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By C. A. GARDNER, Government Botanist

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TREES OF WESTERN AUSTRALIA

By C. A. GARDNER, Government Botanist

Nos. 10 and 11—THE SWAMP, or FLAT-TOPPED YATE (*Eucalyptus occidentalis* Endl.) and THE BROWN MALLET (*Eucalyptus astringens* Maiden)

THE two trees described hereunder may be readily distinguished when growing as they differ considerably in their barks and general appearance and grow under different conditions, but in common with some other trees of the South-West each has the mallee form, and the mallee forms are very difficult to distinguish.

The reader who has so far followed this series is probably aware of the fact that *Eucalyptus* species, like all other flowering plants are identified not by their field characteristics of habit, bark and foliage, but mainly by their buds, flowers and fruits. It is by these characteristics that their status as species and their relationship to other species are determined.

A glance at the accompanying plate will illustrate how close these relationships really are. People acquainted with the two trees can never confuse them, but when one has to rely on the usual specimens consisting of leaves, buds, flowers and fruits, the two are very difficult to separate especially in the case of the mallee or shrubby forms.

THE SWAMP or FLAT-TOPPED YATE (*Eucalyptus occidentalis* Endl.)

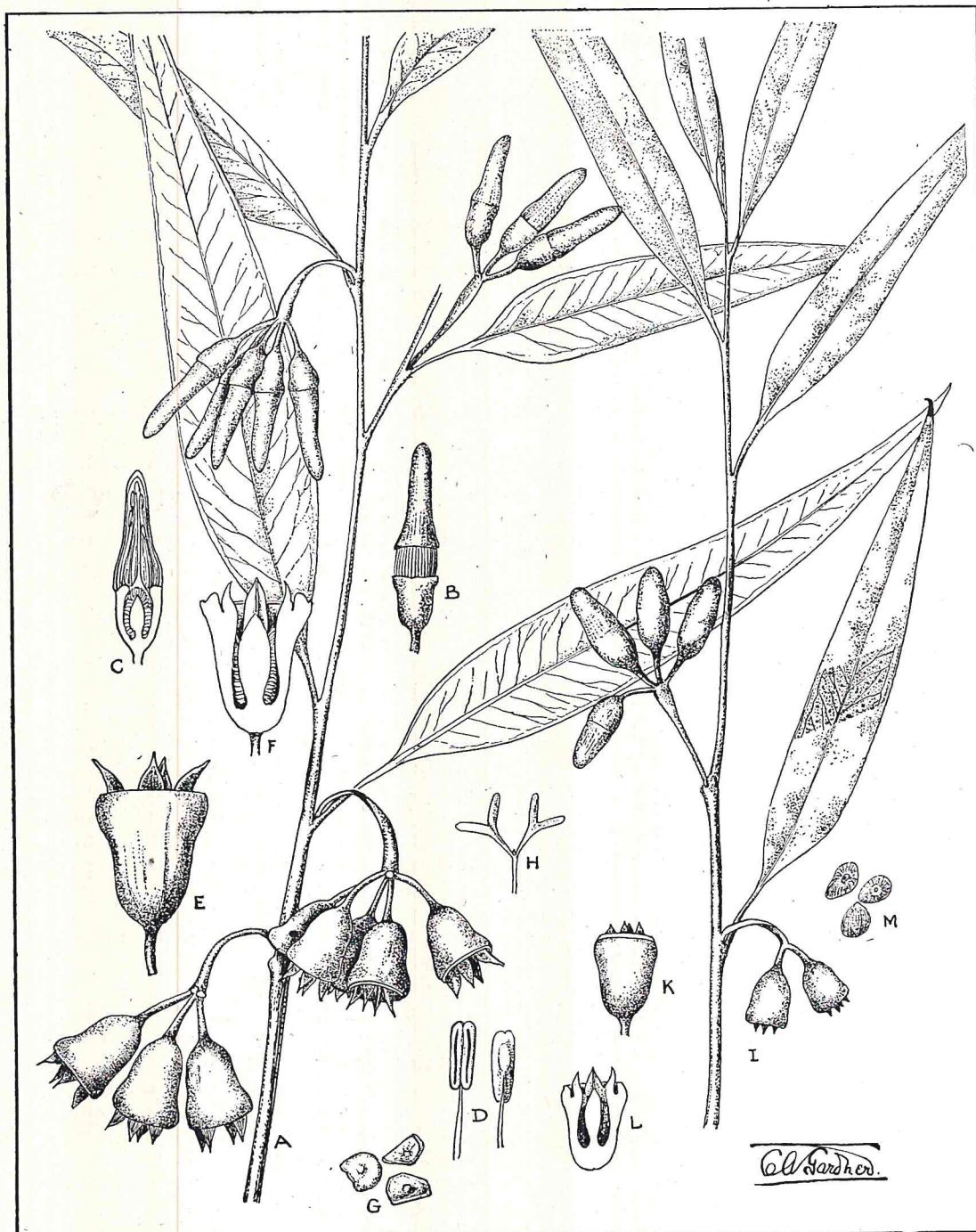
The swamp or flat-topped yate is a tree attaining a height of about 70ft. with a trunk up to 20in. in diameter and a rough flaky-fibrous bark covering the whole of the trunk and the lower parts of the main branches. The branches have a smooth yellowish-grey bark, and

usually spread widely giving the crown of the tree a typically broad and flat appearance, hence the name of "flat-topped" yate.

The rough bark where it meets the smooth bark is frequently ribbony and adheres in rough-looking masses, while the trunk itself has a thick, persistent dark grey, rough, fissured bark, and the trunk is usually thickened or almost buttressed at the base. The timber is pale in colour, hard, and somewhat straight-grained, somewhat like that of yate but inferior to it in strength and durability.

Travelling southward along the Great Southern Railway, one first encounters this tree in the Wagin and Dumbleyung districts, growing on alluvial flats which are subject to flooding—as for example the margins of the Wagin and Dumbleyung lakes. From there southward the tree is common in such situations especially around Katanning and Cranbrook.

From the latter locality, it extends almost to the south coast and eastward to Esperance and beyond. It is usually associated with wet depressions or clay



A to H—FLAT-TOPPED YATE (*E. occidentalis* Endl.). A—Branchlet with leaves, buds and fruits; B—Bud in the opening stage; C—Section of bud showing the erect filaments; D—Anthers; E—Fruit; F—Longitudinal section of fruit; G—Seeds; H—Cotyledons.
 I to M—BROWN MALLET (*E. astringens* Maiden). I—Branchlet showing leaves, buds and fruits; K—Fruit; L—Section of fruit; M—Seeds.

Wagin.

Icon. origin.

flats with a characteristically sparse undergrowth of low shrubs and cushion-like or mat-like plants. The flat-topped yate soils are "cold" soils in which the annual plants germinate late in the season, but dry out earlier than in the lighter soils. Around and to the north of Esperance the tree may be found in sandy soils close to swamps and depressions.

While this soil condition remains fairly constant there is one notable exception which is interesting. At Jarramongup on the Gairdner River the tree is found on the high undulating country.

The late Mr. E. A. Hassell who owned, and for many years lived at Jarramongup, told me that the name "Jarramongup" was a corruption of the native "Yarramoitch", which means "Moitch standing up", or "Moitch on high ground". The natives had noticed this peculiarity in the tree, which here occurred on granitic country practically devoid of shrubs and carrying excellent natural pasture of wallaby and other grasses. Jarramongup was a place famous for game. "Moitch" was the native name of the tree, and it would be well if this name were restored in place of "Flat-topped yate". According to the same authority, "Poot" was the local name for the red morrell, and "Moe" the name for the flooded gum.

Apart from a limited value as a source of timber, the tree is of little importance. Owing to the confusion between brown mallet and flat-topped yate, the figures available concerning its essential oils must be disregarded, and the bark, in marked contrast to that of the brown mallet, is very low in tannins. On the other hand it is a tree which flowers profusely, and probably would be of interest to beekeepers on this account.

The specific name, *occidentalis*, meaning "western", given by the botanist Endlicher (who did not see the living tree) is of no significance. The vernacular name of flat-topped yate is used in reference to its flat-topped

appearance when contrasted with that of the yate tree (*E. cornuta*) which it somewhat resembles, but from which it can be superficially distinguished by its smooth branches. The appellation "swamp", not quite so apt, is used because of its typical environment.

BOTANICAL DESCRIPTION

A tree attaining a height of 50-60 feet, or a shrub, often flowering when very young; bark rough on the trunk, dark grey, fissured, the branches smooth. Leaves alternate, stalked, spreading, the leaf-stalks up to one inch in length, the blade lance-shaped, somewhat curved, 4-7 inches long, leathery, shining, oil-dotted, the midrib conspicuous, the lateral nerves diverging from the midrib at an acute angle, the intramarginal nerve distant from the margin.

Umbels axillary, 3-7 flowered, the peduncle flattened upwards or at least compressed, sometimes rather broad, 1-2 inches long, spreading or recurved. Pedicels nearly half an inch long, slender, gradually thickened upwards into the calyx-tube. Calyx-tube bell-shaped, less than an inch long (7-9 mm.), the rim expanded when in flower.

Operculum cylindrical, rather acute, usually somewhat dilated at the base, half to threequarters of an inch long. Stamens numerous, the filaments erect in the bud (not kinked), white, the anthers narrow and opening in parallel longitudinal slits.

Fruit bell-shaped, smooth, from above half an inch to nearly an inch long, the rim prominent and flat, the capsule slightly sunk, with usually four strong broad acutely pointed valves with slightly spreading tips. Fertile seeds pale brown, small, variously shaped with thin margins. Seed-leaves Y-shaped.

THE BROWN MALLET

(*Eucalyptus astringens* Maiden)

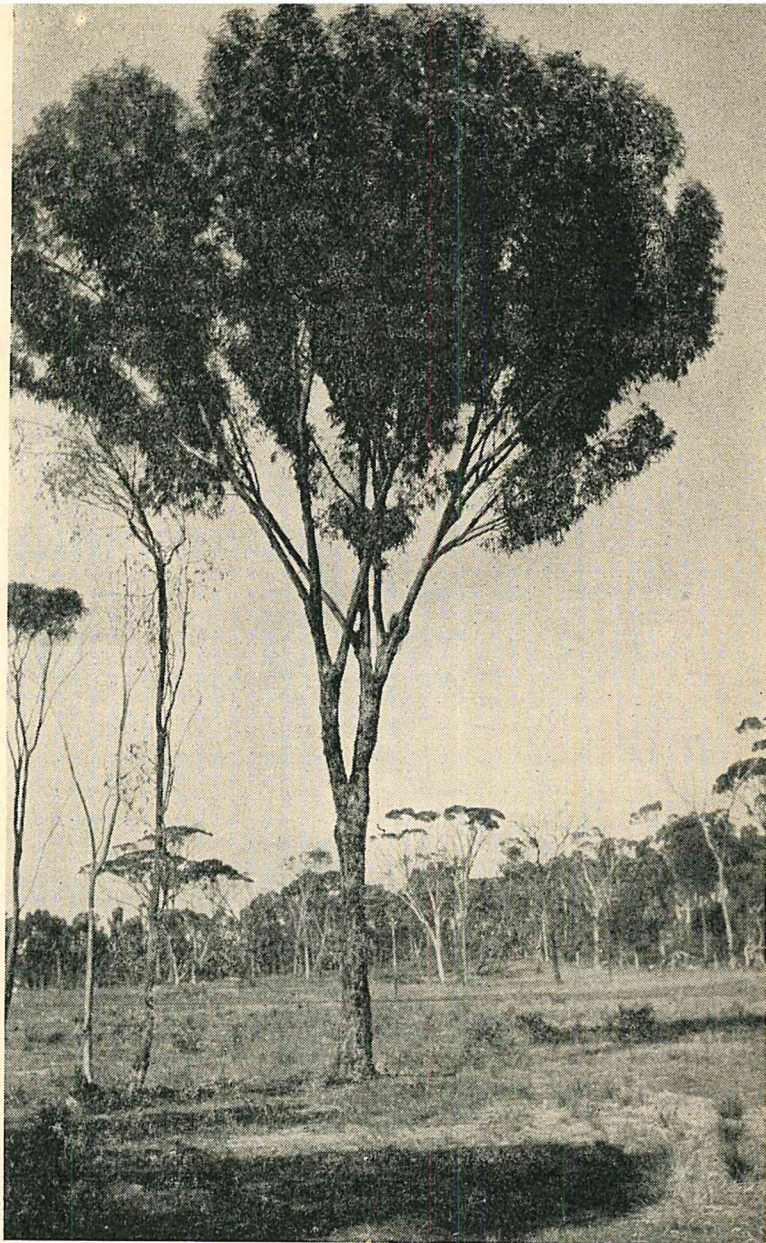
The brown mallet (*Eucalyptus astringens* Maiden) was formerly known as *E. occidentalis* var. *astringens*. This tree is valuable because of the high tannin content of its bark. Although now rarely seen in a fully developed condition in the field, the tree attains a height of 50 feet with a trunk up to two feet or more in diameter, and erect branches. The bark is smooth and brown or grey (usually both colours are present) but with small flakes of unshed bark usually adhering in small patches, especially near the base. The bark is thin, usually with kino vessels running longitudinally through it, somewhat "gummy", and during the winter and spring weather is easily stripped. It is astringent to the taste and rich in tannins. The specific epithet *astringens* refers to this bark. The timber is pale brown, very strong and straight-grained and somewhat like that of the gimlet tree. Young trees have a dense bushy crown, but trees

in the woodland formation become sparsely foliated with age.

The brown mallet occurs typically on lateritic soil, usually on hills, its range extending from near Brookton southwards to Peringillup near Cranbrook, thence eastwards to Gnowangerup and Ravenshorpe to near Hopetoun. In the northern part of its range, that is as far south as Highbury, it is found on the ironstone hills only, but to the south it is found also on the level clay soils. Between Brookton and Wagin its presence usually indicates poison country, several toxic plants being found in association with the thickets of the trees, but this is not so to the south. Its eastern limits have not been accurately defined, but the tree remains fairly common on gravelly soils near Quairading and Bending, and small areas are found in the Ravensthorpe Hills.

It is mainly in the eastern areas that the mallee forms of the brown mallet and the flat-topped yate are found, and these can be separated only by the comparative breadth of the leaves, the somewhat longer operculum of *E. occidentalis* together with large fruits and broader stronger valves, those of *E. astringens* being smaller, somewhat rounded at the orifice, and the valves slender. The plate illustrates these small differences.

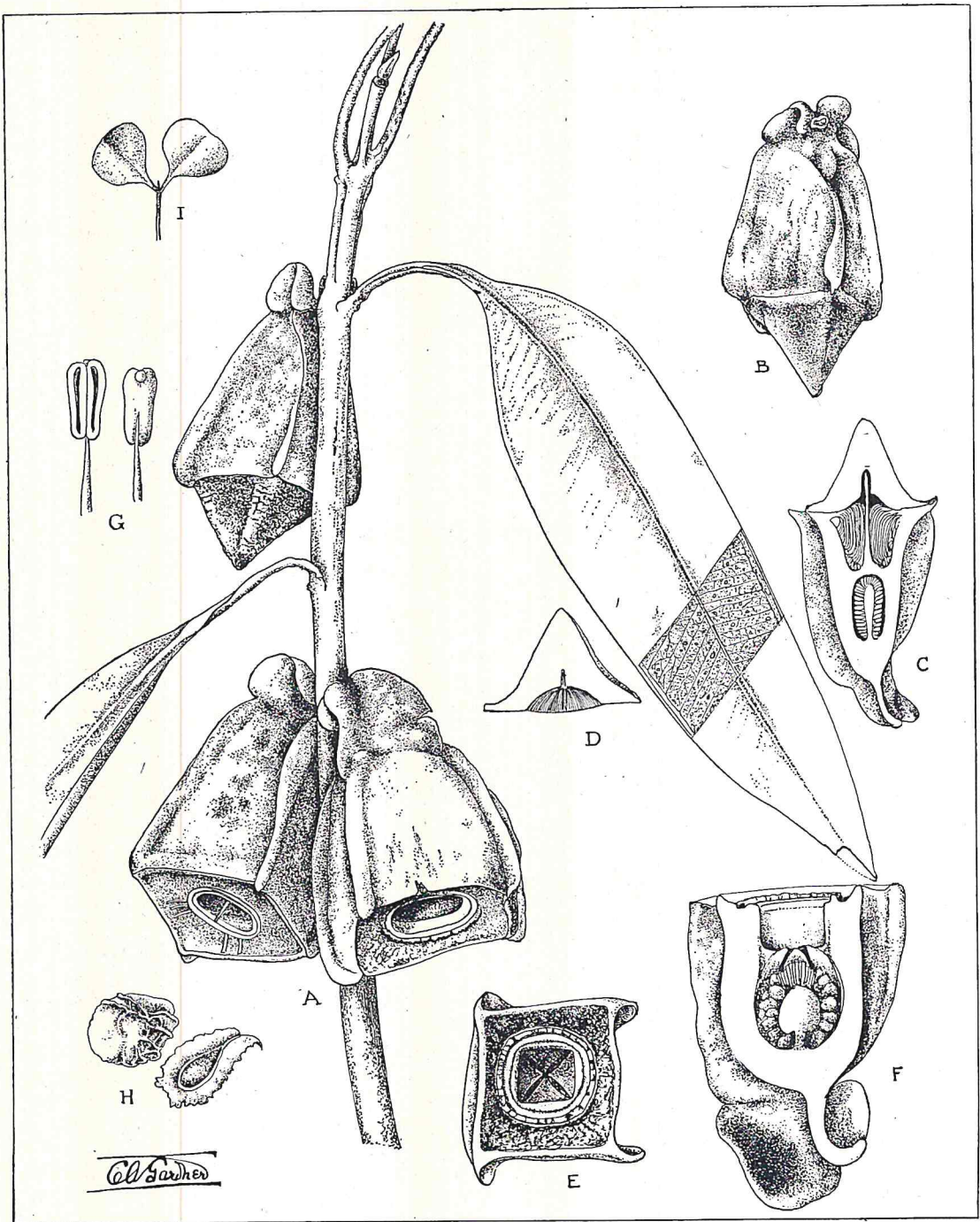
The brown mallet is valued for its bark, and is cultivated. The Forests Department maintains plantations of the tree in several areas. The bark is stripped at certain times of the year when, because of its moisture content, it strips easily: in the summer it cannot be so stripped. The tannin con-



The Brown Mallet.

tent varies from 40 to 57 per cent. The tree like the gimlet very rarely suckers, but propagates freely from seeds.

Apart from the mallees there are three trees which might be confused, having somewhat similar buds and fruits: the brown mallet has erect branches and a smooth bark throughout, and grows in high situations; the



THE FOUR-WINGED MALLEE
(Eucalyptus tetraptera Turcz.)

A—Branch with leaves, buds and fruit; B—Flower bud; C—Section of flower-bud; D—Operculum in longitudinal section; E—Apical view of ripe fruit; F—Section of the fruit; G—Anthers; H—Seeds; I—Cotyledons.

Perth, W.A.

Icon origin.

swamp or flat-topped yate has a rough bark on the trunk and smooth branches of a pale colour, and occurs in low-lying situations not far removed from fresh water during the winter months. *Eucalyptus Sargentii* is the salt gum, which grows near Wyola and Cunderdin, and again near Hine's Hill, and Lake Mears. It has a rough-barked, usually short trunk, the bark being almost black and very curly, and the branches are smooth and reddish. This tree grows in saline soils, and is usually the last tree to perish when land becomes salt. In this respect it has a value in its salt tolerance. The blue mallet (*E. Gardneri*) should not be confused with the brown mallet, differing in its blue-grey leaves and narrow

acutely-pointed bud cap, with fruits not unlike those of the Wandoo.

BOTANICAL DESCRIPTION OF BROWN MALLET

Tree 30-45 feet tall, with a straight trunk and erect branches, the bark smooth, reddish-brown and grey, sometimes with persistent patches of curly crisped bark adhering in spots, the trunk cylindrical or rather angular. Timber pale brown, straight-grained, strong. Branchlets angular. Leaves alternate, stalked, erect, leathery, lance-shaped, the same colour on both surfaces, somewhat shining, the veins not very prominent, and usually finer and less spreading than in *E. occidentalis*, acute, the midrib prominent. Oil dots fairly numerous, the leaf 4-6 inches long.

Umbels 3-7 flowered, the peduncles at first erect, later spreading or recurved, terete or angular. Calyx-tube bell-shaped, about one-third of an inch long, smooth. Operculum cylindrical, from as long as to half as long again as the calyx-tube, usually blunt. Stamens as in *E. occidentalis*. Frut bell-shaped, rarely half an inch long, the rim raised above the ovary, but more or less rounded and not expanded as in *E. occidentalis*, the valves fine and much less exerted than in *E. occidentalis*. Seed-leaves Y-shaped.

No. 12—THE FOUR-WINGED MALLEE (*Eucalyptus tetraptera* Turcz.)

THIS small shrub was first discovered by James Drummond in 1847 between Cape Riche and Doubtful Island Bay, and was named by the Russian botanist Turczaninow from the four-winged buds and fruits. It is now fairly common in cultivation, being attractive when in bud and in flower, and always curious because of its large square fruits and large, very thick, bright green leaves, which are the thickest of any species of *Eucalyptus*. The plant is deserving of a place in any garden, and will thrive in poor sandy soils.

Eucalyptus tetraptera is confined to a stretch of country extending from the Stirling Range eastwards to Israelite Bay to the east of Esperance. It rarely exceeds three feet in height, and is rendered conspicuous and distinctive by reason of its thick branches, usually of a dark colour, very thick and leathery large bright green leaves with only the midrib discernible, and its solitary flowers (usually produced in pairs) in which there is a remarkably broad and somewhat folded or twisted foot-stalk or peduncle without any pedicel or individual flower-stalk under the flower. The peduncle is closely recurved, so that the flowers hang downwards.

The bud is bright scarlet in colour, the almost square calyx-tube with four equal fleshy wings, and the operculum

is distinctly pyramidal. The buds are frequently three and a half inches in length. The filaments are red or pink in colour and incurved in the bud, relatively small for the size of the flower, but rendered conspicuous by their colour. The anthers are oblong, versatile (attached near the middle) and open in parallel longitudinal slits.

The fruit is large, up to three inches in length, four-winged and square in section, with a broad flat disc, and the orifice varies from circular to almost square; the capsule is deeply included together with the four valves. The fruit, at first scarlet, becomes brown with age, and the large seeds are irregularly shaped and winged at the angles, the seed-leaves being broad upwards and not lobed.