
The Family Winteraceae

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by felling it and stripping it of its bark, (a) unless the substance could be extracted economically from its leaves or annual prunings, (b) or unless some means of paring off the bark without destroying the cambium could be devised, (c) or unless the tree were amenable to the coppice system. The last possibility is perhaps the most likely. In this case the peeled poles might form a subsidiary source of revenue.

4. High cost of land and wages.

In conclusion the writer would like to take this opportunity of expressing his thanks to Prof. Augustine Henry for much help in the compilation of these notes.

XX.—THE FAMILY WINTERACEAE.

J. HUTCHINSON.

The family *Winteraceae*, as here understood, has usually been regarded as a tribe of *Magnoliaceae*, and it stands as such in the classifications of Bentham and Hooker (*Genera Plantarum*, i. 17), and Engler and Prantl (*Die Natürl. Pflanzenf.* iii. ii. 18). In the following brief notes the present writer gives reasons for separating the group from the true* *Magnoliaceae*, represented by the genera *Michelia*, Linn., *Manglietia*, Bl., *Talauma*, Juss., *Aromadendron*, Blume, *Magnolia*, Linn., and *Liriodendron*, Linn. This segregation has become more imperative since the *Trochodendraceae* and *Himantandraceae* have been taken out of *Magnoliaceae*, and some degree of uniformity of treatment is now possible.

Robert Brown† was the first to point out that the genera *Illicium* and *Drimys* should be distinguished as a separate family from *Magnoliaceae*, and for them he proposed the name *Wintereae*. Lindley, for a time, and J. Miers took a similar view, as did also Endlicher, who expressed the opinion (*Enchir. Bot.* 428), that the group ought to rank as an independent family, although later (*Genera Plantarum* 836), he included them as a sub-family of *Magnoliaceae*. Even J. D. Hooker and T. Thomson (*Fl. Ind.* 72), say that “the *Wintereae* form a very questionable tribe of *Magnoliaceae*, and may with reason be separated from them.” Hooker, however, as already indicated, included them in the *Magnoliaceae*.

* Other genera referred to the *Magnoliaceae* are *Trochodendron*, Sieb. et Zucc., and *Euptelea*, Oliv., which constitute the distinct family *Trochodendraceae*, and *Cercidiphyllum*, Sieb. et Zucc. the *Cercidiphyllaceae* *Eucommia*, Oliv., and *Tetracentron*, Oliv., are better placed with the *Hamamelidaceae*, whilst *Himantandra*, F. Muell. (= *Galublimima*, Bailey), a remarkable genus incorrectly reduced by Mueller himself to *Eupomatia* (*Annonaceae*), has recently been made the type of a new family, *Himantandraceae* (see Diels “Über die Gattung *Himantandra*, ihre Verbreitung und ihre systematische Stellung,” in *Engl. Bot. Jahrb.* lv. 126–131, fig. i (1917)).

† R. Br. apud DC. *Syst. Veg.* i. 548 (1818); De Candolle, however, treated them as a tribe, *Illiceae* of *Magnoliaceae*.

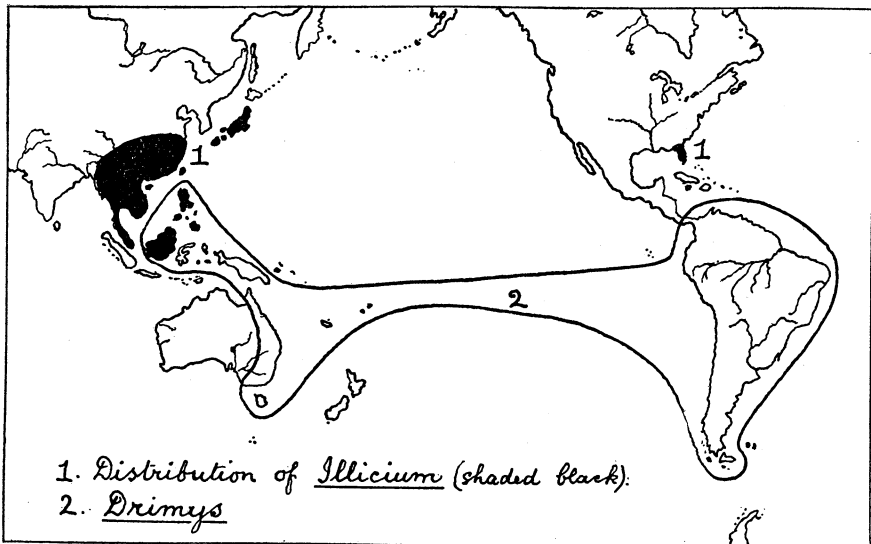
Although the *Winteraceae* are allied to the *Magnoliaceae* and may have had a similar origin, they are considerably more advanced from an evolutionary point of view, and they are very definitely distinguished from them by the following characters :— (1) absence of stipules; (2) secretory cells filled with resin or ethereal oil in the leaves, appearing as transparent dots; (3) very short and small floral axis; (4) relatively few stamens with small divergent anther-cells; (5) few carpels in a single whorl (or very rarely in 2 whorls), sometimes reduced to a single carpel; and there are corresponding differences in the fruits. I give here a key to the families more closely related to *Magnoliaceae*, and the group may take ordinal rank as *Magnoliales* :—

- *Perianth present, conspicuous, never operculate; indumentum not lepidote :
 - Flowers hermaphrodite; stamens free :
 - Leaves stipulate, the stipules often enclosing and protecting the young growths; flowers large, solitary, terminal or rarely axillary; axis elongated and cone-like, especially in fruit; floral parts spirally arranged - - - - **Magnoliaceae.**
 - Leaves exstipulate, pellucid punctate; flowers small or medium-sized, rarely solitary; axis short and never cone-like in fruit; carpels more or less in a single whorl - **Winteraceae.**
 - Flowers unisexual; stamens partially or wholly connate into a globose mass; leaves exstipulate, often pellucid-punctate; trailing shrubs - - **Schizandraceae.**
- **Perianth present, operculate; indumentum lepidote; stamens petaloid - **Himantandraceae.**
- ***Perianth absent or much reduced and bract-like; indumentum never lepidote; stamens not petaloid :
 - Carpels 3; stipules large and interpetiolar, membranous; leaves minutely pellucid - punctate; flowers polygamo-monoecious; monotypic genus (*Lactoris*) in Juan Fernandez - - **Lactoridaceae.**
 - Carpels more than three; stipules absent or small; Leaves not pellucid-punctate; East Asiatic trees and shrubs :
 - Flowers hermaphrodite, clustered or racemose-paniculate; seeds not winged - - - **Trochodendraceae.**

Flowers dioecious, solitary on
 short arrested branchlets;
 stipules adnate to the petiole,
 seeds winged - - - **Cercidiphyllaceae.**

Our knowledge of the family *Winteraceae* is still far from complete and much more collecting of the Australasian and South American species is desirable. With commendable perspicacity, however, considering the material available, the late Prof. Van Tieghem has separated two or three small genera from *Drimys*, which further study will probably show to be fully justified.

Geographical Distribution.—*Winteraceae* have, in contrast with the true *Magnoliaceae*, a much more tropical and southerly distribution. They are absent from Europe, Africa, Central Asia, and Western North America. The largest and most widely spread genus is *Drimys*, representing, however, a very homogeneous group of species distributed from the Malay Archipelago through Eastern Australia to Tasmania, and ranging widely in South America, from Costa Rica to Tierra del Fuego, including the island of Juan Fernandez. The distribution of *Drimys*,



therefore, seems to point to considerable antiquity, connecting as it does two widely separated areas in the Southern Hemisphere (see map); and in floral structure it has a slight tendency to unisexuality and reduction so fully carried out in the case of the *Schizandraceae*. *Illicium* again, has an interesting distribution closely resembling that of *Magnolia* and *Liriodendron*, but more subtropical. It is also a natural genus of closely allied species and must be of great age. It is confined to the Northern Hemisphere, from Assam to Japan and south to Borneo in the Old World, whilst in America it occurs only in Florida. *Illicium*

thus connects the floras of two widely separated areas in the Northern Hemisphere. The remainder of the genera are small and of very restricted range, *Wintera* in New Zealand, *Bubbia* in Lord Howe's Island and New Caledonia, and *Belliolum*, *Exospermum* and *Zygogynum* in New Caledonia.

Economic Products.—"Winter's Bark" from *Drimys Winteri*, Forst., South America; much used in Brazil as an astringent and stimulant. "Star Anise," ripe fruit of *Illicium verum* (see *Kew Bull.* 1888, 173 and figure), a native of South West China; condiment and spice and used for flavouring; fruit also contains a volatile oil distilled in large quantities by natives of Langson; this oil is used in cough mixtures (Greenish, *Mat. Med.* ed. 2, 106, 275 (1909). *Wintera axillaris* is aromatic and pungent and its wood serviceable for inlaying (Cheeseman, *Fl. N. Zeal.* 29).

Principal literature relating to the Winteraceae.—J. Miers, "On the Winteraceae," *Ann. & Mag. Nat. Hist.* ser. 3, ii. 33–48, 109–115 (1858); and *Contrib. to Bot.* i. 123–145, pl. 25–27 (1851–61). Lindley, *Nat. Syst. Bot.* 26 (1830); ed. 2, 17 (1836); *Veg. Kingd.* 417 (1846) (under *Magnol.*). Endlicher, *Gen. Pl.* 836 (1836) (under *Magnol.*). Eichler in *Mart. Fl. Bras.* xiii. i. 129–139, tt. 30–32 (1841). Benth. & Hook. f. *Gen. Pl.* i. 17 (under *Magnol.*). J. Tamboon, "des *Illicium* en général de la *Badiane* et de son Huile essentielle en Particulier" pp. 77, pl. 1–4 (Montpellier 1886). Prantl in *Engl. & Prantl, Nat. Pflanzenf.* iii. ii. 18, fig. 17 (1891); *Nachtr.* ii. 108–9 (1906) (under *Magnol.*). P. Parmentier, "Histoire des *Magnoliacées* (Tribe *Illiciées*)" in *Bull. Sci. Fr. et Belg.* xxvii. 159–337 (1895); Van Tieghem, *Journ. de Bot.* xiv. 275 et seq. (1906).

Description of Winteraceae. Trees or shrubs with exstipulate alternate or rarely subverticillate aromatic pellucid-punctate evergreen leaves. Flowers rather small, in axillary or terminal fascicles or umbellate cymes, of various colours. Floral axis very short, with the parts of the flower arranged more or less in whorls. Perianth double. Sepals 2–6, free and imbricate, or united and rupturing valvately. Petals in 2—several series, imbricate, often conspicuous in bud. Stamens several, in one or several series, hypogynous; anthers introrse. Carpels in a single whorl or rarely subbiseriate, 1—many, free or rarely united, 1—many-ovuled; stigma sessile or on a distinct style. Fruit capsular or baccate. Seeds with copious endosperm and minute embryo.

Anatomical features.—Mainly those of true *Magnoliaceae*. The leaves are markedly papillous and glaucous below in nearly all the species. They contain secretory cells which are filled with resin or ethereal oil, and these are visible especially in young leaves, appearing as translucent dots. *Drimys* is remarkable in having no vessels in the xylem, a feature common to the *Gymnosperms*, and the wood resembles very much that of the *Araucariaceae* especially. It consists entirely of wood prosenchyma, the elements of which have bordered pits and are square

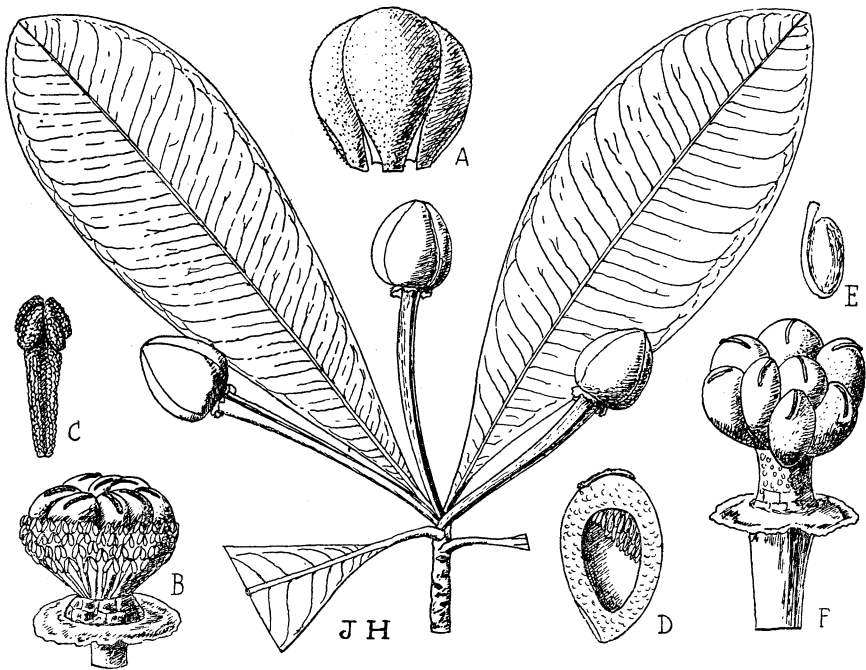
f. Gen. Pl. i. 18. Prantl in Engl. & Prantl, Pflanzenf. iii. ii. 18. J. Tamboon, l.c. (see p. 188).

2. **Drimys**, Forst. Char. Gen. 83, t. 42 (1776).—About 20 species, Malay Archipelago to East Australia and New Caledonia, Central and South America (see map). Type Species: *Drimys Winteri*, Forst., South America—Benth. & Hook. f. Gen. Pl. i. 18. Prantl in Engl. & Prantl, Pflanzenf. iii. ii. 19.—For critical account of the South American species see Miers in Ann. & Mag. Nat. Hist. ser. 3, ii. 42 (1858). For discursive account of *Drimys* see Van Tieghem in Journ. de Bot. xiv. 280 (1900), a summary of which appears in Engl. & Prantl, Pflanzenf. Nachtr. ii. 108 (1906).

3. **Wintera**, Forst. Fl. Ins. Austr. Prodr. 42 (1786), non Murr.—3 species, New Zealand. Type species: *Wintera axillaris*, Forst.—Cheeseman, Fl. N. Zeal. 29 (as *Drimys*).

4. **Bubbia**, Van Tiegh. in Journ. de Bot. xiv. 278, 293 (1900).—7 species, 5 in New Caledonia, 2 in Lord Howe's Island.

5. **Belliolum**, Van Tiegh. l.c. 278, 330 (1900).—4 species in New Caledonia.



Exospermum stipitatum, Van Tiegh. A. outer and closely connivent petals. B. flower with petals removed. C. stamen. D. section of carpel. E. ovule. F. young fruit.

6. **Exospermum**, Van Tiegh. l.c. 279, 333 (1900).—2 species, New Caledonia.—Type species: *Exospermum stipitatum* (see text figure).

7. **Zygogynum**, *Baill.* *Adansonia*, vii. 298 (1867).—6 species, New Caledonia. Type species : *Zygogynum Vieillardii*.

XXI.—NEW OR NOTEWORTHY SOUTH AFRICAN PLANTS. (II.)

JOSEPH BURTT-DAVY.

21. **Elephantorrhiza obliqua**, *Burt-Davy* [Leguminosae-Adenanthereae]; *E. Burchellii*, Benth., affinis, sed foliolis paucioribus latoribus obliquis, calycis lobis longioribus et caulibus puberulis differt.

Suffrutex perennis. *Caules* annui, e collo crescentes, circiter 6 dm. alti, striati, puberuli. *Folia* 4–5-juga; pinnae 13–16-jugae; rhachis rhachillaeque sparse pilosae; foliola 1.2–1.3 cm. longa, 3–4 mm. lata, valde obliqua, mucronata, glabra; costa prominens. *Racemi* subsessiles, 6–7.5 cm. longi, ex axillis foliorum inferiorum crescentes; pedicelli 1 mm. longi. *Calycis* lobi acuminati. *Legumen* non vidi.

SOUTH AFRICA. Transvaal: Carolina Dist., High-veld between Carolina and Oshoek, at an out-span about 1 mile from Robinson's, in open grass-veld about 1650 m., Jan. 10, 1905, *Burt-Davy* 2976 in herb. *Mus. Brit.*

22. **Plectronia ovata**, *Burt-Davy* [Rubiaceae-Vanguerieae]; *P. glaucae*, K. Schum., et *P. spinosae*, Klotzsch, affinis.

Frutex spinosus; spinae tenues. *Petioles* tenues, 4–6 mm. longi. *Laminae* late ovatae, obtusae vel aliquando attenuatae, ad basim truncatae, 2.5 cm. longae, fere 2.5 cm. latae, glabrae, subter glaucescentes. *Pedunculi* tenues, glabri, 1.2–1.9 cm. longi, 10–20-flori; pedicelli tenues, cymoso-fasciculati, glabri, 6–7 mm. longi. *Corollae* fauces barbatae; lobi reflexi, 2.5 mm. longi, glabri, intus pallentes. *Filamenta* inclusa; antherae exsertae. *Stylus* 2.5 mm. exsertus, 2-lamellatus. *Ovarium* glabrum.

SOUTH AFRICA. Transvaal: near Barberton, Dec. 29, 1903 (in flower), *T. C. Legge* in herb. *Transv. Dep. Agric. No.* 1728 and 1729. The type is No. 1729 in herb. *Bolus*.

23. **Plectronia foliosa**, *Burt-Davy* [Rubiaceae-Vanguerieae]; species distincta, ramulis robustis foliosis, foliis magnis.

Arbor parva, ramulis robustis puberulis aliquanto quadrangulatis. *Stipulae* triangulo-acuminatae, circiter 1.2 cm. longae. *Petioles* 1.2–1.8 cm. longi, puberuli. *Laminae* 9–11.5 cm. longae, 3–5 cm. latae, supra puberulae, subter tomentosae, apice acutae vel apiculatae, basi in petiolum gradatim attenuatae; nervi subter prominentes, puberuli; nervi laterales pinnatim dispositi, angulo inter nervos et costam acuto. *Pedunculi* circiter 1.3 cm. longi, pubescentes, cymoso-ramosi, ad apicem ramulorum aggregati, circiter 5 cm. longi; pedicelli breves, circiter 6 mm. longi. *Flores* non vidi.