

Ficoideae.

- (b) Shrubs or trees. Stamens 4-6. Perianth-segments valvate in bud. Embryo straight. Albumen fleshy. Stamens perigynous. Ovules erect. *Rhamnaceae.*

62 (a) Flowers polygamous. 63.

(b) Flowers unisexual. 64.

63 (a) Leaves simple (entire or dentate) and stipulate, or reduced to opposite scales, or wanting. Stamens perigynous, 4-5. Seeds albuminous. Perianth valvate.

Rhamnaceae.

(b) Leaves compound, exstipulate, alternate. Stamens hypogynous, 6-12, very rarely 4-5. Seeds exalbuminous.

Sapindaceae.

64 (a) Ovules descending. Micropyle and radicle superior. Leaves usually stipulate. Ovary most frequently 3-celled. Ovules usually furnished with a cap-shaped funicle. Fruit generally capsular. Embryo central.

Euphorbiaceae.

(b) Ovules ascending. Micropyle and radicle inferior. 65.

65 (a) Stamens 2-3. Flowers in heads or in 2-3-flowered axillary fascicles. Fruit a drupe with several stones. Embryo straight, central. Low heath-like shrubs. Leaves exstipulate. Disc 0. Ovary 2-4 celled. Europe and North America.

Empetraceae.

- (b) Stamens 5 or more. Flowers in leafless or leafy racemes. Fruit a capsule or a berry. Embryo curved, peripheral. Ovary usually many-celled.

Phytolaccaceae.

- 66 (a) Ovules in each cell of the ovary 2. 67.
 (b) Ovules in each cell of the ovary 3 or more. 75.
 67 (a) Flowers hermaphrodite. 68.
 (b) Flowers polygamous or unisexual. 70.
 68 (a) Perianth-leaves 5. Fertile stamens 5. Seeds albuminous. Shrubs or undershrubs. Flowers racemose or cymose. Perianth valvate. Stamens hypogynous or nearly so. Ovary 3-5-celled. Australia.

Sterculiaceae.

- (b) Perianth-leaves 4. Fertile stamens 2, 4, 6, or 8. Seeds exalbuminous. 69.
 69 (a) Herbs or undershrubs. Leaves alternate. Flowers racemose. Perianth-leaves free, imbricate in bud. Stamens hypogynous, 6, rarely 2 or 4. Ovary 2-celled. Stigma 1, entire or bilobed.

Cruciferae.

- (b) Shrubs. Leaves opposite. Flowers solitary in the axils of the leaves, forming leafy racemes or spikes. Perianth-leaves united below, valvate in bud. Stamens

- perigynous, 4, rarely 8. Ovary 4-celled. Stigma 1, 4-lobed, or stigmas 4. South Africa. *Penaeaceae.*
- 70 (a) Leaves stipulate. 71.
 (b) Leaves exstipulate. 73.
- 71 (a) Style 1, undivided (or styles several, wholly united). Stigma 1, entire or lobed. Ovules ascending. Trees. Perianth valvate. Stamens 10-15. Filaments connate more or less, but frequently adnate to the gynophore. Ovary 5-lobed. *Sterculiaceae.*
 (b) Styles several, separate or partially united. Stigmas several. Ovules descending. 72.
- 72 (a) Ovules parietal. Leaves simple, dentate. Stamens numerous, inserted within the disc, or disc wanting. Perianth-leaves distinct, imbricate. Asia, Africa. *Bixineae.*
 (b) Ovules axile. Leaves digitate, or simple and usually entire, rarely dentate; in the latter case stamens few, or inserted outside of the disc. Flowers unisexual. *Euphorbiaceae.*
- 73 (a) Stamens 2. Style 1, simple, with 1-2 stigmas. Disc wanting. Leaves op-

posite. Ovary 2-celled. Ovules pendulous. Seeds albuminous. *Oleaceae*.

(b) Stamens 4 or more. Styles 2-3, or style 1 with 3-6 stigmas, rarely 1 with 1-2 stigmas, but then disc present. 74.

74 (a) Ovules ascending, or only the upper one descending. Seeds exalbuminous. Style 1, simple or cleft at the top, more rarely styles 2, free or united at the base, and then leaves opposite. Stamens free or connate below. Micropyle and radicle almost invariably inferior.

Sapindaceae.

(b) Ovules descending. Seeds albuminous. Styles several, distinct or united at the base only, usually 3, more rarely 2, and then leaves alternate. Flowers unisexual. Micropyle and radicle superior.

Euphorbiaceae.

75 (a) Style or sessile stigma 1, entire or cleft at the apex, rarely divided at the base, but entire above. 76.

(b) Styles or sessile stigmas 2 or more, separate or united at the base only. 81.

76 (a) Leaves bearing lid-covered pitchers at the top. Flowers unisexual, dicecious. Climbing or prostrate shrubs or undershrubs.

Stigma sessile, 3-8-lobed. Leaves alternate. Perianth 3-4-partite, imbricate. Stamens (both filaments and anthers) connate in a column. Ovary 3-4-celled. Tropics of the Old World.

Nepenthaceae.

(*b*) Leaves bearing no pitchers. Flowers hermaphrodite, rarely trees with unisexual or polygamous flowers. Style usually present, more rarely stigma sessile, entire or bilobed. 77.

77 (*a*) Stamens perigynous. Leaves opposite or verticillate, exstipulate. Perianth-lobes valvate in bud. *Lythrarieae.*

(*b*) Stamens hypogynous. Leaves alternate rarely almost opposite or verticillate.

78

78 (*a*) Stamens 1-4 or 6. Perianth of 4 distinct leaves, imbricate in bud. Ovary 2-celled very rarely 3-4-celled. Seeds exalbuminous. Herbs, rarely undershrubs. Leaves exstipulate. Ovules parietal.

Cruciferae.

(*b*) Stamens 5, 8, or more. Perianth valvate in bud, or 5-10-lobed and imbricate. Ovary 3-20-celled. Seeds albuminous. Trees or shrubs, rarely undershrubs. 79.

- 79 (a) Perianth imbricate in aestivation, more or less irregular, corolline. Leaves exstipulate, entire. Anthers dehiscing by apical pores. Ovary 5-20-celled. *Ericaceae*.
- (b) Perianth valvate or open in aestivation, regular, usually herbaceous. Leaves usually stipulate. 80.
- 80 (a) Stamens 5-15, monadelphous, more rarely 5, free. Disc wanting. *Sterculiaceae*.
- (b) Stamens numerous, free, inserted on the disc. Tropical America and Africa.
Tiliaceae.
- 81 (a) Aquatic plants. Perianth 3-lobed or reduced to small scales or hairs. Seeds exalbuminous. Herbs, usually of a moss-like appearance. Styles 2-3.
Podostemaceae.
- (b) Terrestrial plants. Perianth 4-5-lobed or -partite. Seeds albuminous. 82.
- 82 (a) Herbs or undershrubs. Leaves undivided, entire or dentate. Styles and cells of the ovary 3-5. Seeds with a mealy albumen and a peripheral embryo.
Ficoideae.
- (b) Herbs with divided leaves, or more frequently shrubs or trees. Styles and cells of the ovary 2. Seeds with a

- fleshy albumen and an axile embryo.
 Leaves stipulate. Asia, America, Australasia. *Saxifrageae.*
- 83 (a) Ovary 1-celled, sometimes incompletely
 (1) several-celled. 84.
 (b) Ovary completely several-celled. 97.
- 84 (a) Ovule 1.* 85.
 (b) Ovules 2 or more. 91.
- 85 (a) Stamens as many as, and alternate with
 the perianth-segments. Perianth corolline.
 Flowers in heads, which are rarely reduced to a single flower. Perianth gamophyllous, valvate. Stamens 5, inserted on the tube of the perianth. Anthers coherent. *Compositae.*
- (b) Stamens as many as, and opposite to the perianth-segments, or fewer, or more numerous. Perianth calycine or wanting. 86.
- 86 (a) Leaves stipulate. 87.
 (b) Leaves exstipulate. 88.
- 87 (a) Leaves opposite. Micropyle and radicle inferior. Male flowers spicate, destitute

* In *Loranthaceae* and *Cupuliferae* the ovules are usually not to be distinguished from the substance of the ovary during the flowering period. The former have 1 style and 1 ovule, the latter 2 or more styles and ovules.

of a perianth. Female flowers capitate or paniculate, furnished with a 3-dentate perianth. Stamen 1. Stigma 1. Asia, America, Polynesia. *Chloranthaceae*.

(b) Leaves alternate. Micropyle and radicle superior. Flowers furnished with a perianth, rarely the male ones destitute of it, and then flowers on a concave receptacle or stigmas 2. *Urticaceae*.

88 (a) Leaves pinnate. Trees. Stamens 3-40. Leaves alternate. Flowers in spikes or catkins. Europe, Asia, America.

Juglandae.

(b) Leaves simple, and entire or toothed, or wanting. Herbs or shrubs. Stamens 1-5. 89.

89 (a) Leaves opposite or verticillate, sometimes reduced to scales. Parasitical shrubs, growing upon trees. Perianth valvate. Stamens 2-4. Stigma 1. *Loranthaceae*.

(b) Leaves alternate or wanting. Herbs or terrestrial shrubs. 90.

90 (a) Plants destitute of green colour and of perfect leaves. Perianth valvate or open in the bud, or wanting. Stamens 1-3. Herbs. Flowers in spikes or spadices.

Balanophoreae.

- (b) Plants of a green colour, nearly always provided with perfect leaves. Perianth imbricate in the bud. Stamens 5. Style 1 or 0. Stigmas several.

Chenopodiaceae.

- 91 (a) Ovules 2-4. 92.
 (b) Ovules 6 or more. 93.
 92 (a) Stamens as many as perianth-segments, 3-6. Ovules suspended from the top of a central placenta. Seeds albuminous.

Santalaceae.

- (b) Stamens twice as many as perianth-segments, 8-10. Ovules suspended from the top of the cell. Seeds exalbuminous. Tropics and South Africa. *Combretaceae.*

- 93 (a) Leaves stipulate. Shrubs or trees. Flowers monœcious. Ovary imperfectly several-celled, with 2 ovules in each cell. Seeds exalbuminous. *Cupuliferae.*

- (b) Leaves exstipulate. Shrubs or trees, with dicecious or hermaphrodite flowers, or more frequently herbs. Ovary imperfectly several-celled, with more than 2 ovules in each cell, or perfectly one-celled. Seeds albuminous. 94.

- 94 (a) Plants destitute of green colour. Leaves reduced to scales, or wholly wanting.

Stigma 1, usually entire. Fruit a berry. Herbs. Stamens 8 or more. Ovary 1-celled or incompletely many-celled.

Cytinaceae.

(b) Plants of a green colour. Leaves well-developed. Stigmas several, rarely stigma 1, lobed. Fruit a capsule. 95.

95 (a) Perianth 1-2-lipped or 3-lobed, valvate in bud. Stamens usually 6 and adnate to the style. Anthers dehiscing extrorsely (sometimes several of them laterally). Style 1, entire or cleft at the top. Ovary incompletely 4-6-celled. Flowers hermaphrodite. *Aristolochiaceae.*

(b) Perianth 4-9-partite, regular or nearly so, imbricate or open in bud. Stamens free from the style, 4, 8, or more. Anthers dehiscing introrsely or laterally. Styles 2-4, separate. Ovary 1-celled, with 2-3 placentas, very rarely with 4, and then flowers dioecious. 96.

96 (a) Herbs with entire dentate or lobed leaves. Flowers hermaphrodite. Styles 2-3, entire. Perianth-leaves 4-5, imbricate. Stamens as many or twice as many. Europe, Asia, America. *Saxifrageae.*

(b) Herbs with dissected or pinnately-com-

- pound leaves, or trees with entire or dentate leaves. Flowers dioecious, rarely polygamous. Styles 3, bifid, or 4. Europe, Asia, America. *Datisceae.*
- 97 (a) Ovule in each cell 1. 98.
- (83) (b) Ovules in each cell 2 or more.* 103.
- 98 (a) Ovary-cells and styles or stigmas 2. 99.
- (b) Ovary-cells and styles or stigmas 3 or more. 101.
- 99 (a) Perianth in the male flowers wanting, in the female flowers a narrow, dentate limb. Seeds exalbuminous. Trees or shrubs. Leaves stipulate, alternate. Flowers monœcious, the males in catkins, the females in spikes or heads. Ovules pendulous. Europe, Asia, North America. *Cupuliferae.*
- (b) Perianth in all flowers more or less corolline. Seeds albuminous. Herbs or undershrubs, more rarely shrubs or trees, and then leaves exstipulate. 100.
- 100 (a) Perianth-leaves separate down to the

* Compare *Dioscoreaceae*, belonging to Monocotyledons, but bearing frequently net-veined (and exstipulate) leaves. They have unisexual, usually dioecious flowers, 6 perianth-leaves, and 3 or 6 stamens.

ovary. Ovules pendulous. Flowers umbellate or capitate. Leaves alternate, rarely opposite, usually dissected. Stamens 5. *Umbelliferae.*

- (b) Perianth-leaves united beyond the ovary. Ovules ascending or horizontal. Flowers cymose or spicate. Leaves verticillate (very rarely opposite), entire.

Rubiaceae.

- 101 (a) Herbs or undershrubs. Perianth-segments imbricate in bud. Seeds with a mealy albumen and a curved embryo. Leaves alternate, exstipulate, undivided. Flowers hermaphrodite or polygamous. Styles separate. Ovules pendulous.

Ficoideae.

- (b) Shrubs or trees. Perianth-segments valvate in bud. Seeds with a fleshy or cartilaginous albumen and a straight embryo. 102.

- 102 (a) Ovules pendulous. Embryo minute. Flowers umbellate or capitate. Perianth divided down to the ovary. Fruit a drupe or berry. *Araliaceae.*

- (b) Ovules erect. Embryo large. Leaves entire or dentate. Ovary 3-4-celled.

Rhamneae.

- 103 (a) Leaves stipulate. Flowers monœcious.
Stigmas several. 104.
- (b) Leaves exstipulate. Flowers herma-
phrodite or polygamous; in the latter
case only 1 stigma. 105.
- 104 (a) Perianth calycine. Ovules in each cell
2. Fruit a nut. Trees or shrubs.
Flowers spicate or capitate, rarely soli-
tary. *Cupuliferae*.
- (b) Perianth corolline. Ovules in each cell
numerous. Fruit a capsule or berry.
Herbs or shrubs. Leaves unequal-sided.
Flowers cymose. Stamens numerous.
Style usually bifid. *Begoniaceae*.
- 105 (a) Perianth 1-2-lipped or 3-lobed, valvate
in bud. Disc wanting. Albumen
copious. Leaves alternate. Stamens
usually 6 and adnate to the style.
Anthers extrorse. Style simple, with a
lobed stigma, or divided. Ovary 4-6-
celled with several or many ovules in
each cell. *Aristolochiaceae*.
- (b) Perianth 4-8-lobed or partite, imbricate
in bud, or closed in the form of a
cap. Disc present. Albumen wanting.
Trees or shrubs. Leaves usually op-
posite or verticillate, glandular-dotted.

See p. 107.
No. 197(a)

Stamens numerous, free from the style.
Style simple, with a usually entire
stigma. *Myrtaceae.*

POLYPETALAE.

- 1 (a) Ovary superior or nearly so. 2.
(b) Ovary inferior to half-inferior. 165.
- 2 (a) Ovary 1, 1-celled or incompletely several-celled.* 3.
(b) Ovary 1, completely or almost completely several-celled,** or ovaries several, distinct. 54.
- 3 (a) Sepals 2, distinct, rarely connate in form of a cap. 4.
(b) Sepals 3 or more, distinct or connate, in the latter case sometimes forming a 2-lipped or 2-lobed calyx; in this case — ovules attached to the ventral suture of the ovary. 5.

* Rarely several rudimentary ovaries are present in the male flowers or besides the fertile one. Compare also some *Menispermaceae* with 1 sepal and 1 petal in the female flowers, and 4 sepals and a gamopetalous corolla in the male flowers.

** The latter, when the dissepiments are complete at the base and in the middle of the ovary, but do not cohere towards the top.

4 (a) Leaves undivided. Ovules 2 or more, attached to a basal or central placenta. Embryo surrounding a mealy albumen. Herbs or low shrubs. Flowers regular. Calyx and corolla imbricate. Style divided at the top into several stigmatose branches. *Portulacaceae.*

(b) Leaves lobed or dissected. Ovules attached to 2 or more parietal placentas, of which sometimes only 1 is fertile, bearing a single ovule. Embryo minute, at the base of a fleshy albumen. Herbs or low shrubs. Leaves exstipulate. Calyx and corolla imbricate. Stamens hypogynous, 4, 6, or many. Style short or 0. Stigmas several or a lobed one.

Papaveraceae.

5 (a) Perfect stamens 1-10. 6.

(b) Perfect stamens more than 10. 40.

6 (a) Style 1, simple, with 1 stigma or with several stigmas connected at their base, or sessile stigma 1. 7.

(b) Styles 2 or more, free or partially united, with separate stigmas, or sessile stigmas 2 or more. 31.

7 (a) Ovules 1-2. 8.

(b) Ovules more than 2. 19.

- 8 (a) Leaves stipulate.* 9.
 (b) Leaves exstipulate. 10.
- 9 (a) Style basal. Sepals 5, the odd one posterior—(next to the axis), rarely 4. Stamens perigynous. *Rosaceae*.
- (b) Style terminal or nearly so. Odd sepal, if present, anterior. Flowers usually irregular. Stamens usually perigynous and more than petals. *Leguminosae*.
- 10 (a) Leaves simple (entire, dentate, or lobed, rarely divided) or wanting. 11.
 (b) Leaves compound. 16.
- 11 (a) Flowers regular. 12.
 (b) Flowers distinctly irregular. 15.
- 12 (a) Sepals 3. Petals 3. Anthers dehiscing by recurved valves. Stamens perigynous, usually 9. Seeds exalbuminous. *Laurineae*.
- (b) Sepals 4-6. Petals 4-6. Anthers dehiscing by longitudinal slits. 13.
- 13 (a) Herbs or undershrubs. Flowers racemose. Sepals 4, imbricate. Petals 4, imbricate. Stamens 6, hypogynous, four of them

* So also in some *Sterculiaceae* with regular flowers, 5 petals adhering to the staminal tube, and 5 hypogynous stamens opposite the petals.

longer than the other two. Embryo curved. *Cruciferae*

(b) Shrubs or trees. 14.

14 (a) Petals valvate in aestivation. Albumen copious. Embryo straight. *Olacineae*.

(b) Petals imbricate in aestivation. Albumen wanting or nearly so. Ovule 1.

Anacardiaceae.

15 (a) Stamens 4-8, hypogynous. Anthers dehiscing by pores. Flowers racemose. Ovules pendulous. Fruit indehiscent.

Polygaleae.

(b) Stamens 9-10, usually perigynous. Anthers dehiscing by longitudinal slits. Corolla papilionaceous. *Leguminosae*.

16 (a) Ovule 1. Shrubs or trees. Disc present. Albumen scanty or wanting.

Anacardiaceae.

(b) Ovules 2. 17.

17 (a) Ovules ascending. Stamens 10, 5 of which are frequently imperfect, usually perigynous. Shrubs or trees. Flowers hermaphrodite. Petals 5. Fruit a follicular capsule. Seeds with an aril, exalbuminous. Tropics. *Connaraceae*.

(b) Ovules descending. Stamens 3-8, without staminodes, hypogynous. 18.

- 18 (a) Stamens 3-5. Seeds albuminous. Shrubs or trees. Leaves translucently dotted. Flowers polygamous. *Rutaceae*.
- (b) Stamens 8. Seeds exalbuminous. Shrubs or trees. Leaves translucently dotted. Petals 4. Fruit drupaceous. Tropical America. *Burseraceae*.
- 19 (a) Ovules attached to a basal or a free central placenta. 20.
- (b) Ovules attached to a sutural placenta or to parietal placentas. 24.
- 20 (a) Leaves opposite, entire, stipulate. Herbs or undershrubs. Petals 5, imbricate or open in bud. Stamens 3-5, as many as and alternate with the petals, or fewer. Fruit capsular. *Caryophylleae*.
- (b) Leaves alternate. 21.
- 21 (a) Stamens fewer or more numerous than the petals.* Trees or shrubs. Leaves entire, exstipulate. Petals valvate. Ovules 3, suspended from the top of a central placenta. Fruit drupaceous. *Olacineae*.
- (b) Stamens as many as the petals, and opposite to them. 22.

* Compare *Styracaceae* with 5 petals slightly coherent at the base, 10 stamens, and basal erect ovules.

- 22 (a) Petals valvate in the bud. Ovary imperfectly 2-celled. Shrubs with tendrils. Leaves exstipulate. Calyx gamosepalous. Petals 4-5. Ovules 4, basal. Fruit a berry. *Ampelideae.*
- (b) Petals imbricate in the bud. Ovary perfectly 1-celled. 23.
- 23 (a) Sepals 4-5. Petals 4-5. Ovules inserted on a more or less globose central placenta. Shrubs or trees. Leaves exstipulate, entire or dentate. Fruit indehiscent, 1-seeded. *Myrsineae.*
- (b) Sepals 6 or more. Petals 6. Ovules basal. Sepals distinct. *Berberideae.*
- 24 (a) Ovules attached to a sutural placenta (to the ventral or dorsal suture of the ovary). 25.
- (b) Ovules attached to 2 or more parietal placentas. 27.
- 25 (a) Sepals and petals together 12. Stamens of the same number as the petals, and opposite to them, 4, 6, or 8. Flowers regular. Sepals distinct, petaloid. Petals imbricate. Stamens hypogynous. *Berberideae.*
- (b) Sepals and petals together 6-10. Stamens usually more numerous than the petals,

rarely of the same number or fewer, and then 5. 26.

- 26 (a) Petals 4. Stamens 6, four of them longer than the two others. Flowers regular or nearly so. Leaves exstipulate. Herbs or undershrubs. Sepals 4, distinct. Petals imbricate. Stamens hypogynous.

Cruciferae.

- (b) Petals 5 or 1-3, rarely 4; in the latter case stamens 8-10. Flowers distinctly irregular, more rarely regular or nearly so, but then leaves stipulate or shrubs or trees.

Leguminosae.

- 27 (a) Petals 4. 28.

- (b) Petals 5. 29.

- 28 (a) Stamens 6, four of them longer than the two others. Flowers regular. Ovary sessile. Herbs or undershrubs. Flowers racemose. Sepals and petals imbricate in bud. Stamens hypogynous. Placentas 2. Fruit dry and indehiscent, or dehiscing in two valves. *Cruciferae.*

- (b) Stamens 4-10, equal, or nearly equal, in length. Flowers usually irregular. Ovary usually stipitate. Stamens hypogynous. Fruit baccate or dehiscing in two valves. *Capparideae.*

- 29 (a) Leaves pinnate. Stamens perigynous.
 Anthers dehiscing by 1 longitudinal slit.
 Trees. Flowers paniced, irregular.
 Stamens 5. Staminodes 5. Ovary
 stipitate. Placentas 3. Asia, Africa,
 America. *Moringeae.*
- (b) Leaves simple, entire dentate or lobed.
 Stamens hypogynous, or nearly so.
 Anthers dehiscing by 2 longitudinal
 slits. 30.
- 30 (a) Leaves stipulate. Placentas 3-5, only
 slightly projecting. Embryo large. Sta-
 mens 5. *Violarieae.*
- (b) Leaves exstipulate. Placentas 2-5, pro-
 jecting far into the ovarian cavity, or 2
 only slightly projecting. Embryo small.
 Leaves alternate. Sepals imbricate.
 Stamens 5. Asia, Africa, Australasia.
Pittosporeae.
- 31 (a) Ovule 1. 32.
- (⁶) (b) Ovules 2 or more. 34.
- 32 (a) Sepals 3. Petals 3. Leaves usually stipu-
 late. Stamens usually 9. Styles 2-4.
 Albumen copious, mealy. *Polygonaceae.*
- (b) Sepals 4-6. Petals 4-6. 33.
- 33 (a) Stamens as many as and opposite to the
 petals. Leaves exstipulate. Flowers

hermaphrodite. Calyx 5-lobed. Petals 5, hypogynous, imbricate. Disc 0. Style 5-partite. *Plumbagineae.*

(b) Stamens as many as and alternate with the petals, or fewer, or more numerous than the petals.* Leaves exstipulate. Filaments free, more rarely adnate to the disc. Trees or shrubs. Disc usually present. Styles usually 3. Albumen thin or wanting. *Anacardiaceae.*

34 (a) Leaves opposite. 35.

(b) Leaves alternate or (all) radical. 36.

35 (a) Segments of the calyx imbricate in aestivation. Ovules attached to a basal or central placenta. Herbs or undershrubs. Seeds albuminous. *Caryophylleae.*

(b) Segments of the calyx induplicate-valvate in aestivation. Ovules attached to several parietal placentas. Herbs or undershrubs. Leaves exstipulate. Stamens 4-6, hypogynous. Style 2-4-fid. Albumen mealy. *Frankeniaceae.*

36 (a) Petals hypogynous. Shrubs or trees.

* So also in some *Lineae* with only 1 fertile and 2-3 rudimentary ovary-cells. They have stipulate leaves, 5 petals furnished with a ligule on their inner face, 10 stamens connate at the base, and no disc.

Seeds exalbuminous. Ovules attached to basal or more or less parietal placentas. Leaves scale-like, exstipulate. Flowers spicate or racemose. Sepals and petals imbricate. Disc present. Seeds with a tuft of hairs at the top. Europe, Asia, Africa. *Tamariscineae.*

(b) Petals perigynous, more rarely hypogynous, and then herbs. Seeds albuminous. Ovules attached to parietal placentas. 37.

37 (a) Anthers extrorse. Herbs with glandular hairs. Leaves circinate in bud. Sepals and petals imbricate in bud. Stamens isomerous. Disc 0. Placentas 2-5, alternating with the styles. *Droseraceae.*

(b) Anthers introrse. 38.

38 (a) Styles and placentas 2. Stamens usually twice as many as petals. Herbs.

Saxifrageae.

(b) Styles and placentas 3-5. Stamens as many as petals. 39.

39 (a) Receptacle (calyx-tube) enlarged to a disc-like or fringed corona, more rarely without a corona; in the latter case flowers unisexual. Petals imbricate (and not contorted) or valvate in bud,

usually persistent. Tendrils most frequently present. Ovary usually stipitate.

Passifloreae.

(*b*) Receptacle without a corona. Flowers hermaphrodite. Petals contorted in bud, deciduous. Calyx-lobes imbricate. Placentas 3, opposite to the styles. Asia, Africa, America. *Turneraceae.*

40 (*a*) Style or sessile stigma 1; style undivided.

(⁵) 41.

(*b*) Styles or sessile stigmas 2 or more; styles separate or united below. 51.

41 (*a*) Ovule 1. Trees. Leaves opposite, entire, exstipulate. Flowers polygamous. Petals hypogynous. Ovule basal. Seed exalbuminous. Tropics. *Guttiferae.*

(*b*) Ovules 2 or more. 42.

42 (*a*) Ovules basal, apical, central, or sutural. 43.

(*b*) Ovules on several parietal placentas. 47.

43 (*a*) Petals and stamens hypogynous. Sepals imbricate in bud. 44.

(*b*) Petals and stamens perigynous, rarely nearly hypogynous, but then sepals valvate in bud. 45.

44 (*a*) Herbs. Leaves lobed or dissected. Sepals deciduous. Ovules several or many, at-

tached to the ventral suture of the ovary. Seeds without an aril. Flowers racemose or paniced. *Ranunculaceae.*

- (*b*) Shrubs. Leaves entire or dentate. Sepals persistent. Ovules 2, basal, rarely more numerous and attached to the ventral suture of the ovary. Seeds furnished with an aril. Flowers solitary or paniced. Tropics and Australia.

Dilleniaceae.

- 45 (*a*) Ovules 2, inserted on a free central placenta, or more numerous, and inserted on a basal or central placenta. Leaves exstipulate, entire. Calyx-lobes valvate. Style terminal. *Lythrarieae.*

- (*b*) Ovules 2, basal apical or sutural, or more numerous, and inserted on the ventral suture of the ovary. Leaves usually stipulate. 46.

- 46 (*a*) Calyx-lobes imbricate or open in aestivation. Petals imbricate or open, 4-12. Ovules 2. Flowers usually racemose. Leaves usually simple. *Rosaceae.*

- (*b*) Calyx-lobes valvate or closed in aestivation. Petals usually valvate or 1-3. Ovules usually more than 2, rarely 2 and descending, and then flowers spicate

or capitate. Leaves compound or phyllodineous. Style terminal, or nearly so.

Leguminosae.

- 47 (a) Filaments connate throughout. Trees. Leaves alternate, exstipulate, translucently dotted. Flowers regular. Anthers extrorse. Style simple, stigma lobed. Fruit a berry. America and Madagascar.

Canellaceae.

- (b) Filaments free or connate at the base only. 48.

- 48 (a) Leaves, at least the lowermost, opposite. Ovules orthotropous. Herbs, undershrubs, or shrubs. Flowers regular. Petals caducous. Ovary sessile. Fruit capsular. Embryo curved or spiral. Albumen mealy or cartilaginous.

Cistineae.

- (b) Leaves alternate. Ovules anatropous or amphitropous. 49.

- 49 (a) Style usually wanting, rarely distinctly discernible, in the latter case herbs. Albumen thin or wanting. Flowers hermaphrodite or polygamous. Petals nearly always 4 and hypogynous. Ovary almost invariably stipitate. Embryo curved.

Capparideae.

- (b) Style distinctly discernible. Shrubs or trees. Albumen copious, fleshy. 50.
- 50 (a) Petals resembling the sepals. Ovules on each placenta numerous. Petals and stamens more or less perigynous. Leaves entire or toothed. Flowers regular. Ovary sessile. *Samydaceae*.
- (b) Petals sensibly different from the sepals, more rarely resembling them, but then only few ovules on each placenta. Petals and stamens hypogynous, or nearly so. Flowers regular. *Bixineae*.
- 51 (a) Flowers irregular. Petals open in aestivation. Ovary open at the top. Herbs. Leaves stipulate, alternate. Flowers racemose. Petals laciniate. Disc 1-sided. Seeds exalbuminous. Europe, West Asia, North Africa. *Resedaceae*.
- (b) Flowers regular. Petals imbricate in aestivation. Ovary closed. Herbs with exstipulate leaves, or shrubs, or trees. 52.
- 52 (a) Flowers unisexual. Leaves stipulate, alternate. Shrubs or trees. Seeds albuminous. Africa, America. *Bixineae*.
- (b) Flowers hermaphrodite. Leaves exstipulate. 53.

- 53 (a) Leaves alternate. Undershrubs, shrubs, or trees. Flowers solitary or spicate or racemose. Seeds hairy. Europe, Asia, Africa. *Tamariscineae.*
- (b) Leaves opposite. Flowers solitary or cymose. Seeds exalbuminous. *Hypericineae.*
- 54 (a) Ovaries several, distinct or connate at the base only, with wholly distinct styles and stigmas. 55.
- (b) Ovaries several, with connate styles or stigmas, or ovary 1. 69.
- 55 (a) Petals and stamens perigynous. 56.
- (b) Petals and stamens hypogynous. 59.
- 56 (a) Sepals, petals, and stamens arranged in a spiral manner. Anthers extrorse. Shrubs. Leaves opposite, undivided, exstipulate. Receptacle (calyx-tube) urceolate. Fruits indehiscent. Seeds exalbuminous. North America. *Calycanthaceae.*
- (b) Sepals, petals, and stamens arranged in whorls. Anthers introrse. 57.
- 57 (a) Leaves stipulate, alternate. Odd calyx-lobe posterior. *Rosaceae.*
- (b) Leaves exstipulate. 58.
- 58 (a) Leaves compound, alternate. Shrubs or trees. Stamens as many, or twice as

many as petals. Ovules 2. Fruits capsular. Tropics. *Connaraceae*.

(*b*) Leaves simple, entire dentate or lobed. Herbs or undershrubs, rarely shrubs with opposite leaves. Receptacle only slightly concave. Stamens as many, or twice as many as petals. Fruits capsular. Seeds albuminous. *Crassulaceae*.

59 (*a*) Stamens as many to twice as many as sepals. 60.

(*b*) Stamens more than twice as many as sepals. 66.

60 (*a*) Ovule in each carpel 1.* 61.

(*b*) Ovules in each carpel 2 or more. 62.

61 (*a*) Leaves opposite or verticillate. Flowers hermaphrodite or polygamous. Petals 5. Stamens 10. Carpels 5-10. Shrubs. Leaves exstipulate. *Coriariaceae*.

(*b*) Leaves alternate. Flowers dioecious. Petals 6, rarely 3. Stamens 6, opposite to the petals, rarely 9 or 12. Carpels 3. Climbing plants. Leaves exstipulate.

Menispermaceae.

* Compare *Platanaceae* with indistinct, scale-, or hair-like sepals and petals, stipulate leaves, and capitate flowers, and some *Anacardiaceae* with several carpels, of which only 1 is fertile, with alternate exstipulate leaves, and 10 stamens.

- 62 (a) Petals twice as many as sepals, 6. Shrubs or trees. Leaves entire. Tropics.

Anonaceae.

- (b) Petals as many as sepals, 3 or more, usually 5. 63.

- 63 (a) Leaves simple, entire toothed or lobed. 64.

- (b) Leaves compound. 65.

- 64 (a) Sepals distinct. Stamens arranged in an irregular manner, more numerous than the petals, but usually fewer than twice as many as petals. Shrubs or undershrubs. Leaves alternate. Sepals persistent. Seeds furnished with an aril. Australia.

Dilleniaceae.

- (b) Sepals united more or less. Stamens arranged in a regular manner, as many, or twice as many as petals. Herbs or undershrubs, usually fleshy, rarely shrubs with opposite leaves. Carpels 3 or more.

Crassulaceae.

- 65 (a) Stamens and staminodes together 3-8. Ovules descending, anatropous. Shrubs or trees. Leaves alternate. Calyx gamosepalous.

Rutaceae.

- (b) Stamens and staminodes together 10. Ovules ascending, orthotropous. Shrubs or trees. Leaves alternate. Tropics.

Connaraceae.

66 (a) Perianth consisting of 3 sepals, and 6 or more (rarely 3) petals; sepals sometimes passing gradually into the petals. Shrubs or trees. 67.

(b) Perianth usually consisting of 4 or more sepals, and an equal or smaller number of petals, more rarely sepals fewer than petals, or gradually passing into them, or only 3, but then herbs. 68.

67 (a) Sepals valvate in the bud. Albumen ruminated. Leaves exstipulate.

Anonaceae.

(b) Sepals imbricate in the bud. Albumen uniform. Leaves usually stipulate. Asia, America, Australasia.

Magnoliaceae.

68 (a) Seeds furnished with an aril. Sepals persistent. Leaves undivided, rarely pinnately divided. Usually shrubs or trees. Leaves alternate. Sepals 4 or more, imbricate.

Dilleniaceae.

(b) Seeds without an aril. Sepals deciduous, rarely persistent, but then leaves palmately divided. Herbs, more rarely woody climbers with opposite leaves.

Ranunculaceae.

69 (a) Ovule in each cell of the ovary 1. 70.

- (b) Ovules in each cell of the ovary 2 or more. 97.
- 70 (a) Stamens distinctly perigynous. 71.
- (b) Stamens hypogynous. 74.
- 71 (a) Stamens 10 or more. Trees. Ovary 2-celled. Style basal. Tropics.
- Rosaceae.*
- (b) Stamens 4-5. 72.
- 72 (a) Stamens opposite to the petals. Calyx-lobes valvate, petals valvate or open in aestivation. Shrubs or trees. Ovary entire or slightly lobed. *Rhamneae.*
- (b) Stamens alternate with the petals. Calyx-lobes and petals imbricate in aestivation. 73.
- 73 (a) Herbs. Petals with their claws united in a tube, except at the base. Flowers spicate or racemose. Stamens unequal in length. Ovary lobed. Australia, New Zealand, Philippine Islands.
- Stackhousieae.*
- (b) Shrubs or trees. Petals free. Ovary entire or slightly lobed. *Celastrineae.*
- 74 (a) Flowers unisexual. 75.
- (b) Flowers hermaphrodite or polygamous. 79.
- 75 (a) Ovary 4-6-partite. Leaves usually pinnate, alternate, exstipulate. Styles con-

nate. Ovules pendulous or horizontal. Micropyle and radicle superior. Fruits drupaceous. Tropics. *Simarubeae*.

(b) Ovary entire or slightly lobed. Leaves simple or digitate. 76.

76 (a) Ovules pendulous or descending, usually covered by the enlarged, more or less scale-like funicle. Micropyle and radicle superior. Cells of the ovary and branches of the style most frequently 3. Fruit usually capsular. *Euphorbiaceae*.

(b) Ovules erect, ascending, or horizontal. Micropyle and radicle inferior. 77.

77 (a) Leaves alternate. Sepals 3. Petals 3. Albumen copious. Small shrubs. Leaves undivided, exstipulate. Stamens 2-4. Ovules horizontal. Fruit a drupe. Europe, North Asia, America.

Empetraceae.

(b) Leaves opposite or verticillate. Sepals 2, 4, or more. Petals 4-10. Albumen wanting. 78.

78 (a) Leaves stipulate. Segments of the calyx valvate in the bud. Stamens 4. Style 1, undivided. Stigmas 1-2. Ovary 2-celled. Ovules erect. Fruit a berry. South Asia, Africa. *Salvadoraceae*.

- (b) Leaves exstipulate. Segments of the calyx imbricate in the bud. Stamens numerous. Styles 4-5, free, or wanting. Stigmas 4-5. Ovary 4-5-celled. Ovules ascending. Fruit a fleshy capsule. Tropical America. *Guttiferae*.
- 79 (a) Flowers polygamous. 80.
 (b) Flowers hermaphrodite. 84.
- 80 (a) Leaves opposite or verticillate, entire. Juice resinous. Stamens numerous. Tropics. *Guttiferae*.
 (b) Leaves alternate, usually compound. 81.
- 81 (a) Filaments united throughout, or for a great part. Leaves pinnate or 3-foliate. Anthers 5-10. Australasia and South Asia. *Meliaceae*.
 (b) Filaments free. 82.
- 82 (a) Stamens inserted within the disc. Ovules ascending or horizontal. Radicle inferior. *Sapindaceae*.
 (b) Stamens inserted outside of the disc. Ovules pendulous or horizontal. Radicle superior. 83.
- 83 (a) Ovary entire or slightly lobed. Styles several, distinct, or sessile stigma 1. Ovules with a dorsal raphe and an in-

- terior micropyle. Leaves pinnate.
Tropics. *Anacardiaceae.*
- (b) Ovary deeply divided. Styles connate.
Ovules with a ventral raphe and an exterior micropyle. Leaves pinnate.
Stamens 2-10. *Simarubeae.*
- 84 (a) Stamens 1-10. 85.
(b) Stamens more than 10. 95.
- 85 (a) Herbs or undershrubs. 86.
(b) Shrubs or trees. 89.
- 86 (a) Sepals 4. Petals 4. Flowers regular, or nearly so. Stamens 6, four of which are longer than the two others, rarely 2-4. Ovary usually 2-celled. *Cruciferae.*
(b) Sepals 5. Petals 5, more rarely 2-3. 87.
- 87 (a) Ovary 2-celled. Anthers dehiscing by pores. Flowers irregular. Stamens 8.
Polygaleae.
(b) Ovary 3-5-celled. Anthers dehiscing by longitudinal slits. 88.
- 88 (a) Leaves opposite or verticillate. Ovary 3-celled. Stamens 2-6, or 10. Undershrubs. Petals 5. America.
Malpighiaceae.
(b) Leaves alternate or radical. Ovary 5-celled, more rarely 3-celled, but then stamens 8. Stamens 8-10. *Geraniaceae.*

- 89 (a) Leaves simple, entire dentate or lobed. 90.
 (b) Leaves compound. 93.
- 90 (a) Stamens 8. Ovary 2-celled. Style 1, undivided. Flowers irregular. Anthers dehiscent by pores. *Polygaleae*.
 (b) Stamens 3-6, or 10. Ovary 3-6-celled, rarely 2-celled, but then styles 2, free or partially united. 91.
- 91 (a) Ovary 5-6-celled. Leaves alternate, stipulate. Petals imbricate. Receptacle enlarged into a disc or gynophore. Style entire. Tropics. *Ochnaceae*.
 (b) Ovary 2-4-celled.* 92.
- 92 (a) Leaves alternate. Style 1, entire, or almost wanting. Stigma 1, entire or obscurely lobed. Seeds albuminous. Leaves exstipulate. Petals imbricate. Stamens 10. Ovary entire. America. *Cyrilleae*.
 (b) Leaves opposite or verticillate, more rarely alternate, but then styles several, free, and flowers racemose or umbellate.

* Compare some *Olacineae* with nearly complete ovary-cells and valvate petals, and some *Lineae* with 3-4 ovary-cells, of which only 1 is fertile, with alternate stipulate leaves, solitary or fascicled axillary flowers, imbricate petals furnished with a ligule, and several free or partially united styles.

Seeds exalbuminous. Calyx usually with glands on the outside. Petals imbricate, usually toothed or fringed. Ovary most frequently lobed.

Malpighiaceae.

- 93 (a) Filaments united throughout or for a great part. Leaves pinnate. Ovary entire. Tropics. *Meliaceae.*

(b) Filaments free. 94.

- 94 (a) Leaves glandular-dotted. Filaments without a scale. Ovary entire. Tropics.

Rutaceae.

(b) Leaves not dotted. Filaments usually furnished with a scale at their base. Ovary usually divided. *Simarubeae.*

- 95 (a) Sepals valvate or open in aestivation, united more or less. Anthers 1-celled. Disc and gynophore wanting. Leaves stipulate. Stamens monadelphous.

(84)

Malvaceae.

(b) Sepals imbricate in aestivation, free or nearly so. Anthers 2-celled. Disc or gynophore present. 96.

- 96 (a) Leaves stipulate. Flowers yellow. Ovary usually deeply lobed. Ovules ascending. Albumen wanting. Leaves undivided. Tropics and South Africa. *Ochnaceae*

- (b) Leaves exstipulate. Flowers white. Ovary entire. Ovules pendulous. Albumen copious. Leaves undivided. Tropical America and Africa.

Humiriaceae.

- 97 (a) Stamens hypogynous. Disc wanting, but
 (69) separate glands or a gynophore sometimes present. (Receptacle convex, or stalk-shaped, or small and plane.) 98.
 (b) Stamens hypogynous, but inserted at the base or on the surface of a ring-, cup-, or cushion-shaped disc, or perigynous. (Receptacle concave or enlarged into a disc.) 132.
- 98 (a) Leaves opposite or verticillate. 99.
 (b) Leaves alternate or (all) radical. 105.
- 99 (a) Stamens 1-10. 100.
 (b) Stamens more than 10. 104.
- 100 (a) Sepals 4, united to the middle or beyond. Petals valvate in bud. Ovary 2-celled. Trees or shrubs. Flowers regular. Petals 2-4. Stamens 2-4. Style undivided. Stigma entire or bifid. *Oleaceae.*
 (b) Sepals 3 or 5, free or united at the base, rarely 4, free. Petals imbricate in bud, or only 1 present. Ovary 3-5-celled. 101.

101 (a) Flowers unisexual, regular. Shrubs or trees.* Sepals 4-5. Petals 4-5. Styles or sessile stigmas 4-5. Tropical America.

Guttiferae.

(b) Flowers hermaphrodite. Shrubs or trees with irregular flowers, or herbs or undershrubs. 102.

102 (a) Style 1, entire, with an entire or 2-lobed stigma. Ovary 3-celled. Flowers irregular. Shrubs or trees. Leaves entire. Fertile stamen usually 1, rarely 2 or 5-10. South America. *Vochysiaceae.*

(b) Style 1, with a 5-partite or rarely 3-partite stigma, or with several branches, or styles several, distinct. Ovary 5-celled, rarely 3-4-celled, but then flowers regular. 103.

103 (a) Style 1, undivided or cleft at the top, or wanting, and then 1 or several sessile stigmas. Ovules in each cell 2, rarely and only in irregular flowers more numerous. Herbs or undershrubs, rarely shrubs. *Geraniaceae.*

(b) Styles 2-5, free, with capitate stigmas.

* So also some *Euphorbiaceae* with 6 unequal perianth-leaves and 3 styles.

Ovules in each cell more than 2. Flowers regular. Herbs or undershrubs. Leaves undivided, stipulate. *Elatineae.*

- 104 (a) Styles 3-5, free or united at the base, filiform. Flowers hermaphrodite. Leaves exstipulate. Cotyledons distinctly developed, not very thick. Seeds without an aril. Leaves herbaceous.

Hypericineae.

- (b) Style wanting, or 1, entire or cleft at the top, or styles several, short and thick, rarely filiform, but then flowers (as usually) polygamous and leaves stipulate. Cotyledons thick and fleshy, or very small, or wanting. Seeds usually furnished with an aril. Leaves most frequently coriaceous. Trees or shrubs with a resinous juice. Tropics.

Guttiferae.

- 105 (a) Leaves stipulate.* Flowers hermaphrodite or polygamous, very rarely unisexual, and then with 4-5 sepals, 4-5 petals, and one undivided style or 1 sessile stigma. 106.

* Compare some *Euphorbiaceae* with 6 or rarely more, unequal perianth-leaves, unisexual flowers, and several free or partially united styles.

- (b) Leaves exstipulate. 115.
- 106 (a) Segments of the calyx imbricate in the bud (at least in the young bud). 107.
- (b) Segments of the calyx valvate or open in the bud. 111.
- 107 (a) Stamens 2-10. 108.
- (b) Stamens more than 10. 110.
- 108 (a) Ovary lobed. Style usually 1. Leaves usually lobed or compound. Herbs or undershrubs, rarely shrubs with irregular flowers. Ovary 5-celled. *Geraniaceae*.
- (b) Ovary entire. Styles usually several. Leaves simple, entire or rarely dentate. 109.
- 109 (a) Stamens free, 5. Shrubs or trees. Ovary 2-3-celled. Flowers regular. Tropics. *Chailletiaceae*.
- (b) Stamens united at the base. Herbs or undershrubs, more rarely shrubs or trees, but the stamens 10. Ovary 5-celled, rarely 3-4-celled. Flowers regular. *Lineae*.
- 110 (a) Petals 4. Ovary upon a long gynophore. Stigma sessile. Ovules in each cell more than 2. *Capparideae*.
- (b) Petals 5. Ovary sessile.* Style 1, simple.

* So also some *Dilleniaceae* with stipuliform wings on the petioles, and with several distinct styles.

- Ovules in each cell 2. Tropics of the Old World. *Dipterocarpeae.*
- 111 (a) Petals valvate in aestivation. Shrubs furnished with tendrils. Stamens as many as petals, 4-5, free. Ovary sessile, 2-celled, rarely 3-4-celled. *Ampelideae.*
- (b) Petals imbricate in aestivation. 112.
- 112 (a) Style wanting. Ovary raised above the stamens upon a long gynophore. Ovules attached to the walls (or dissepiments) of the ovary-cells. Petals 4. Filaments free. *Capparideae.*
- (b) Style present. Ovary sessile or stalked together with the stamens. Ovules attached to the inner angle of each ovary-cell. 113.
- 113 (a) Filaments free, more rarely united at the base into several clusters. Fertile stamens 10 or more. Anthers 2-celled, rarely the cells afterwards confluent. Style undivided. *Tiliaceae.*
- (b) Filaments united to the middle or beyond, or monadelphous at the base, rarely almost free, but then fertile stamens 5. 114.
- 114 (a) Anthers 1-celled. *Malvaceae.*
- (b) Anthers 2-celled. *Sterculiaceae.*

- 115 (a) Herbs or undershrubs. 116.
 (b) Shrubs or trees. 124.
- 116 (a) Stamens 2-10. 117.
 (b) Stamens more than 10. 123.
- 117 (a) Sepals 4. Petals 4. Stamens 6, four of which are longer than the two others, rarely fewer. Ovary 2-celled (very rarely 3-4-celled) or transversely several-celled. Style undivided. *Cruciferae*.
- (b) Sepals 5 or 3. Petals 5 or 3. 118.
- 118 (a) Segments of the calyx valvate in the bud. Stamens as many as the petals, and opposite to them. Ovary 3-7-celled. *Sterculiaceae*.
- (b) Segments of the calyx imbricate in the bud. Stamens as many as the petals, and alternate with them, or more numerous. 119.
- 119 (a) Ovary 2-celled. Style 1, with an entire or bidentate stigma, or styles 2. 120.
- (b) Ovary 5-celled. Style 1, with a 5-lobed stigma, or 5-partite, or styles 5, or a 5-partite sessile stigma. 121.
- 120 (a) Style 1, undivided. Undershrubs. Stamens 5. Asia, Africa, Australasia. *Pittosporae*.
- (b) Styles 2, free. Herbs. *Saxifrageae*.

- 121 (a) Style 1, undivided. Anthers dehiscing by apical pores. Herbs. Stamens 10. Ovules numerous. Europe, North and Central Asia, North and Central America.

Ericaceae.

- (b) Styles or sessile stigmas 5, free or united below. Anthers dehiscing by longitudinal slits. 122.

- 122 (a) Antheriferous stamens as many as the petals, 5. Glands on the outside of the staminal tube 5. Leaves undivided. Flowers regular. Ovary entire. Ovules in each cell 2. *Lineae.*

- (b) Antheriferous stamens more numerous than the petals, 5 or 10. Glands absent. *Geraniaceae.*

- 123 (a) Leaves pitcher-like. Style 1, lobed or cleft at the top. Seeds without an aril. Flowers solitary upon a radical scape. Ovary 5-celled. North America.

Sarraceniaceae.

- (b) Leaves not pitcher-like. Styles 2-5, free. Seeds furnished with an aril. India and Australia. *Dilleniaceae.*

- 124 (a) Stamens as many, or twice as many as petals. 125.

- (*b*) Stamens more than twice as many as petals. 129.
- 125 (*a*) Segments of the calyx valvate in aestivation. 126.
- (*b*) Segments of the calyx imbricate or open in aestivation. 127.
- 126 (*a*) Petals valvate in aestivation. Stamens 6-10, twice as many as the petals. Anthers dehiscing by 1 pore at the top. Ovary 2-celled. Leaves entire or dentate. Australia. *Tremandreae*.
- (*b*) Petals imbricate or open in aestivation. Stamens 5, as many as, and opposite to the petals. Anthers dehiscing by 2 pores or slits. Ovary 3-5-celled. Leaves entire, dentate, or lobed. *Sterculiaceae*.
- 127 (*a*) Ovules in each cell numerous. Leaves simple, entire or dentate.* Stamens 10-14, twice as many as the petals, free. Anthers dehiscing by 2 pores. Ovary 3-7-celled. *Ericaceae*.
- (*b*) Ovules in each cell 2. Leaves usually compound. Anthers dehiscing by longitudinal slits. 128.

* So also some *Pittosporae* with an almost completely septate (usually 2-celled) ovary and 5 isomerous stamens.

- 128 (a) Filaments free. Leaves glandular-dotted.
Rutaceae.
- (b) Filaments united into a tube. Leaves rarely dotted. *Meliaceae.*
- 129 (a) Ovary upon a long gynophore. Stigma 1, sessile. Ovules numerous, attached to the walls (or dissepiments) of each ovary-cell. *Capparideae.*
- (b) Ovary sessile. Stigma 1, upon a distinct style, or stigmas several, with or without styles. Ovules attached to the inner angle of each ovary-cell. 130.
- 130 (a) Styles several, free or cohering in the middle only. Anthers adnate. Ovary deeply lobed. Seeds with a copious albumen and a minute embryo. Tropics and Australia. *Dilleniaceae.*
- (b) Style 1, simple, more rarely several, but then anthers versatile. Ovary entire, or slightly lobed. Seeds without an albumen, or with a rather scanty albumen and a rather large embryo. 131.
- 131 (a) Ovules in each cell 2. Segments of the calyx enlarged in fruit, usually in the form of wings. Ovary 2-4-celled. Style undivided. Seeds thick, exalbuminous. Tropics of the Old World.
Dipterocarpeae.

(*b*) Ovules in each cell 3 or more. Segments of the calyx not remarkably enlarged in fruit. *Ternstroemiaceae.*

132 (*a*) Leaves stipulate. 133.

⁽⁹⁷⁾ (*b*) Leaves exstipulate. 146.

133 (*a*) Stamens as many as petals or fewer. 134.

(*b*) Stamens twice as many as petals or more. 139.

134 (*a*) Fertile stamen 1. Leaves entire, opposite or verticillate. Flowers irregular, hermaphrodite. Sepals 5. Petals 1-3, imbricate. Ovary 3-celled. Style entire. Ovules pendulous. South America.

Vochysiaceae.

(*b*) Fertile stamens 3-6. 135.

135 (*a*) Stamens as many as the petals and opposite to them. Tendril-bearing shrubs. Leaves alternate, usually lobed or compound. Flowers regular. Petals 4-5, valvate. Ovary 2-celled. Style entire or wanting. Stigma 1. Ovules ascending. *Ampelideae.*

(*b*) Stamens as many as the petals and alternate with them, or fewer. 136.

136 (*a*) Leaves compound, pinnate, rarely digitate. Flowers hermaphrodite. Ovary 2-4-lobed. *Sapindaceae.*

- (b) Leaves simple, entire or dentate. 137.
- 137 (a) Style 1, simple. Ovules erect or ascending. *Celastrineae*.
- (b) Style 1, cleft or divided, or styles several, Ovules pendulous or descending. 138.
- 138 (a) Petals 5, bifid, a little exceeding the calyx. Styles 2-3, entire, free or partially united. Fruit drupaceous. Seeds exalbuminous. Flowers hermaphrodite or polygamous, rarely dioecious. Segments of the calyx imbricate. Leaves alternate. Tropics. *Chailletiaceae*.
- (b) Petals usually scale-like or only 3-4, rarely 5 and a little exceeding the calyx, but then styles 3, bifid. Fruit capsular, rarely baccate or drupaceous, but with albuminous seeds. Flowers monœcious or dioecious. Leaves alternate. *Euphorbiaceae*.
- 139 (a) Style 1, undivided. 140.
- (b) Styles 2-5, free or united at the base only. 145.
- 140 (a) Leaves simple, entire or dentate. Stamens usually numerous. 141.
- (b) Leaves compound. Stamens 6-10. 144.
- 141 (a) Sepals 3. Stamens inserted within a free cup-shaped disc. Leaves alternate.

Sepals imbricate. Petals 5. Seeds albuminous. Madagascar. *Chlaenaceae*.

(b) Sepals 4-5. Stamens inserted on the calyx-tube, or on a cushion-shaped disc, or outside of a cup-shaped disc. 142.

142 (a) Stamens inserted upon a cushion-shaped disc. Ovules usually more than 2 in each cell. Leaves generally alternate. Flowers usually racemose. Segments of the calyx valvate, rarely slightly imbricate. Seeds albuminous. *Tiliaceae*.

(b) Stamens inserted on the calyx-tube, rarely at the base of a cup-shaped disc. Ovules in each cell of the ovary 2, pendulous or descending. 143.

143 (a) Leaves alternate. Segments of the calyx imbricate in the young bud. Seeds exalbuminous. Petals contorted in bud. Segments of the calyx enlarged in fruit, usually wing-like. Tropics of the Old World. *Dipterocarpeae*.

(b) Leaves opposite. Segments of the calyx valvate in the bud. Seeds albuminous. Flowers axillary, solitary or fascicled. Petals laciniate. Tropics and South Africa. *Rhizophoreae*.

144 (a) Leaves alternate, unequally pinnate, very

- rarely 1-3-foliolate. Sepals valvate in bud, united at the base or beyond. Trees. Stamens more or less perigynous. Ovary 2-4-celled, with a very short style and a lobed stigma. Tropics of the Old World. *Burseraceae*.
- (b) Leaves opposite, very rarely alternate but abruptly pinnate. Sepals imbricate in bud, free or united at the base, 4-5. Filaments usually each with a scale on the inner side. *Zygophylleae*.
- 145 (a) Styles 2. Stamens 8-12. Leaves usually opposite. *Saxifrageae*.
- (b) Styles 5. Stamens usually numerous. Leaves alternate. *Rosaceae*.
- 146 (a) Leaves simple. 147.
- (132) (b) Leaves compound.* 160.
- 147 (a) Leaves opposite or verticillate. 148.
- (b) Leaves alternate or (all) radical. 154.
- 148 (a) Stamens fewer than the petals, 3. Leaves undivided, not dotted. Sepals valvate. Anthers dehiscing by longitudinal or transversal slits. Style undivided. Ovary immersed in the disc, 3-celled. *Celastrineae*.

* Compare some *Saxifrageae*, herbs or undershrubs with dissected leaves and 2 free styles.

- (b) Stamens as many as the petals, or more numerous. 149.
- 149 (a) Ovules in each cell of the ovary 2. 150.
 (b) Ovules in each cell of the ovary more than 2. 151.
- 150 (a) Ovary 2-celled. Style 1 with 2 stigmas, or styles 2. Leaves not dotted. Stamens 4-12. *Sapindaceae*.
- (b) Ovary 3-5-celled. Style 1, undivided or divided at the base only, with 1 or 4-5 stigmas. Leaves glandular-dotted. Stamens 4-10. *Rutaceae*.
- 151 (a) Styles or sessile stigmas 5-10, sometimes united into a 5-fid style. Sepals imbricate or open in bud. Stamens numerous, with connate filaments. Ovary 5-10-celled. Tropics. *Guttiferae*.
- (b) Style 1, undivided. 152.
- 152 (a) Leaves glandular-dotted. Calyx-lobes imbricate or open in aestivation, Stamens perigynous. Anthers without appendages, dehiscing by 2 longitudinal slits, rarely by 2 terminal pores. Ovary 2-3-celled. Australasia and Malay Archipelago. *Myrtaceae*.
- (b) Leaves without dots. 153.
- 153 (a) Calyx-lobes imbricate or open in aestiva-

tion (sometimes almost wanting), rarely connate in the form of a cap. Anthers dehiscing by 1 pore at the top, rarely by 2 pores or 1 slit, usually appendaged. Stamens perigynous. Leaves usually with several longitudinal ribs.

Melastomaceae.

- (b) Calyx-lobes valvate in aestivation (but usually alternating with accessory teeth). Anthers dehiscing by 2 longitudinal slits.

Lythrarieae.

- 154 (a) Herbs or undershrubs.* Stamens 4-12. 155.
 (b) Shrubs or trees. 157.

- 155 (a) Stamens perigynous. Styles 2, free, rarely 4 sessile stigmas. Leaves perfectly developed. Stamens 4-10. Ovules numerous.

Saxifrageae.

- (b) Stamens hypogynous. Style 1, undivided, or styles 4-5, connate above. 156.
 156 (a) Plants destitute of green colour. Leaves scale-like, without dots. Ovules in each cell numerous. Stamens 6-12. Europe, Asia, North America. *Monotropeae.*

- (b) Plants of a green colour. Leaves per-

* Compare some *Nymphaeaceae* with hypogynous sepals, but usually epigynous petals, and with numerous stamens.

fect, glandular-dotted. Ovules in each cell few. Stamens 4-10. *Rutaceae.*

- 157 (a) Stamens numerous, more than twice as many as petals, perigynous. Leaves glandular-dotted. Ovules in each cell several or many. Australasia and Malay Archipelago. *Myrtaceae.*

(b) Stamens 2-10, twice as many as petals or fewer. 158.

- 158 (a) Stamens as many as petals and opposite to them, or only 2 stamens fertile. Petals 4-5, opposite to the sepals, 2 of them frequently much smaller than the 3 others, or only 3 present. Stamens hypogynous. Ovary 2-3-celled, with 2 ovules in each cell. Asia, America.

Sabiaceae.

(b) Stamens as many as petals and alternate with them, or fewer, or more numerous, 3-10.* 159.

- 159 (a) Leaves glandular-dotted. Radicle of the embryo superior. Ovules in each cell 2.

Rutaceae.

(b) Leaves without dots. Radicle of the

* Compare some *Passifloreae* with 5 petals, united below in the male flowers, but distinct in the females, with 10 stamens, more than 2 ovules in each ovary-cell, and dotless leaves.

- embryo inferior. Stamens as many as petals, or fewer, 3-5. *Celastrineae*.
- 160 (a) Stamens inserted within the disc.
 (146) Shrubs or trees. Flowers usually polygamous. Stamens as many as, and alternate with the petals, or more numerous. Radicle of the embryo inferior. *Sapindaceae*.
- (b) Stamens inserted outside the disc. 161.
- 161 (a) Fertile stamens 2. Petals 5, unequal (two of them being much reduced in size), or 3. Anthers dehiscing by pores or transversal slits. Radicle of the embryo inferior. Shrubs or trees. Leaves alternate. Flowers hermaphrodite or polygamous. Ovary 2-3-celled. Asia, America. *Sabiaceae*.
- (b) Fertile stamens as many as petals or more, rarely fewer, but then petals 4-5 and almost equal in size. Anthers dehiscing by longitudinal slits. Radicle of the embryo superior. 162.
- 162 (a) Stamens as many as petals and opposite to them. Flowers dicecious. Leaves alternate, not dotted. Shrubs or trees. Ovary 2-3-celled. Embryo undivided. America. *Simarubeae*.

- (b) Stamens as many as petals and alternate with them, or fewer, or more numerous. Flowers hermaphrodite or polygamous, rarely unisexual, in the latter case leaves opposite. 163.
- 163 (a) Stamens monadelphous, rarely free, but then as many as petals, and ovules more than 2 in each cell of the ovary. Shrubs or trees. Leaves alternate, not dotted. Style simple. *Meliaceae.*
- (b) Stamens free. Ovules in each cell of the ovary 2, rarely more, but then stamens more numerous than the petals. 164.
- 164 (a) Fruit drupaceous, but sometimes with a dehiscent epicarp. Seeds exalbuminous. Cotyledons contorted. Leaves almost invariably without dots, alternate. Trees or shrubs, abounding in balsam or resin. Style simple. *Burseraceae.*
- (b) Fruit various, but very seldom drupaceous, and then seeds albuminous and cotyledons plane. Leaves glandular-dotted. Shrubs or trees, more rarely herbs, in the latter case style simple. *Rutaceae.*
- 165 (a) Perfect stamens 1-10. 166.
- (a) (b) Perfect stamens more than 10. 191.

- 166 (a) Ovule in each complete cell of the ovary,
or in a 1-celled ovary 1.* 167.
- (b) Ovules in each complete cell of the ovary
or in a 1-celled ovary 2 or more. 179.
- 167 (a) Stamens as many as the petals and oppo-
site to them. 168.
- (b) Stamens as many as the petals, and
alternate with them, or fewer, or more
numerous. 169.
- 168 (a) Ovary 1-celled. Style simple, with an
entire stigma. Ovule fused with the
substance of the ovary before its fecunda-
tion. Radicle of the embryo superior.
Shrubs or trees, usually parasitical
shrubs growing upon trees.

Loranthaceae.

- (b) Ovary 2-4-celled. Style simple, with a
lobed stigma or with several stigmas, or
divided more or less. Ovules erect.
Radicle of the embryo inferior. Ter-
restrial shrubs or trees. *Rhamnaceae.*

- 169 (a) Style 1, simple or cleft at the apex only,
or sessile stigma 1. 170.
- (b) Styles 2 or more, free or connected at

* In *Loranthaceae* the ovule is not to be distinguished
from the substance of the ovary at the time of flowering.

- the base only, or sessile stigmas 2 or more. 175.
- 170 (a) Petals valvate in aestivation. 171.
 (b) Petals imbricate or contorted in aestivation. 173.
- 171 (a) Herbs or undershrubs. Seeds without albumen. Stem climbing or prostrate. Flowers unisexual. Calyx valvate or open in bud. Stamens as many as petals, or more frequently fewer. Anthers extrorse. *Cucurbitaceae*.
- (b) Shrubs or trees. Seeds with copious albumen. 172.
- 172 (a) Leaves simple, entire dentate or lobed, exstipulate. Ovary 1-4-celled. Ovules with a lateral or dorsal raphe. Calyx valvate or open in bud. Stamens as many as petals or more. Anthers dehiscent introrsely or laterally. *Cornaceae*.
- (b) Leaves compound, rarely simple, but then ovary 5- or more-celled and leaves usually stipulate. Ovules with a ventral raphe. Calyx-limb short or scarcely perceptible. Stamens as many as petals. *Arabiaceae*.
- 173 (a) Segments of the calyx 2-4, valvate in

the bud. Petals 2-4, contorted in the bud. Stamens 2, 4, 6, or 8. Herbs or undershrubs, very rarely shrubs. Leaves herbaceous. Seeds without albumen.

Onagrariaceae.

- (b) Segments of the calyx 5 (very rarely 4), imbricate in the young bud. Petals 5 (very rarely 4), imbricate in the bud. Stamens 5 or 10, very seldom 4 or 8. Shrubs, rarely undershrubs, usually heath-like. 174.

- 174 (a) Stamens 4-5. Ovary half-inferior. Seeds with copious albumen. Flowers capitate, rarely paniculate. Anthers dehiscing by longitudinal slits. Ovary 1-2-celled. South Africa. *Bruniaceae.*

- (b) Stamens 8-10. Ovary inferior. Seeds without albumen. Ovary 1-2-celled. Australia. *Myrtaceae.*

- 175 (a) Ovary half-inferior. Fruit capsular. 176.

- (b) Ovary inferior. Fruit indehiscent or separating into two indehiscent cocci.

177.

- 176 (a) Leaves stipulate. Seeds with a crustaceous or horny testa and a thin albumen. Shrubs or trees. Leaves petiolate. Flowers racemose or capitate. Sepals

usually valvate in bud. Styles 2. Asia and Madagascar. *Hamamelideae.*

- (b) Leaves exstipulate. Seeds with a membranous testa and a copious albumen. Undershrubs or low heath-like shrubs. Leaves sessile or shortly petiolate. Flowers capitate or paniculate. Sepals and petals imbricate in bud. Styles 2. South Africa. *Bruniaceae.*

- 177 (a) Petals 2-4 or in the female flowers wanting. Herbs or undershrubs. Flowers solitary, fascicled and axillary, spicate, racemose, or paniculate. Anthers basifixed. Testa membranous.

Haloragae.

- (b) Petals 5 or more, rarely 4, but then shrubs or trees. 178.

- 178 (a) Fruit baccate or drupaceous. Disc usually entire. Anthers dorsifixed. Seeds with a membranous testa and a copious albumen.

Arabiaceae.

- (b) Fruit separating into two nuts. Disc bilobed. Flowers umbellate or capitate. Petals 5. Stamens 5. Styles 2. Seeds with a membranous testa and a copious albumen. *Umbelliferae.*

- 179 (a) Style 1, simple or cleft at the apex only,
 (166) or sessile stigma 1. 180.
 (b) Styles 2 or more, free or connected at
 the base only, or sessile stigmas 2 or
 more. 188.
- 180 (a) Petals valvate in aestivation. 181.
 (b) Petals imbricate (or contorted) in aestiva-
 tion. 184.
- 181 (a) Stamens 8-10, twice as many as petals.
 Segments of the calyx valvate in aestiva-
 tion. Shrubs or trees. Flowers usually
 polygamous. Ovary 1-celled. Ovules
 2-6, suspended from the top of the cell.
 Seeds exalbuminous. Tropics and South
 Africa. *Combretaceae.*
- (b) Stamens 2-6, as many as petals, or fewer.
 Segments of the calyx imbricate or open
 in aestivation. 182.
- 182 (a) Flowers unisexual. Seeds exalbuminous.
 Stem climbing or prostrate, usually
 herbaceous. Anthers extrorse.
Cucurbitaceae.
- (b) Flowers hermaphrodite. Seeds albumin-
 ous.* Shrubs or trees. 183.

* So also some herbaceous *Campanulaceae*, the petals of
 which are only slightly coherent, and frequently separate
 afterwards to the base.

183 (a) Stamens as many as petals and opposite to them, or fewer. Ovules suspended from the top of the cavity or a free central placenta. Fruit a drupe. Ovary incompletely septate. Ovules 2-5. Tropics. *Olacineae.*

(b) Stamens as many as petals and alternate with them. Ovules parietal or axile. Fruit a berry or a capsule.

Saxifrageae.

184 (a) Ovary 1-celled. Ovules apical (*i.e.*, suspended from the top of the cell). Shrubs or trees. Calyx valvate. Anthers dehiscent by longitudinal slits. Seeds exalbuminous. Tropics and South Africa.

Combretaceae.

(b) Ovary 1-celled, with basal central or parietal ovules, or several-celled. 185.

185 (a) Leaves glandular-dotted. Stamens twice as many as petals, rarely isomerous; in the latter case leaves opposite. Shrubs. Calyx imbricate or open in bud. Ovary 1-3-celled. Seeds exalbuminous. Australasia, South Asia, South America.

Myrtaceae.

(b) Leaves without dots, very rarely glandular-dotted, and then alternate and stamens isomerous. 186.

- 186 (a) Anthers dehiscing at the apex by 1-2 pores, rarely by 1 slit. Leaves usually opposite and with several longitudinal ribs. Stamens as many, or twice as many, as petals. Connective usually appendaged. Ovary 1-celled, with a free central placenta, or several-celled. Seeds exalbuminous. *Melastomaceae.*
- (b) Anthers dehiscing by two longitudinal slits.* 187.
- 187 (a) Ovary 1-3-celled. Petals imbricate or open in aestivation. Seeds albuminous. Ovary 1-celled, with several or numerous parietal ovules, or several-celled, with numerous axile ovules. Stamens as many as petals. *Saxifrageae.*
- (b) Ovary completely or incompletely 4-5-celled. Petals contorted in aestivation. Seeds exalbuminous. Calyx valvate in aestivation. *Onagrarieae.*
- 188 (a) Stamens as many as the petals and opposite to them, 6-7, rarely 4-5 or 8. Shrubs or trees. Flowers hermaphrodite.

* Compare *Celastrineae*, the ovary of which is not distinctly inferior, but frequently partially immersed into the disc. They have an imbricate calyx, and a several-celled ovary, with 2 or few ascending ovules in each cell.

Anthers opening outwardly or laterally.
Ovary half-inferior, 1-celled. Seeds
albuminous. *Samydaceae.*

(*b*) Stamens as many as the petals and alter-
nate with them, or fewer, or more
numerous, 2-5 or 8-10. 189.

189 (*a*) Flowers unisexual. Stamens 2-5.
Anthers adnate, opening outwardly.
Seeds exalbuminous. Climbing herbs or
shrubs. *Cucurbitaceae.*

(*b*) Flowers hermaphrodite, rarely unisexual,
but then stamens 8. Anthers opening
inwardly or laterally. Seeds albuminous.
190.

190 (*a*) Stamens 8. Herbs or undershrubs.
Anthers attached at the base. Ovules
2-4, pendulous. Leaves exstipulate.
Petals 4, or in the female flowers 0.
Ovary 1-celled. *Haloragaceae.*

(*b*) Stamens 10 or 2-5, rarely 8, but then
shrubs or trees. Anthers usually at-
tached at the back. Ovules usually
numerous. *Saxifrageae.*

191 (*a*) Style 1, simple, rarely cleft at the apex
(¹⁶⁵) (in the latter case petals valvate in
aestivation), or sessile stigma 1. 192.

(*b*) Styles 2 or more, free or united at the

- base, or sessile stigmas 2 or more.
 Petals imbricate in aestivation. 196.
- 192 (a) Leaves stipulate, opposite. Shrubs or trees. Calyx valvate in bud. Ovary several-celled, with 2 ovules in each cell, very rarely 1-celled. Tropics.
Rhizophoreae.
- (b) Leaves extipulate. 193.
- 193 (a) Petals induplicate-valvate in aestivation, 4-5. Ovary 1-celled. Ovules parietal or apical. Leafy herbs or shrubs. America and Africa. *Loaseae.*
- (b) Petals imbricate in aestivation, rarely open or closed (in the form of a cap).
 194.
- 194 (a) Ovary 1-celled, with numerous ovules attached to several parietal placentas. Succulent plants, usually destitute of perfect leaves, rarely provided with large and dotless leaves. Petals 6 or more. *Cacteeae.*
- (b) Ovary 1-celled, with 2-10 ovules attached to a basal or central placenta, or more frequently several-celled. Plants provided with leaves. 195.
- 195 (a) Leaves opposite or verticillate, without dots. Anthers dehiscing by 1 apical

pore, rarely by 2 pores or by slits. Leaves usually with several longitudinal ribs. Connective usually appendaged. Ovary several-celled. Seeds exalbuminous. *Melastomaceae.*

- (b) Leaves opposite and glandular-dotted, or more frequently alternate. Anthers dehiscing by 2 longitudinal slits, rarely by 2 apical pores.* Stamens inserted upon an epigynous disc, which lines the calyx-tube. Seeds exalbuminous.

Myrtaceae.

196 (a) Leaves stipulate. 197.

(b) Leaves exstipulate. 199.

197 (a) Flowers monœcious, irregular. Sepals in the male flowers 2. Ovary several-celled, with numerous ovules in each cell. Leaves alternate, unequal-sided. Anthers adnate. Seeds exalbuminous.

Begoniaceae.

(b) Flowers hermaphrodite, regular. Sepals 4-8. Ovary several-celled with 1-2 ovules in each cell, or 1-celled. 198.

198 (a) Ovary 1-celled. Seeds albuminous.

* So also some *Styracaceae*, the petals of which are only very slightly coherent at the base. They have albuminous seeds and no disc.

Scalp. 54
No. 104
b.

Petals 6-8, very rarely 4-5. Trees or shrubs. Leaves alternate. Ovary half-inferior. Ovules several or many, parietal. *Samydaceae.*

(*b*) Ovary several-celled. Seeds exalbuminous. Petals 5. Leaves alternate, without dots. Ovules in each cell 1-2.

Rosaceae.

199 (*a*) Shrubs. Calyx-segments valvate in aestivation. Petals 4-5. Ovules axile. Albumen fleshy. Leaves opposite. Ovary 2-10-celled. Fruit capsular. *Saxifrageae.*

(*b*) Herbs or undershrubs. Calyx-segments imbricate in aestivation. Petals numerous. Ovules parietal or basal. Albumen mealy. 200.

200 (*a*) Aquatic plants with floating leaves on long radical petioles. Ovules attached to the dissepiments of the ovary. Fruit a berry. Embryo straight. Flowers solitary. Anthers adnate. Ovary many-celled. *Nymphaeaceae.*

(*b*) Terrestrial plants with fleshy, usually opposite leaves. Ovules attached to basal or parietal placentas. Fruit a capsule. Embryo curved. Petals linear. Ovary 4-20-celled. *Ficoideae.*

GAMOPETALAE.

- 1 (a) Ovary superior or nearly so. 2.
 (b) Ovary inferior to half-inferior. 95.
- 2 (a) Perfect stamens as many as corolla-lobes
 and opposite to them, or more numer-
 ous. 3.
 (b) Perfect stamens as many as corolla-lobes
 and alternate with them, or fewer. 27.
- 3 (a) Ovaries several, distinct or united at the
 base only, with separate styles and
 stigmas. 4.
 (b) Ovary 1, entire or lobed, in the latter case
 with partially or wholly connate styles.
 5.
- 4 (a) Sepals 3. Corolla-lobes 6, rarely 3.
 Stamens numerous. Anthers extrorse.
 Fruits baccate. Albumen copious, rumi-
 nated. Shrubs or trees. Tropics.
Anonaceae.
 (b) Sepals 4-20. Corolla-lobes 4-20. Stamens
 twice as many. Anthers introrse.
 Fruits follicular, several or many-

seeded. Albumen sparing. Herbs or undershrubs, rarely shrubs.

Crassulaceae.

- 5 (a) Ovary perfectly 1-celled. 6.
 (b) Ovary perfectly, rarely imperfectly several-celled. 11.
 6 (a) Ovule 1. 7.
 (b) Ovules 2 or more. 8.
 7 (a) Styles 3, or style 1 with 3 stigmas.*

Flowers dioecious; male flowers with 4 calyx-lobes, 4 corolla-lobes, and 4 connate stamens; female flowers with 1 sepal and 1-2 petals. *Menispermaceae.*

- (b) Styles 5, or style 1 with 5 stigmas. Flowers hermaphrodite, with 5 calyx-lobes, 5 corolla-lobes, and 5 stamens.

Plumbagineae.

- 8 (a) Ovules attached to the ventral suture of the ovary.** Leaves usually compound and stipulate. Flowers regular with valvate, or irregular with imbricate

* So also some *Polygonaceae* with a calyx-like involucre, a 6-partite perianth, and usually 9 stamens, and some *Chenopodiaceae* with 2 sepaloid bracteoles, adnate to the 5-partite perianth.

** So also some *Sterculiaceae*, the petals of which are adnate to the staminal tube. They have regular flowers with imbricate corolla-lobes and isomerous stamens.

corolla-lobes. Stamens twice as many as corolla-lobes, or more. Style and stigma entire. Fruit usually a legume. Albumen sparing or 0. *Leguminosae*.

- (b) Ovules attached to a free central placenta. Leaves simple, entire dentate or lobed, in a few aquatic plants dissected. Flowers usually regular and with imbricate corolla-lobes. 9.

9 (a) Sepals 2. Stigmas 3. Albumen mealy. *Portulacaceae*.

- (b) Sepals 3-9. Stigma 1, entire or lobed. Albumen fleshy or horny. 10.

10 (a) Herbs. Fruit capsular. Seeds 2 or more. Anthers introrse. Leaves exstipulate. Fertile stamens as many as corolla-lobes. Stigma entire. *Primulaceae*.

- (b) Shrubs or trees. Fruit indehiscent, more or less drupaceous. Seed 1, less frequently 2 or more, and then anthers extrorse. Leaves exstipulate. Fertile stamens as many as corolla-lobes.

Myrsineae.

11 (a) Leaves stipulate (but stipules sometimes minute and caducous). 12.

- (b) Leaves exstipulate. 16.

12 (a) Flowers unisexual. Corolla-lobes imbri-

- cate or contorted in aestivation. Disc present. Anthers 2-celled. Styles 2-4. Ovule in each cell 1. *Euphorbiaceae.*
- (b) Flowers hermaphrodite, very rarely polygamous. 13.
- 13 (a) Corolla-lobes valvate in aestivation. Stamens 5. Ovule in each cell 1. Shrubs or trees. Anthers 2-celled. Stigma 1. *Ampelideae.*
- (b) Corolla - lobes contorted - imbricate in aestivation. Stamens 10 or more, rarely 5, but then ovules in each cell 2 or more. 14.
- 14 (a) Segments of the calyx imbricate in the young bud. Ovary 2-4- (nearly always 3-) celled. Filaments free or united at the base only. Resinous trees or climbing shrubs. Calyx enlarged in fruit. Anthers 2-celled. Ovules 2. Tropics of the Old World. *Dipterocarpeae.*
- (b) Segments of the calyx valvate in the bud. Ovary usually 5- or more-celled, rarely 2-4-celled, but then filaments united to the middle or beyond. Filaments always united more or less. 15.
- 15 (a) Anthers 2-celled, rarely the cells confluent at the top, in this case ovary stalked.

Ovary 5-celled, with 2 or more ovules in each cell. *Sterculiaceae.*

(b) Anthers 1-celled. Ovary sessile.

Malvaceae.

16 (a) Flowers unisexual, rarely polygamous. Styles several, free or partially united.

17.

(b) Flowers hermaphrodite.

19.

17 (a) Ovules in each cell of the ovary 1-2. Shrubs or trees. Juice not milky. Leaves entire. Sepals more or less united. Corolla-lobes contorted in aestivation.

Ebenaceae.

(b) Ovules in each cell of the ovary more than 2. 18.

18 (a) Stamens 10. Ovules parietal. Shrubs or trees. Juice milky. Calyx 5-lobed. Corolla-lobes valvate, rarely contorted in aestivation. Tropical America.

Passifloreae.

(b) Stamens more than 10. Ovules axile. Shrubs. Leaves undivided. Sepals free or united at the base. Corolla-lobes imbricate, rarely contorted in aestivation.

Ternstroemiaceae.

19 (a) Sepals free or united at the base only.

- Corolla-lobes imbricate or contorted in aestivation. 20.
- (b) Sepals united to the middle or beyond. 24.
- 20 (a) Stamens more than twice as many as corolla-lobes, 9 or more. Shrubs or trees. Leaves undivided. Flowers regular. *Ternstroemiaceae.*
- (b) Stamens as many to twice as many as corolla-lobes, rarely more, but only 8. 21.
- 21 (a) Styles 5, free or connate at the base. Herbs or undershrubs. Stamens 10. Leaves usually compound. Flowers regular. Anthers dehiscing by longitudinal slits. Ovary 5-celled. *Geraniaceae.*
- (b) Style 1. Shrubs or trees, rarely herbs or undershrubs, but then stamens 4-8. Leaves simple, entire or dentate. 22.
- 22 (a) Flowers irregular. Ovary 2-4-celled, with 1-4 ovules in each cell. Stamens monadelphous. Anthers 4-8, dehiscing by a pore at the apex. *Polygaleae.*
- (b) Flowers regular, rarely slightly irregular, but then ovary 5-celled, with numerous ovules in each cell. Stamens usually free. Shrubs or trees. 23.
- 23 (a) Stamens as many as the lobes of the corolla,

rarely more numerous ; in the latter case anthers extrorse. Anthers dehiscent by 2 longitudinal slits. Ovule in each cell 1. Leaves alternate. Fruit a berry, with 1-12 seeds. Juice milky. *Sapotaceae*.

(b) Stamens more numerous than the lobes of the corolla. Anthers introrse, usually dehiscent by apical pores. Ovules in each cell 2 or more, rarely 1, but then anthers dehiscent by pores or leaves verticillate. Fruit a capsule, more rarely a berry with numerous seeds or a drupe. *Ericaceae*.

24 (a) Leaves translucently dotted. Ovary deeply lobed, with two ovules in each cell. Trees or shrubs. Corolla-lobes valvate in bud. Stamens 4-8. Anthers bursting lengthwise. Ovary 4-5-celled. America and Australia. *Rutaceae*.

(b) Leaves without dots. Ovary entire or slightly lobed, rarely deeply, but then with more than 2 ovules in each cell. 25.

25 (a) Leaves compound, usually pinnate. Filaments united nearly to the top. Ovules in each cell 2. Leaves alternate. Corolla-lobes valvate, very rarely imbricate in bud. Anthers 8-10, bursting lengthwise. Style 1. Tropics. *Meliaceae*.

- (b) Leaves simple, entire or dentate. Filaments free or united at the base, rarely higher upwards, but then ovules in each cell more than 2. 26.
- 26 (a) Ovary 3-celled. Anthers bursting lengthwise. Corolla-lobes valvate, rarely imbricate in aestivation. Shrubs or trees. Leaves alternate. Stamens 10. Style 1.
Styraceae.
- (b) Ovary 4- or more-celled, rarely 2-celled. Anthers usually bursting at the top. Corolla-lobes imbricate or contorted in aestivation. Style 1. *Ericaceae.*
- 27 (a) Perfect stamens as many as corolla-lobes,
(2) 3 or more. Flowers usually regular. 28.
- (b) Perfect stamens fewer than corolla-lobes, 2-4,* rarely as many as corolla-lobes but only 2. Flowers usually irregular. 74.
- 28 (a) Ovary single and 1-2-celled, or distinct ovaries 2. 29.
- (b) Ovary single and 3- or more-celled, or distinct ovaries 3 or more. 56.

* In some *Sapotaceae* the corolla-lobes, which are equal in number (6-8) and opposite to the stamens, are furnished each with 2 petaloid appendages of the same size, so that there seem to be three times as many corolla-lobes as stamens.

- 29 (a) Ovules in the whole (or in each) ovary
1-4. 30.
- (b) Ovules in the whole (or in each) ovary
more than 4. 45.
- 30 (a) Leaves opposite or verticillate. 31.
- (b) Leaves alternate, radical, or wanting. 36.
- 31 (a) Stamens free from the corolla. Anthers
dehiscing at the apex by pores or broad
slits. Corolla-lobes 4, contorted in aesti-
vation. Small shrubs. Leaves whorled.
Stigma 1. Ovary 1-2-celled, with 1 ovule
in each cell. *Ericaceae.*
- (b) Stamens inserted on the corolla. Anthers
dehiscing by longitudinal slits. Corolla-
lobes 5, contorted, or 4-5, imbricate or
valvate in aestivation. 32.
- 32 (a) Ovule 1. Trees or shrubs. Leaves op-
posite. Corolla 4-partite, imbricate in
bud. Stigma 1. Asia and Africa.
Salvadoraceae.
- (b) Ovules 2-4. 33.
- 33 (a) Style stigmatose below the apex only.
Corolla-lobes 5, contorted in aestivation.
Shrubs or trees. Ovary 2-celled or 2
distinct ovaries. *Apocynaceae.*
- (b) Style stigmatose at the apex or between

- its lobes. Corolla-lobes imbricate or valvate in aestivation. 34.
- 34 (a) Corolla scarious. Fruit dehiscing transversely. Calyx 4-partite. Corolla 4-fid, imbricate in bud. Stigma 1. Ovary 2-celled. *Plantagineae*.
- (b) Corolla not scarious. Fruit dehiscing septicidally or indehiscent. 35.
- 35 (a) Corolla valvate in the bud, very rarely imbricate; in the latter case stigmas 4. Leaves furnished with stipules or connected by a transverse line at their base. Shrubs or trees. Stigmas 2-4. Ovary 2-celled. *Loganiaceae*.
- (b) Corolla imbricate in the bud. Stigmas 1-2. Leaves destitute of stipules. Ovary 2-celled or incompletely 2-4-celled. *Verbenaceae*.
- 36 (a) Corolla valvate or plaited in aestivation (in the latter case sometimes twisted, but not imbricate). 37.
- (b) Corolla imbricate in aestivation (sometimes twisted, but not plaited). 40.
- 37 (a) Ovules erect. Stigmas usually 2. Corolla usually plaited in aestivation. Leaves exstipulate. Sepals free or united at the base, imbricate in bud. Anthers de-

- hiscing by 2 longitudinal slits. Ovules 2-4. Embryo folded. *Convolvulaceae*.
- (b) Ovules pendulous or descending. Stigma 1. Corolla valvate in aestivation. 38.
- 38 (a) Leaves bipinnate, stipulate. Flowers in spikes or heads. Calyx small, valvate or open in bud. Anthers dehiscing by 2 longitudinal slits. Ovary 1-celled, with 2-4 ovules. *Leguminosae*.
- (b) Leaves simple, entire dentate or lobed, exstipulate. 39.
- 39 (a) Anthers dehiscing by 1 longitudinal slit. Ovary 1-2-celled, with 1 ovule in each cell. Sepals free or united at the base, imbricate in bud. Shrubs or trees. Embryo straight. Australasia and South Asia. *Epacrideae*.
- (b) Anthers dehiscing by 2 longitudinal slits. Ovary 1-celled, with 2 ovules. Sepals usually united to the middle or beyond, imbricate or open in bud. Shrubs or trees. Embryo straight. *Olacineae*.
- 40 (a) Plants destitute of green colour and of leaves. Parasitical herbs. Stem twining. Ovules 4. *Convolvulaceae*.
- (b) Plants of a green colour, provided with leaves. 41.

- 41 (a) Stamens 4. 42.
 (b) Stamens 5. 43.
- 42 (a) Flowers regular. Calyx 4-partite. Stamens equal or nearly equal in length. Anthers 2-celled. Ovules erect or horizontal. Fruit usually dehiscent transversely. Radicle of the embryo inferior. Herbs or undershrubs. *Plantagineae*.
- (b) Flowers more or less irregular. Calyx spathaceous (split on one side), or 2-partite, or 5-lobed. Stamens didynamous. Anthers 1-celled. Ovules pendulous. Fruit indehiscent or separating into 2 nuts. Radicle of the embryo superior. Ovules 1-2. Europe, Asia, Africa. *Selagineae*.
- 43 (a) Style stigmatose below the smooth, 2-lobed apex. Stigma 1. Shrubs or trees. Corolla contorted in aestivation. Leaves entire. Ovary 2-lobed and 2-celled, or 2 distinct ovaries. Ovules 4. *Apocynaceae*.
- (b) Style stigmatose at the apex, or at the apices of its branches, or between the apical lobes. Stigmas usually 2, rarely and only in herbaceous plants 1. Corolla imbricate in aestivation, rarely contorted,

but then stem herbaceous. Ovary 1, entire or bilobed. 44.

44 (a) Ovary 1-celled (sometimes incompletely 2-celled). Herbs. Style 2-fid. Leaves lobed or divided, rarely entire or dentate. Ovules 4. *Hydrophyllaceae.*

(b) Ovary 2-celled (2-lobed or incompletely 4-celled). Shrubs or trees, rarely herbs, but then style undivided. Leaves entire or dentate, rarely lobed. Ovules 2-4. *Boragineae.*

45 (a) Ovary 1, 1-celled, with a sutural placenta. Leaves compound, bipinnate, stipulate, alternate. Flowers regular, spicate or capitate. Corolla-lobes valvate in bud. Stigma 1, terminal. (29)

Leguminosae.

(b) Ovary 1, 1-celled, with 2 parietal rarely basal or central placentas, or 2-celled, or distinct ovaries 2. Leaves simple, but sometimes dissected. 46.

46 (a) Style stigmatose only on the outer face of its thickened top (below the apex or the apical lobes). Ovaries usually 2, distinct, but the styles connate at the top. Plants with a milky juice, undivided, usually opposite leaves (sometimes with-

- out leaves), and 5-merous regular flowers. 47.
- (b) Style stigmatose at (or up to) the apex or between its lobes. Ovary 1, entire or slightly lobed. 48.
- 47 (a) Styles separate up to the common thickened top. Stigma furnished with 5 glands, alternate with the anthers, to which the pollen adheres. Pollen usually wax-like and cohering into masses. Anthers usually adhering to the thickened top of the style. Ovaries 2, distinct. *Asclepiadeae*.
- (b) Styles separate at the base only, or wholly united. Stigma without glands, but sometimes furnished with appendages, opposite to the anthers, to which, however, the pollen does not adhere. Pollen granular. Anthers usually free. Thickened top of the style usually apiculate above the stigma, or contracted in the middle. *Apocynaceae*.
- 48 (a) Stamens free from the corolla. Leaves alternate. Flowers regular, or nearly so. Corolla-lobes 5, imbricate in bud. Style undivided. Asia, Africa, Australasia. *Pittosporae*.

- (*b*) Stamens inserted on the tube of the corolla. 49.
- 49 (*a*) Leaves (all) opposite or verticillate. Flowers regular, or nearly so. 50.
- (*b*) Leaves alternate (but sometimes in pairs, or the lowermost opposite) or radical or wanting, rarely opposite or verticillate, but then flowers distinctly irregular with a 2-lipped corolla. 51.
- 50 (*a*) Ovary 1-celled, or incompletely 2-celled, more rarely completely 2-celled; in the latter case herbs and corolla-lobes contorted in aestivation. Herbs, rarely shrubs, and then stigma 2-partite. Leaves exstipulate, but sometimes sheathing at the base, entire. Corolla-lobes contorted, very rarely (otherwise) imbricate in the bud. *Gentianeae*.
- (*b*) Ovary completely 2-celled, rarely incompletely, but then trees or shrubs and stigma entire. Herbs with valvate or imbricate (but not contorted) corolla-lobes, or more frequently shrubs or trees. Leaves stipulate or sheathing at the base, entire or dentate. Stigma entire, very rarely bipartite. *Loganiaceae*.
- 51 (*a*) Style 2-fid or 2-partite, with terminal

- stigmas. Herbs or undershrubs. Flowers regular. Corolla-lobes imbricate or contorted in bud. Stamens 5, very rarely 6-10. *Hydrophyllaceae.*
- (b) Style undivided, with an entire or 2-partite stigma. 52.
- 52 (a) Ovary 1-celled. 53.
- (b) Ovary 2-celled. 54.
- 53 (a) Corolla-lobes valvate or contorted in aestivation, in the latter case leaves reduced to scales. Stigma 2-partite, more rarely entire, and then leaves reduced to scales. Flowers regular or nearly so. Leaves entire, radical or alternate, or reduced to scales. Herbs. *Gentianeae.*
- (b) Corolla-lobes imbricate in aestivation. Leaves perfectly developed. Stigma entire. Flowers more or less irregular. Leaves entire or dentate. Herbs. *Gesneraceae.*
- 54 (a) Corolla scarious, 4-lobed, regular, imbricate in aestivation. Herbs or undershrubs. Fruit dehiscing transversely below the middle. Disc 0. Stigma entire. *Plantagineae.*
- (b) Corolla not scarious, 5-8-lobed, more rarely 4-lobed, but then irregular (2-lipped) or

plaited or valvate in aestivation or shrubs or trees. Fruit indehiscent or dehiscent longitudinally, rarely transversely above the middle. 55.

- 55 (a) Corolla valvate or plaited in aestivation (sometimes plaited and imbricate at the same time), rarely imbricate and not plaited, in this case fruit berried or dehiscent transversely, embryo much curved (in a more or less annular or spiral form), and corolla usually regular and with a long tube. Dissepiment of the ovary usually oblique to the axis of the flower. Inflorescence usually cymose. Leaves alternate, but sometimes in pairs.

Solanaceae.

- (b) Corolla imbricate and not plaited in aestivation. Fruit dehiscent longitudinally. Embryo straight, or but little curved. Corolla regular, with a very short tube, or more frequently irregular. Dissepiment of the ovary transverse to the axis of the flower. Inflorescence racemose, but sometimes consisting of cymes. Herbs or undershrubs.

Scrophularineae.

- 56 (a) Ovules in each cell of the ovary 1-2. 57.

- (b) Ovules in each cell of the ovary more than 2. 69.
- 57 (a) Leaves opposite or verticillate. 58.
 (b) Leaves alternate or (all) radical. 62.
- 58 (a) Stamens free from the corolla. Anthers dehiscing by apical pores. Small shrubs. Leaves whorled. Corolla regular; lobes contorted in aestivation. Stamens 4. Style and stigma entire. *Ericaceae*.
- (b) Stamens inserted on the corolla. Anthers dehiscing by longitudinal slits. 59.
- 59 (a) Ovary-cells 3. Stigmas 3. Fruit dehiscing loculicidally. Herbs or undershrubs. Corolla regular; lobes contorted in aestivation. Stamens 5. Europe, Asia, America. *Polemoniaceae*.
- (b) Ovary-cells 4-5. Stigmas 1, 2, 4 or 5. Fruit indehiscent or separating into nuts. 60.
- 60 (a) Ovary entire. Corolla-lobes imbricate in bud. Stigmas 2, rarely 5. *Verbenaceae*.
- (b) Ovary 4-partite. 61.
- 61 (a) Stamens 4. Stigmas 2, rarely 1. Flowers usually in false-whorls. Corolla-lobes imbricate in bud. *Labiatae*.
- (b) Stamens 5. Stigma 1. Corolla regular. *Boragineae*.

- 62 (a) Plants destitute of green colour. Leaves reduced to scales. Ovary 12-28-celled, entire. Herbs. Style and stigma 1. Stamens 5-8. North America.

Lennoaceae.

- (b) Plants of a green colour. Leaves perfectly developed. Ovary 3-10-celled, rarely many-celled, but then either divided or stem woody.* Style undivided or 2-4-partite. 63.

- 63 (a) Anthers dehiscing by 1 longitudinal slit. Corolla valvate in aestivation. Flowers solitary, spicate or racemose. Shrubs or trees. Stamens 5. Stigma 1. Australasia and South Asia. *Epacrideae.*

- (b) Anthers dehiscing by 2 longitudinal slits, or 2 apical pores. Corolla imbricate, contorted, plaited, or induplicate in aestivation; in the latter case inflorescence cymose. 64.

- 64 (a) Anthers attached at the base, opening laterally or at the top. Corolla contorted in aestivation. Shrubs or trees. Flowers unisexual or polygamous.

Ebenaceae.

* Compare some *Lineae*, the petals of which are sometimes slightly coherent at their edges. They have a herbaceous stem, five stamens, and a 5-partite style.

- (b) Anthers attached at the base, but opening inwardly (in this case corolla imbricate in bud), or more frequently attached at the back. Herbs or undershrubs, more rarely shrubs or trees, but then corolla imbricate plaited or induplicate in aestivation. 65.
- 65 (a) Stamens 4. Style and stigma entire. Herbs or undershrubs. Corolla scarious, imbricate in bud. Flowers solitary, spicate or capitate. *Plantagineae*.
- (b) Stamens 5 or more, rarely 4; in the latter case style 2-partite or shrubs or trees. 66.
- 66 (a) Ovary 3-celled. Stigmas 3.* Corolla contorted and not plaited in aestivation. Ovary entire. Cotyledons plane. Herbs or undershrubs. Calyx gamosepalous. Stamens 5. Fruit capsular. Europe, Asia, America. *Polemoniaceae*.
- (b) Ovary usually 4- or more-celled and stigmas 1-2 or 4-8, rarely ovary 3-celled and stigmas 1-3, in this case corolla

* So also in some *Stackhousiaceae*, the petals of which are free at the base, but connate in the middle, and imbricate in aestivation. Their ovary is lobed.

plaited in aestivation and cotyledons folded. 67.

67 (a) Shrubs or trees. Petals united at the base only. Style undivided or wanting. Corolla-lobes imbricate in bud. Ovules pendulous. Fruit a drupe. *Ilicineae*.

(b) Herbs or undershrubs, more rarely shrubs or trees, but then corolla with a manifest, usually long tube, more rarely with a short one, in the latter case style 2-partite. 68.

68 (a) Micropyle and radicle of the embryo superior. Flowers in 1-sided cymes. Mostly roughly-hairy plants. Cells or lobes of the ovary 4. Cotyledons plane, more rarely folded, in the latter case seeds exalbuminous. *Boragineae*.

(b) Micropyle and radicle of the embryo inferior. Flowers not in 1-sided cymes. Corolla plaited in aestivation. Stamens 5. Ovules erect. Seeds albuminous. Embryo curved or folded.

Convolvulaceae.

69 (a) Ovaries several (as many as corolla-lobes),
(56) free or connate at the base only. Styles free. Mostly fleshy plants.

Crassulaceae.

(b) Ovary 1, entire or lobed. Style 1, entire or cleft at the top. 70.

70 (a) Corolla valvate or plaited in aestivation. Stamens inserted on the corolla. Sepals more or less united. Leaves alternate. Style undivided. Embryo curved.

Solanaceae.

(b) Corolla imbricate or contorted in aestivation, rarely valvate, but then stamens free from the corolla and sepals distinct. 71.

71 (a) Ovary 3-celled. Stamens inserted on the corolla. Anthers dehiscing by 2 longitudinal slits. Mostly herbs. 72.

(b) Ovary 4-20-celled, very rarely 3-celled, but then stamens free from the corolla. Anthers dehiscing by 2 apical pores or 1 longitudinal slit (very rarely 2 slits). Shrubs or trees. 73.

72 (a) Corolla-lobes contorted in aestivation. Filaments thread-like. Stigmas 3, narrow. Radicle of the embryo short. Sepals united more or less, usually to the middle or beyond. Disc usually present. Europe, Asia, America.

Polemoniaceae.

(b) Corolla-lobes imbricate in aestivation.

Filaments thick. Stigma 1, capitate, 3-lobed, rarely stigmas 3, capitate. Radicle of the embryo long. Sepals free or united at the base only. Disc 0. Europe, East Asia, North America.

Diapensiaceae.

- 73 (a) Anthers dehiscing by 1 longitudinal slit. Ovary 5-celled. Corolla regular. Leaves alternate. Style undivided. Australasia and Fuegia.

Epacrideae.

- (b) Anthers dehiscing by 2 apical pores, rarely by 2 longitudinal slits. Ovary 3-4-celled and corolla regular, or ovary 5-20-celled and corolla slightly irregular. Stamens free from the corolla. Style undivided.

Ericaceae.

- 74 (a) Ovules in the whole ovary 1-10, in each cell 1-2, rarely 3-4. 75.
 (b) Ovules in the whole ovary numerous, in each cell more than 4. 84.
- 75 (a) Ovule in each cell of the ovary 1. 76.
 (b) Ovules in each cell of the ovary 2-4. 79.
- 76 (a) Ovules pendulous. Radicle of the embryo superior. Leaves alternate (only the lowermost sometimes opposite) or all radical. 77.
 (b) Ovules erect, ascending, horizontal, or

descending. Radicle of the embryo inferior. Leaves opposite or verticillate, rarely alternate; in the latter case ovules ascending. 78.

77 (a) Flowers in terminal spikes or heads. Anthers 1-celled. Ovary 1-2-celled. Europe and extratropical Asia and Africa. *Selagineae*.

(b) Flowers axillary, solitary or fascicled. Anthers usually 2-celled. Ovary 2-10-celled. Stamens 4. Australasia, South-east Asia, South Africa. *Myoporineae*.

78 (a) Ovary entire, very rarely slightly 4-lobed; in the latter case ovary incompletely septate at first, ovules attached more or less laterally, and fruit usually drupaceous. Ovary completely or incompletely 2- or 4- (very rarely 8- or 1-) celled.

Verbenaceae.

(b) Ovary 4-partite, more rarely 4-lobed (in the latter case fruit dry), completely 4-celled. Ovules erect. Leaves all opposite or verticillate. Flowers usually in false whorls. *Labiatae*.

79 (a) Ovary 4-5-celled, deeply lobed. Ovules in each cell 2, superposed. Tropical America. *Rutaceae*.

(*b*) Ovary 2-celled (very rarely 1-celled), entire or slightly lobed. 80.

80 (*a*) Stamens 2, alternating regularly with the ovary cells. Flowers regular without a disc. Leaves almost invariably opposite. Ovary completely 2-celled.

Oleaceae.

(*b*) Stamens 4 or 2; in the latter case three out of five suppressed or sterile, and consequently the two fertile stamens not alternating regularly with the ovary-cells. Flowers regular, with a disc or with four stamens, or more frequently irregular. 81.

81 (*a*) Leaves alternate. Stigma 1, entire or slightly lobed. Ovules pendulous. Stamens 4. Ovary completely 2-celled. Radicle of the embryo superior. Australasia, South-East Asia, South Africa, Central America. *Myoporineae.*

(*b*) Leaves opposite or verticillate, very rarely alternate; in the latter case stigma 2-partite and ovules ascending. 82.

82 (*a*) Ovules in each cell 2, collateral. Calyx 2-5-dentate or -partite. Corolla-lobes imbricate in bud. Fruit indehiscent or dehiscing septicidally. Ovary com-

pletely or incompletely 2-celled. Stamens 4. Ovules attached at the base or laterally. Cells of the fruit 1-seeded. Radicle of the embryo inferior.

Verbenaceae.

(b) Ovules in each cell 2 superposed, or 4, rarely 2 collateral, but then calyx-limb entire or with many teeth and corolla contorted in bud. Fruit dehiscing loculicidally, very rarely indehiscent; in the latter case only 1 cell of the ovary fertile and calyx-limb entire. 83.

83 (a) Seeds albuminous, sessile or nearly so. Calyx-limb 4-5-toothed. Stigma 1. Corolla-lobes imbricate in bud. Ovary completely 2-celled.

Scrophularineae.

(b) Seeds exalbuminous, supported by enlarged and hardened funicles, rarely sessile, but then calyx-limb entire or many-toothed. Stigmas usually 2. Seeds attached at the base or laterally.

Acanthaceae.

84 (a) Ovary 1-celled (sometimes incompletely several-celled). Ovules attached to a free central placenta or to parietal placentas. 85.

(*b*) Ovary completely several-celled. Ovules attached to axile placentas. 89.

85 (*a*) Ovules attached to a free central placenta. Herbs. Leaves radical or reduced to alternate scales. Corolla spurred. Stamens 2. Seeds exalbuminous.

Lentibulariaceae.

(*b*) Ovules attached to parietal placentas. 86.

86 (*a*) Plants destitute of green colour. Leaves reduced to scales. Embryo much shorter than the albumen. Parasitical herbs. Flowers spicate or racemose, rarely solitary. Stamens 4. Seeds minute.

Orobanchaceae.

(*b*) Plants of a green colour. Leaves perfectly developed. Embryo as long as the albumen, or more frequently without albumen. 87.

87 (*a*) Posterior corolla-lobe interior in aestivation. Seeds very small. Herbs or shrubs, very seldom trees. Leaves entire or dentate. Fruit capsular, the placentas remaining attached to the valves, or indehiscent. *Gesneraceae.*

(*b*) Posterior corolla-lobe exterior in aestivation. Seeds rather large. 88.

88 (*a*) Herbs, erect or prostrate. Fruit a

drupaceous capsule, the fleshy valves separating from the enlarged and hardened placentas. Seeds pendulous. Leaves entire, dentate, or lobed. Flowers racemose. Placentas 2-fid. Stigmas 2. America. *Pedalineae.*

- (b) Trees, rarely climbing shrubs. Fruit indehiscent, baccate, very rarely capsular, the valves bearing the placentas along their middle line. Seeds immersed into the pulpy placentas, horizontal. Stamens 4. Stigmas 2. Africa and America.

Bignoniaceae.

- 89 (a) Ovary 4-celled. Herbs, very rarely spinous shrubs. Corolla-lobes imbricate in bud. Stamens 4. Fruit a capsule, with several or many-seeded cells.

Pedalineae.

- (b) Ovary 2-celled. 90.

- 90 (a) Leaves alternate, simple, entire or dentate, rarely lobed or divided. 91.

- (b) Leaves alternate and compound, or more frequently opposite or verticillate. 93.

- 91 (a) Fruit a drupe, with 4 one-seeded cells. Ovules in each cell of the ovary 6-8. Shrubs or trees. Stamens 4. Corolla-lobes imbricate in bud. Stigma entire

or notched. Ovules descending. Australia. *Myoporineae.*

(b) Fruit a capsule, with 2 or rarely more, several or many-seeded cells. Ovules in each cell of the ovary numerous, more rarely few, but then herbs or undershrubs or stamens 2 or corolla-lobes induplicate-valvate in bud. 92.

92 (a) Corolla induplicate-valvate in aestivation, or plaited and imbricate at the same time. Dissepiment of the ovary oblique to the axis of the flower. *Solanaceae.*

(b) Corolla imbricate and not plaited in aestivation. Dissepiment of the ovary transverse to the axis of the flower.

Scrophularineae.

93 (a) Leaves compound, rarely simple; in the latter case calyx usually closed in the bud. Stigma 2-partite. Placentas in each cell 2, removed from each other (usually separated by the enlarged dissepiment) after flowering. Seeds exalbuminous, usually winged, if not, leaves compound. Calyx gamosepalous, open valvate or closed in bud. Seeds sessile, laterally attached. *Bignoniaceae.*

(b) Leaves simple, but sometimes dissected,

in this case stigma entire. Calyx imbricate valvate or open in bud. Placentas in each cell 1, more rarely 2, also after flowering not much distant from each other. Seeds winged and albuminous, or more frequently without wings. 94.

94 (a) Seeds usually attached to enlarged and hardened funicles and exalbuminous, rarely sessile and with some albumen, in this case sepals united at the base only and style 2-lobed at the top. Capsule loculicidal, dehiscing to the base, the placentas remaining attached to the entire recurved valves. Embryo with broad cotyledons and an inferior or descending radicle. *Acanthaceae.*

(b) Seeds sessile or attached to short funicles, albuminous. Fruit various; if loculicidal with the placentas attached to the valves, then sepals united to the middle or beyond or style entire at the top. Cotyledons short or narrow.

Scrophularineae.

95 (a) Stamens numerous. 96.

(1) (b) Stamens 1-10. 99.

96 (a) Ovary one-celled. Succulent plants with-

out perfect leaves, rarely shrubs or trees with fleshy leaves. Segments of the corolla 6 or more. Style 1, undivided, with several stigmas. Fruit a many-seeded berry. *Cactaceae.*

(*b*) Ovary several-celled. 97.

97 (*a*) Herbs or undershrubs. Segments of the corolla numerous, linear. Stigmas several, sessile, free or united below. Ovules basal or parietal. Albumen mealy. Leaves fleshy. Fruit a many-seeded capsule. *Ficoideae.*

(*b*) Shrubs or trees. Segments of the corolla 3-10. Stigma 1, upon an undivided style, entire or lobed. Ovules axile. Albumen fleshy or wanting. 98.

98 (*a*) Flowers provided with an epigynous disc, upon which the stamens are inserted. Seeds without albumen. Leaves usually glandular-dotted. Petals usually cohering in the form of a cap.

Myrtaceae.

(*b*) Flowers without an epigynous disc. Seeds with copious albumen. Leaves not dotted. Fruit a 1-5-seeded drupe. Asia, Australia, America. *Styraceae.*

99 (*a*) Stamens twice as many as corolla-lobes.

- Anthers opening at the top. Ovary
several-celled. *Vacciniaceae.*
- (b) Stamens as many as corolla-lobes, or
fewer. 100.
- 100 (a) Stamens as many as corolla-lobes and
opposite to them. 101.
- (b) Stamens as many as corolla-lobes and
alternate with them, or fewer. 103.
- 101 (a) Corolla-lobes imbricate in bud. Ovules
numerous. Ovary 1-celled, with a free
central placenta. Shrubs, growing on
the ground. Asia, Africa, Australasia.
Myrsineae.
- (b) Corolla-lobes valvate in bud. Ovules
1-3. 102.
- 102 (a) Terrestrial shrubs or trees (growing on
the earth). Stigma 3-lobed. Ovary
imperfectly 3-celled. Ovules 3. Tropics.
Olacineae.
- (b) Parasitical shrubs, growing upon trees.
Stigma entire. Ovary perfectly 1-celled.
Ovule 1, more or less fused with the sub-
stance of the ovary. *Loranthaceae.*
- 103 (a) Ovary containing only 1 ovule (but
sometimes 3-celled with 2 empty cells).
104.
- (b) Ovary containing 2 or more ovules. 110.

- 104 (a) Corolla-lobes imbricate in aestivation. Anthers free. Ovule pendulous. Cauline leaves opposite or verticillate. 105.
- (b) Corolla-lobes valvate or open in aestivation. Anthers most frequently coherent. Ovule usually erect. Cauline leaves usually alternate. Stigmas 1-2.* 107.
- 105 (a) Stamens 5. Fruit more or less succulent and drupaceous. Shrubs or trees. Flowers corymbose or paniced. Stigmas 3. Seed albuminous. *Caprifoliaceae*.
- (b) Stamens 1-4. Fruit dry (an achene). Herbs or undershrubs, rarely shrubs. 106.
- 106 (a) Flowers in heads (rarely cymes); each flower enclosed at the base by a tubular involucl. Seed albuminous. Ovary 1-celled. Stigma 1. *Dipsaceae*.
- (b) Flowers in cymes, without an involucl. Seed exalbuminous. Ovary 1-3-celled. Stigmas 1-3. *Valerianeae*.
- 107 (a) Stigma included by a cup-shaped or bilabiate indusium. Ovule erect. Seed albuminous. *Goodenovieae*.
- (b) Stigma without an indusium. 108.
- 108 (a) Style entire at the top. Ovule pendul-

* Three in some *Cucurbitaceae*, the petals of which are almost free, the corolla-tube being united with the calyx-tube. They have climbing or prostrate stems and unisexual flowers.

- ous. Herbs. Flowers in heads. Anthers more or less coherent. Seed albuminous. South America. *Calycereae*.
- (b) Style in the fertile flowers 2-fid at the top. Ovule erect. 109.
- 109 (a) Anthers free. All flowers furnished with a corolla. Seed albuminous. Leaves opposite or verticillate. *Rubiaceae*.
- (b) Anthers coherent, rarely almost free, but then female flowers destitute of a corolla. Seed exalbuminous. Flowers in heads, surrounded by a common involucre; rarely the heads reduced to single flowers. *Compositae*.
- 110 (a) Perfect stamens as many as corolla-lobes. 111.
- (b) Perfect stamens fewer than corolla-lobes. 118.
- 111 (a) Ovaries 2, distinct. Style 1, stigmatose below the top only. *Apocynaceae*.
- (b) Ovary 1, entire. 112.
- 112 (a) Leaves opposite or verticillate. 113.
- (b) Leaves alternate or (all) radical. 115.
- 113 (a) Stamens free from the corolla or (if inserted on it) both filaments and anthers connate. Leaves exstipulate. Ovules more than 2 in each cell. *Campanulaceae*.
- (b) Stamens inserted on the corolla, distinct,

rarely the filaments or the anthers (not both) connate. 114.

114 (a) Leaves opposite, exstipulate (very rarely stipulate and then pinnatisect), not growing black by drying. *Caprifoliaceae*.

(b) Leaves opposite and stipulate or verticillate, entire or rarely dentate or lobed, frequently growing black by drying.

Rubiaceae.

115 (a) Petals connate throughout in the form of a cap. Ovule in each cell 1, pendulous. Style divided. Shrubs or trees. Leaves compound, stipulate. Flowers umbellate or capitate. Tropics. *Araliaceae*.

(b) Petals free at the top or in the middle. Ovules in each cell 1, erect, or 2 or more. Style usually undivided. 116.

116 (a) Flowers unisexual, regular, very rarely irregular; in the latter case stamens free. Anthers usually extrorse. Seeds exalbuminous. Climbing or prostrate plants. Juice not milky. *Cucurbitaceae*.

(b) Flowers hermaphrodite, rarely unisexual, but then irregular and with connate stamens. Anthers introrse. Seeds albuminous. 117.

117 (a) Stigma included by a cup-shaped or bilabiate indusium. Juice not milky.

Leaves simple, exstipulate. Flowers hermaphrodite. *Goodenovieae.*

- (b) Stigma without an indusium (but sometimes surrounded by hairs). Juice usually milky. Leaves exstipulate.

Campanulaceae.

- 118 (a) Filaments combined with the style into a column. Herbs or undershrubs. Leaves entire. Anthers 2. Stigmas 1-2. Australasia, South Asia, South America. *Stylidiaceae.*

- (b) Filaments free from the style. 119.

- 119 (a) Flowers unisexual, regular. Stem climbing or prostrate. Leaves alternate. Stamens, placentas, and stigmas usually 3. *Cucurbitaceae.*

- (b) Flowers hermaphrodite, more or less irregular. 120.

- 120 (a) Stamens 2. Anthers waved, 1-celled or unequally 2-6-celled. Disc 0. Shrubs or trees. Leaves opposite, entire or dentate. Corolla almost regular. Ovary incompletely 2-celled. South America.

Columelliaceae.

- (b) Stamens 4. Anthers not waved, 2-celled. Disc usually present. Leaves entire or dentate. Stigmas 1-2. Tropical America.

Gesneraceae.

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