

ACACIA SEEDLINGS, PART VII.

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[With Plates II - V.]

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SYNOPSIS:

VITALITY OF SEEDS IN SEA-WATER.

RAPID GERMINATION.

SEQUENCE IN THE DEVELOPMENT OF LEAVES.

NUMBER OF PINNÆ ON ONE LEAF.

CLOSING UP OF PHYLLODES AT NIGHT.

FLOWERING SEEDLINGS.

DESCRIPTION OF SEEDLINGS.

Vitality of Seeds in Sea-Water.

A seed of *Acacia melanoxylon* from Jenolan Caves germinated when planted after having been immersed in sea-water 4 years and 1 month. This constitutes a record for this experiment so far as I am aware.

Rapid Germination.

During these experiments it has been noted that seeds of *Acacia pendula* and *A. Oswaldi* germinate very rapidly after being placed in hot water and planted, and that both species produce fleshy cotyledons. They, especially the latter, will grow in hot districts with a low rainfall, and in many instances may germinate as the result of a thunder-storm. It would seem, therefore, that this character of speedy germination may have developed to allow the young plants to become established quickly after a rain storm and before the ground again becomes dried up as often happens in the far interior.

Sequence in the Development of Leaves.

In Part VI, (p. 147), it was mentioned that 95 species had been found to commence with one simply pinnate leaf, while 12 had an opposite pair. The following four may be added to the former list, which brings the total to 99:—*A. Catechu* Willd., (Hawaii, E. C. Andrews, cultivated), *A. Havilandi* Maiden, *A. Jonesii* F.v.M. and Maiden, *A. Westoni* Maiden.

To the twelve species commonly having an opposite pair of simply pinnate leaves the following two may be added:—*A. arabica* Willd., (Hawaii, E. C. Andrews, cultivated), *A. Koa* A. Gray, (seeds from Hawaii, E. C. Andrews).

Although *A. Westoni* usually has only one simply pinnate leaf it occasionally has an opposite pair.

A. linifolia may have an opposite pair (J. J. Fletcher).

Number of Pinnæ on One Leaf.

In addition to those phyllodineous Acacias already recorded as having more than one pair of pinnæ on one leaf (Part VI, p. 147), the following may be added:—*A. difformis*, *A. longifolia* and *A. Westoni* may have two, and *A. melanoxylon* nine pairs.

Closing Up of Phyllodes at Night.

The closing up at night of leaflets on plants of the Family Leguminosæ, including the genus *Acacia*, is well known. Recently, however, it was noticed that the phyllodes of *A. complanata* respond to changes from light to darkness. On a small plant, with the stem bent almost into a horizontal position, the lower margins of two almost opposite phyllodes were 7 cm. apart during sunlight, while at night they closed up to within 3 cm. of each other, the movement of each amounting to 2 cm., or just over $\frac{3}{4}$ of an inch.

Flowering Seedlings.

Several examples have been quoted of *Acacia* seedlings having flowered in 4, 5 or 6-inch pots, (Part VI, p. 151), and

the following are now added:—*A. accola*, *A. complanata*, *A. decora*, *A. flexifolia*, *A. hakeoides*, *A. penninervis*, *A. podalyriæfolia*, *A. rubida*, *A. subulata*, *A. trinervata*, and *A. vomeriformis*.

Description of Seedlings.

PUNGENTES—(Uninerves).

ACACIA ASPARAGOIDES A. Cunn. Seeds from Medlow and Mount Victoria. (Plate II, Numbers 1 to 3).

Seeds dull black, often mottled, oval to oblong-oval, 3 to 3·5 mm. long, 2 mm. broad, 1·5 mm. thick.

Hypocotyl terete, brownish-green to pale pink above soil, thickening into flange at root, 9 mm. to 1·5 cm. long, ·8 to 1 mm. thick at base, about ·5 mm. at apex, glabrous.

Cotyledons sessile, auricled, oblong-oval, 4 mm. long, 2 to 2·5 mm. broad, upperside green, underside pale green to pinkish, with one or two raised lines.

Stem terete, brownish-grey, slightly tomentose. First internode ·5 mm.; second 1 mm.; third 1 to 3 mm.; fourth 1 to 5 mm.; fifth and sixth 2 to 6 mm.

Leaves—No. 1. Abruptly pinnate, petiole 3 to 5 mm., channelled above, green, glabrous; leaflets two pairs, oblong-acuminate to obovate, about 4 mm. long, 1 to 2 mm. broad, upperside green, underside paler; rachis 2 mm., glabrous, with terminal seta; stipules reduced to scales.

No. 2. Abruptly bipinnate, petiole 5 mm. to 1 cm., channelled above, glabrous, with terminal seta; leaflets one to two pairs, the basal pair oblong-acuminate, the apical pair obovate, mucronate, 1 to 5 mm. long, ·5 to 2 mm. broad, upperside green, underside paler; rachis 4 to 5 mm., with terminal seta.

Nos. 3 and 4. Abruptly bipinnate, petiole 7 mm. to 1·1 cm., channelled above, glabrous; leaflets two pairs, similar

to those of No. 2; rachis 4 to 7 mm.; stipules tapering to linear, 1 mm. long.

Nos. 5 and 6. These may be linear phyllodes or they may be abruptly bipinnate similar to No. 4.

Nos. 7 to 12. Linear, tapering, rigid, pungent-pointed phyllodes, 7 to 8 mm. long, about 1 mm. broad, with a prominent vein on each side and usually with a very slight angle near the base on the upper margin which is channelled below the angle in the early phyllodes.

Many seeds of this species produce twin plants which in most cases soon become separated.

UNINERVES—(Racemosæ).

ACACIA BANCROFTI Maiden.¹ Seeds from Eidsvold, Queensland (Dr. T. L. Bancroft, per J. H. Maiden). Plate II, Numbers 4 to 6.

Seeds black, oblong, 9 mm. to 1 cm. long, 4 mm. broad, 2 mm. thick. The water in which the seeds with funicles were immersed turned pale brown.

Hypocotyl terete, red, 1·3 to 3·5 cm. long, about 2 mm. thick at base, 1 mm. at apex.

Cotyledons sessile, auricled, oblong, 1·3 to 1·4 cm. long, 4·2 to 5 mm. broad, upperside green, underside reddish-brown to red.

Stem terete, reddish-brown, becoming brownish-green, glabrous. First internode ·5 to 1 mm.; second 1 to 3 mm.; third 2 to 3 mm.; fourth 3 to 6 mm.; fifth 3 to 8 mm.; sixth 3 mm. to 2·7 cm.

Leaves—No. 1. Abruptly pinnate, petiole 6 mm. to 1·2 cm., with gland near basal pair of leaflets, brownish-green, glabrous; leaflets four to five pairs, oblong-acuminate, the apical pair slightly obovate, mucronate, 5 mm. to 1·2 cm.

¹ Proc. Roy. Soc., Queensland, Vol. xxx, 26, (1918).

long, 1·5 to 5 mm. broad, midrib distinct on underside, upperside green with splashes of reddish-brown, underside reddish-brown; rachis 1·5 to 2·2 cm., with terminal seta; stipules reduced to scales.

No. 2. Abruptly bipinnate, petiole 1·7 to 2 cm. vertically flattened to from 2 to 3 mm. broad, the midrib sometimes distinct, at others absent or coinciding with the lower margin, the upper and lower margins nerve-like, gland near base, terminal seta present; leaflets two to four pairs, often unequally pinnate, oblong-acuminate to obovate, 2 to 6 mm. long, 1 to 3 mm. broad; rachis up to 7 mm.; stipules reduced to scales.

Nos. 3 to 6. Phyllodes from 3 to 8 cm. long, 8 mm. to 2·7 cm. broad, falcate, with distinct midrib, prominently penninerved, the upper margin sinuous with from one to three lobes terminating in a gland.

This is the fifth seedling described in this series where the No. 3 leaf may be reduced to a phyllode, the previous cases being *A. excelsa*, *A. alata*, *A. aspera*, and *A. flexifolia*. (See *A. Oswaldi*, *infra*.)

UNINERVES—(Racemosæ).

ACACIA DIFFORMIS R. T. Baker.¹ Seeds from Wyalong, New South Wales. (Plate II, Numbers 7 to 9.)

Seeds brownish or rusty-black, oblong-oval, 7 to 8 mm. long, 3·5 to 4 mm. broad, 2 mm. thick.

Hypocotyl terete, very pale green, to pale pink or red, 1·3 to 4·5 cm. long, 2 to 2·5 mm. thick at base, ·8 to 1·2 mm. at apex, swelling into flange at root, constricted immediately above the soil, glabrous.

Cotyledons usually two, in one case three, sessile, auricled, oblong, apex rounded, 9 mm. to 1 cm. long, 3·5 to

¹ Proc. Linn. Soc. N.S. Wales, xxii, 154, (1897).

4 mm. broad, upper side often at first yellowish-green, becoming green, underside brownish-yellow to purple and reddish-brown, with one or two raised lines along central portion, and sometimes several glands or warty protuberances, soon becoming revolute and cylindrical.

Stem terete, reddish-green to brownish-red, glabrous, first internode .5 mm.; second 1 mm.; third 1 to 6 mm.; fourth 1 to 7 mm.; fifth 2 mm. to 1.1 cm.; sixth 6 mm. to 1.6 cm.; seventh 6 mm. to 1.8 cm.

Leaves—No. 1. Abruptly pinnate, petiole 2 to 7 mm., glabrous; leaflets four to six pairs, oblong-acuminate, 5 to 9 mm. long, 1.5 to 4 mm. broad, upper side green, underside paler, margins sometimes red; rachis 1 to 2 cm., with terminal seta; stipules reduced to scales.

No. 2. Usually abruptly bipinnate, petiole 6 mm. to 2 cm., glabrous, with terminal seta; leaflets three to five pairs, oblong-acuminate, the apical pair often obovate, 2 to 5 mm. long, 1 to 2 mm. broad; rachis 7 mm. to 1.4 cm.; stipules reduced to scales.

In one case No. 2 was simply pinnate with one pair of leaflets; in another case it was abnormally bipinnate, with one leaflet about the middle while towards the apex there was one pinna with three pairs of small leaflets, and opposite to this was a single leaflet.

No. 3. Usually abruptly bipinnate, petiole 8 mm. to 2.1 cm.; leaflets three to five pairs; rachis 6 mm. to 1 cm.

In one case No. 3 was simply pinnate with two pairs of leaflets; in another case the leaf had a terminal pair of pinnæ and about the middle of the common petiole there was one large leaflet intact on one side of the midrib while the other side was divided into four small leaflets.

Leaf No. 3 may be twice pinnate.

No. 4. Abruptly bipinnate, petiole 1·2 to 3·4 cm. long, up to 3 mm. broad, with the midrib practically along the lower margin, the upper margin nerve-like, often with a gland towards the base; leaflets four to six pairs.

Nos. 5 to 9. Rarely No. 5 may be bipinnate, but usually Nos. 5 to 9 are falcate, linear phyllodes, with the midrib usually just below the centre of the lamina, and a finer vein above, starting from the base but not reaching the apex. No. 5 varies from 2 to 7 cm. long, 3 to 7 mm. broad; No. 6, 3 to 11 cm. long, 3 to 7 mm. broad; Nos. 7 to 9, 3 to 17 cm. long, 3 mm. to 1 cm. broad.

UNINERVES—(Racemosæ).

ACACIA CULTRIFORMIS A. Cunn. Seeds from Wyalong.
(Plate III, Numbers 1 to 3.)

Seeds dull black, oblong to oblong-oval, about 5 mm. long, 2·5 to 3 mm. broad, 1 to 1·5 mm. thick.

Hypocotyl terete, reddish, up to 1·8 cm. long, about 2 mm. thick at base, 7 to 1 mm. at apex.

Cotyledons sessile, slightly auricled, oblong, apex rounded 5 to 6 mm. long, 3 to 4 mm. broad, upperside at first brownish-yellow to brownish-red, becoming dark green, underside reddish to brownish-red, with one to three longitudinal nerves, soon becoming revolute and cylindrical.

Stem terete, reddish-green to green, glabrous. First internode 5 mm.; second 1 mm.; third 2–3 mm.; fourth 3–4 mm.; fifth 1 to 4 mm.; sixth and seventh 1 to 5 mm.

Leaves—No. 1. Abruptly pinnate, petiole 3 to 5 mm., glabrous; leaflets three to four pairs, oblong-acuminate, the apical pair often obovate, 4 to 6 mm. long, 1 to 3 mm. broad, upperside green, underside paler, rachis 3 to 6 mm., with terminal seta; stipules reduced to scales.

No. 2. Abruptly bipinnate, petiole 4 mm. to 1 cm., glabrous, with terminal seta; leaflets two to four pairs,

oblong-acuminate to obovate, 2 to 5 mm. long, 1 to 2·5 mm. broad, upper side green, underside paler; rachis 3 to 8 mm.; stipules flat acuminate scales. No. 2 may have two pairs of pinnæ. In one case No. 2 was simply pinnate.

Nos. 3 to 5. In one case No. 3 was simply pinnate, but they are usually abruptly bipinnate, petiole 6 mm. to 1·5 cm. often with a gland on the upper margin; leaflets two to six pairs; rachis 4 mm. to 1·4 cm.

Nos. 6 and 7. These may be phyllodes, or abruptly bipinnate, petiole 1 to 1·2 cm. long, dilated up to 4 mm. broad, with the main nerve along the lower margin, a gland on the upper margin; leaflets seven pairs; rachis about 1 cm.

Nos. 8 to 12. Falcate to almost triangular phyllodes, 6 mm. to 1·5 cm. long, 4 to 8 mm. broad, greyish-green on both sides, the midrib below the centre of the lamina, which contains numerous lateral parallel veins, mucronate, the upper margin nerve-like, having an angle terminating in a gland, glabrous or slightly glaucous.

PLURINERVES—(Oligoneuræ).

ACACIA TRINEURA F.v.M. Seeds from Wyalong. (Plate III, Numbers 4 and 5.

Seeds black, oblong, about 3·5 to 4 mm. long, 2 mm. broad, 1 mm. thick.

Hypocotyl terete, red to pink, up to 1·7 cm. long, about 1 mm. thick at base, about ·5 mm. at apex.

Cotyledons sessile, auricled, oblong, 5 mm. long, 2 mm. broad, upper side green, underside brownish-red.

Stem terete, brownish-grey. First internode ·5 mm.; second to fourth about 1 mm.; fifth 3 to 4 mm.; sixth and seventh 5 mm. to 1·2 cm.

Leaves—No. 1. Abruptly pinnate, petiole about 3 mm., glabrous; leaflets one to two pairs, the basal pair oblong-acuminate, the apical pair often obovate, 3 to 4.5 mm. long, 1 to 2.5 mm. broad, upperside green, underside reddish-brown, midrib distinct on underside; rachis about 2 mm., with terminal seta.

No. 2. Abruptly bipinnate, petiole 4 to 9 mm., glabrous, with terminal seta; leaflets two to three pairs, oblong-acuminate to obovate, 2 to 5 mm. long, 1 to 2 mm. broad, mucronate; rachis 4 to 7 mm., with terminal seta; stipules flat acuminate scales.

Nos. 3 and 4. Abruptly bipinnate, petiole 6 mm. to 1.4 cm., glabrous; leaflets three to five pairs; rachis 6 mm. to 1 cm.

Nos. 5 to 7. Abruptly bipinnate petiole 1.1 to 2.9 cm., vertically dilated to 1 mm. in No. 5, and to 6 mm. in No. 7.

In the case of No. 6 the midrib is below the centre of the lamina, with a finer parallel vein above. In No. 7 the midrib is below the centre of the lamina, with a finer parallel vein above and below, and above each of these there is an even finer vein. Leaflets five to seven pairs.

No. 8. This may be a phyllode or abruptly bipinnate, petiole up to 2.5 cm. long, 5 mm. broad.

Nos. 9 to 12. Cuneate-oblong, glabrous phyllodes, sometimes slightly viscid, with venation similar to the dilated petiole of No. 7, except that the three principal veins in the phyllodes are of about equal prominence, the middle one runs along the centre of the lamina, and sometimes a fourth very fine vein may be seen near the lower margin, making seven in all.

PLURINERVES—(Microneuræ).

ACACIA PENDULA A. Cunn. Seeds from Boggabri (Mrs. F. C. S. Holt). Plate IV, Numbers 1 to 3.

Seeds brown, obovate to almost orbicular, 4·5 to 6 mm. long, 3·5 to 5·5 mm. broad, about 1 mm. thick. The seeds germinate quickly.

Hypocotyl terete, green to light brown, up to 3 cm. long, 1 to 2 mm. thick at base, ·5 to 1·5 mm. at apex.

Cotyledons sessile, auricled, obovate to almost orbicular, up to 8 mm. long, 5 to 7 mm. broad, thick or slightly fleshy, upperside green, underside pale green.

Stem terete, greenish-brown to grey, glabrous, or with a slight glaucescence. First internode ·5 mm.; second ·5 to 3 mm.; third 1 to 5 mm.; fourth to eighth 2 mm. to 1 cm.

Leaves—No. 1. Simply pinnate, (in one case there was an opposite pair), petiole 3 to 6 mm., glabrous; leaflets three to five pairs, oblong-acuminate, 4 to 8 mm. long, 1·5 to 2·5 mm. broad, upperside green, underside paler; rachis 6 mm. to 1 cm., with terminal seta; stipules small.

No. 2. Abruptly bipinnate, petiole 7 mm. to 1 cm., green, glabrous, with terminal seta; leaflets three to four pairs, oblong-acuminate, the apical pair obovate, 3 to 5 mm. long, 1 to 2·5 mm. broad, mucronate; rachis about 7 to 8 mm.; stipules small. No. 2 may have two pairs of pinnæ.

Nos. 3 to 5. Abruptly bipinnate, petiole 5 mm. to 2·8 cm., green, glabrous, leaflets three to six pairs; rachis 7 mm. to 1·5 cm.

Nos. 6 to 12. Abruptly bipinnate, petiole 2·2 to 6·5 cm., dilated from about ·5 to 1·5 mm. broad; leaflets five to seven pairs; rachis 1 to 2·5 cm.; stipules about 1·5 mm.

Nos. 13 to 20. Abruptly bipinnate, petiole 2·3 to 9·3 cm., dilated up to 2 mm. broad, midrib distinct, leaflets six to seven pairs; rachis 8 mm. to 2·3 cm.

Nos. 21 to 30. Some of these may be linear phyllodes, or abruptly bipinnate, petiole up to 12 cm. long, up to 5 mm. broad, midrib distinct, lamina finely striate with parallel nerves on each side of midrib.

Nos. 31 to 40. Usually linear phyllodes, similar to the dilated petiole of Nos. 21 to 30.

PLURINERVES—(Microneuræ).

ACACIA OSWALDI F.v.M. Seeds from Boggabri (Mrs. F. C. S. Holt), Cobar (Archdeacon F. E. Haviland), Broken Hill (E. C. Andrews), and Tottenham, New South Wales. (Plate III, Numbers 6 to 8).

Seeds very dark brown to black, oblong-oval to almost orbicular, up to 8 mm. long, up to 6 mm. broad, 3 mm. thick, areola 4 to 5 mm. long. The seeds germinate very quickly, and in hot weather the seedling may appear in six days after the seed has been planted.

Hypocotyl terete, pale green to reddish-brown, 1·5 to 3·4 cm. long, 2 to 3 mm. thick at base, up to 2 mm. at apex, expanding into flange at base.

Cotyledons sessile, sagittate, obovate, 8 mm. to 1 cm. long, 5 to 8 mm. broad, thick or somewhat fleshy, upper-side at first pale green, becoming dark green, underside at first yellowish-green, becoming pale green, sometimes remaining until the phyllodes appear. One plant had three cotyledons, one of normal size and two smaller.

Stem terete, brownish-green to grey, glabrous. First internode ·5 to 1 mm.; second and third 2 to 4 mm.; fourth to sixth 2 to 5 mm.

Leaves—Nos. 1 and 2. Simply pinnate, forming an opposite pair, petiole 7 mm. to 1·2 cm., often slightly dilated, glabrous; leaflets one to four pairs, 7 mm. to 1·4 cm. long, 3 to 5 mm. broad, oblong-acuminate, the apical pair sometimes obovate, venation distinct, green on both sides; rachis 1 to 2 cm., with terminal seta.

No. 3. This may be a phyllode or simply pinnate, petiole 5 mm. to 1·3 cm., sometimes slightly dilated, glabrous; leaflets one to four pairs, often unequally pinnate; rachis 4 to 7 mm., sometimes vertically flattened, with terminal seta.

No. 4. This may be a phyllode or simply pinnate, petiole up to 2 cm., vertically flattened to 3 mm. broad; leaflets from one leaflet up to three pairs.

No. 5. Usually a phyllode, but may be simply pinnate with one pair of leaflets, or abruptly bipinnate with one or two pairs of leaflets, petiole up to 6 mm. broad.

Nos. 6 to 10. Phyllodes linear-lanceolate to cuneate, sometimes falcate, narrowed at the base, with a strong central nerve and two others less conspicuous not always confluent at the apex and some finer veins parallel or anastomosing, terminating in a somewhat pungent spine about 2 mm. long.

This is the sixth seedling described in this series where the No. 3 leaf may be reduced to a phyllode. (See *Acacia Bancrofti*, *supra*.)

This species, the seedling of which was described by Lubbock¹ from two plants, seldom produces bipinnate leaves, and may develop phyllodes when only an inch above the soil.

JULIFLORÆ—(Tetrameræ).

ACACIA LONGIFOLIA Willd. Seeds from Dundas, Woodford, Hill Top (E. Cheel), Termeil, New South Wales. (Plate V, Numbers 1 to 3.)

Seeds black, those from Dundas shiny black, oblong, 3 to 4 mm. long, 1·5 to 2·5 mm. broad, 1·5 to 2 mm. thick. The largest seeds were those from Termeil, and the shortest from Woodford.

¹ "A Contribution to our Knowledge of Seedlings," by Sir John Lubbock, I, 473, (1892).

Hypocotyl terete, at first pale, becoming brownish-green, 6 mm. to 1.8 cm. long, the largest being from Hill Top, 1.5 to 1.7 mm. thick at base, .6 to 1 mm. at apex.

Cotyledons sessile, auricled, oblong to oblong-oval, 4 to 6 mm. long, about 2.5 mm. broad, upper side green, under side reddish to reddish-brown or brownish-green, becoming revolute and cylindrical.

Stem at first angular, becoming terete, sometimes at first reddish, later green to greyish-green, glabrous to slightly pilose. First internode .5 mm.; second 1 to 2 mm.; third and fourth usually 1 to 4 mm. but 2 cm. in one Lane Cove plant (collected by Mr. J. J. Fletcher); fifth usually 3 mm. to 1 cm. but 5.6 cm. in one Lane Cove plant (J. J. Fletcher); sixth 6 mm. to 2.8 cm.; seventh 8 mm. to 5.3 cm., the longest and some of the moderately short being from Woodford.

Leaves—No. 1. Abruptly pinnate, petiole 5 to 6 mm., in Hill Top specimens up to 1 cm., glabrous; leaflets two to four pairs, oblong-acuminate, 4 to 7 mm long, 2 to 3 mm. broad, upper side green, underside reddish to pale green; rachis 5 to 8 mm., up to 1.1 cm. in Hill Top specimens, with terminal seta.

No. 2. Abruptly bipinnate, petiole 6 mm. to 2 cm. in Hill Top specimen, sometimes with small gland, with terminal seta; leaflets two to four pairs, oblong-acuminate, the apical pair often obovate, 2 to 5 mm. long, 1 to 2 mm. broad; rachis 6 mm. to 1 cm., stipules small. In one case this leaf was simply pinnate with one pair of leaflets.

Nos. 3 and 4. Abruptly bipinnate, petiole 1.4 to 2.7 cm. in No. 3, 2.5 to 5.2 cm. in No. 4, the latter sometimes vertically flattened to 7 mm. broad, with a strong nerve along or close to the lower margin and a finer one above, not always confluent at the apex, a gland sometimes on upper margin; leaflets four to six pairs in No. 3, and five

to eight in No. 4; rachis 1·1 cm. to 2·5 cm. in Hill Top plants of No. 4; stipules up to 2 mm. long. No. 4 may have two pairs of pinnæ.

No. 5. Sometimes a phyllode but often abruptly bipinnate, petiole 4·4 to 8·8 cm. long, 1 to 9 mm. broad, with a strong nerve below the centre of the lamina and a slightly less prominent vein above the centre, besides smaller veins; leaflets usually six to seven pairs, but up to nine in Hill Top plants, up to 1·2 cm. long, 4 mm. broad in Woodford and Lane Cove specimens; sometimes twice pinnate.

Nos. 6 to 8. Usually phyllodes, but sometimes abruptly bipinnate, the latter state being only found on Nos. 7 and 8 in one Hill Top specimen, 3·7 to 7·5 cm. long, 3 to 7 mm. broad; leaflets up to ten pairs on No. 6 in one Hill Top specimen; rachis up to 4 cm. No. 7 may have two pairs of pinnæ.

Nos. 9 to 12. Oblong-lanceolate to linear phyllodes, from about 6 to 8 cm. long and under 1 cm. broad, up to 23 cm. long and perhaps 1·5 cm. broad, with two conspicuous veins the lower one the more prominent, the rest of the lamina faintly reticulate.

The Hill Top specimens belong to the form named *A. intertexta* Sieb.

JULIFLORÆ—(Tetrameræ).

ACACIA FLORIBUNDA Willd. Seeds from Dundas near Sydney.

(Plate V, Numbers 4 to 6.)

Seeds black, oblong, 3 to 3·5 mm. long, 1·5 to 2 mm. broad, 1 to 1·5 mm. thick.

Hypocotyl terete, pale green to reddish-brown, 1 to 4 cm. long, 1·5 mm. thick at base, about ·7 mm. at apex.

Cotyledons sessile, sagittate, oblong, apex rounded, 4·5 to 5 mm. long, 2 to 2·5 mm. broad, upper side green, under side brown, with a few lines along centre.

Stem terete, tomentose, greenish-brown to grey. First internode .5 mm.; second .5 to 5 mm.; third .5 to 6 mm.; fourth and fifth 1 mm. to 1.3 cm.; sixth 1 mm. to 1 cm.; seventh and eighth 1 to 8 mm.

Leaves—No. 1. Simply pinnate, petiole 2 mm. to 1 cm., glabrous; leaflets two to three pairs, oblong-acuminate to obovate, 4 to 8 mm. long, 2 to 3 mm. broad, often mucronate, upperside green, underside paler; rachis 2 to 4 mm., with terminal seta.

In one case the first leaf had two pairs of leaflets except that one of the basal leaflets was transformed into a pinna with two pairs of small leaflets.

No. 2. Abruptly bipinnate, petiole 4 mm. to 1.2 cm., green, glabrous, with terminal seta; leaflets two to three pairs, oblong-acuminate, 2 to 5 mm. long, 1 to 2 mm. broad; rachis 5 to 6 mm.; stipules minute.

Nos. 3 to 5. Abruptly bipinnate, petiole 7 mm. to 2.8 cm.; leaflets three to six pairs, up to 7 mm. long, 3 mm. broad; rachis 8 mm. to 2 cm.; stipules about 1 mm. long.

Nos. 6 to 8. Abruptly bipinnate, petiole 1.1 to 4.2 cm. long, often dilated to about 1 to 1.5 mm. broad, with a strong nerve along or near the lower margin; leaflets five to nine pairs; rachis 1.2 to 3 cm.

Nos. 9 and 10. These may be linear phyllodes, or abruptly bipinnate, petiole 1 to 5.4 cm., dilated to about 1.5 mm.; leaflets five to ten pairs; rachis 7 mm. to 3.5 cm.

Nos. 11 to 20. Linear phyllodes, about 3 to 7 cm. long, 1 to 3 mm. broad, with distinct midrib, and finer parallel vein above not confluent at the apex, and where the lamina is broad enough an even finer nerve may be seen with pocket lens below, the phyllode terminating in a short mucrone, straight, or curving slightly outwards. In later phyllodes there may be at least three veins on each side of the central nerve.

BIPINNATÆ—(Botryocephalæ).

ACACIA POLYBOTRYA Benth. Seeds from Mudgee (J. H. Maiden). (Plate IV, Numbers 4 to 6.)

Seeds glossy-black, oblong, 6 to 8 mm. long, 3 to 3·5 mm. broad, 2 mm. thick.

Hypocotyl terete, brownish-red, 1 to 2·5 cm. long, up to 3 mm. thick at base, 1 mm. at apex.

Cotyledons sessile, auricled, oblong, apex rounded, up to 9 mm. long, 4 mm. broad, upperside green, underside reddish, soon becoming revolute.

Stem brown to green, or bluish-green on exposed side, glabrous to pilose. First internode ·5 to 1 mm.; second 1 to 3 mm.; third and fourth 6 mm. to 1·5 cm.; fifth to seventh 1 to 2·8 cm.

Leaves—No. 1. Abruptly pinnate, petiole 4 to 7 mm., usually with gland, glabrous; leaflets four to five pairs, the basal leaflets sometimes alternate, oblong, rather obtuse, the apical pair usually obovate, 3 to 7 mm. long, up to 4 mm. broad, midrib distinct, upperside green, underside paler; rachis 9 mm. to 1·3 cm., glabrous, with terminal seta.

No. 2. Abruptly bipinnate, petiole 8 mm. to 1·8 cm., brownish-green, with gland and terminal seta; leaflets four to five pairs, the basal leaflets sometimes alternate, oblong to obovate, 2 to 6 mm. long, 1 to 3 mm. broad; rachis 1 to 1·5 cm., with terminal seta; stipules reduced to scales.

Nos. 3 and 4. Abruptly bipinnate with one to three pairs of pinnæ, from 1 cm. in the single petiole to 3·7 cm. in the common petiole, with gland, pilose; leaflets five to nine pairs; rachis 1·1 to 2·8 cm.

Nos. 5 to 9. Abruptly bipinnate with three to eight pairs of pinnæ, common petiole 2·6 to 6·5 cm., with gland near base, and sometimes also at base of apical pair of pinnæ, pilose; leaflets eight to ten pairs; rachis up to 3 cm., pilose.

BIPINNATÆ—(Botryocephalæ).

ACACIA DISCOLOR Willd. Seeds from Woodburn near Milton, Medlow and Mosman, New South Wales. (Plate V, Numbers 7 to 9.

Seeds black, oval to oblong-oval, 4 to 5·5 mm. long, 2·5 to 3·5 mm. broad, about 1·5 mm. thick.

Hypocotyl terete, reddish to red, 1·2 to 4 cm. long, up to 2·5 mm. thick at base, 1 mm. at apex, glabrous except sometimes with a few roots.

Cotyledons sessile, sagittate, obovate-oval, up to 6 mm. long, 4 mm. broad, upper and underside red, the latter with a raised line along centre, becoming revolute in a few days.

Stem at first angular, becoming terete, brownish-red to brownish-green, glabrous in the Milton specimens, with a slight tomentum in the Medlow plants. First internode 5 mm.; second 3 mm. to 2·7 cm.; third 3 to 6 mm.; fourth to seventh 4 mm. to 1·7 cm.

Leaves—No. 1. Abruptly pinnate, petiole 2 to 6 mm., glabrous; leaflets four to six pairs, oblong-acuminate, often mucronate, 4 to 8 mm. long, up to 2 mm. broad, upperside reddish-green, underside red; rachis 5 mm. to 2·1 cm., reddish, with terminal seta.

No. 2. Abruptly bipinnate, petiole 5 to 9 mm., pilose to hirsute, a gland on upper margin, terminal seta present; leaflets four to nine pairs, oblong-acuminate, the apical pair often obovate, 3 to 5 mm. long, 1 to 3 mm. broad, mucronate, upperside reddish-green, underside red; rachis 8 mm. to 1·8 cm.

Nos. 3 and 4. Abruptly bipinnate, petiole 7 mm. to 1 cm., with a gland, hirsute; leaflets four to eight pairs on No. 3, eight to twelve pairs on No. 4; rachis 1·1 to 2·5 cm. No. 4 may have two pairs of pinnae.

Nos. 5 to 10. Abruptly bipinnate, Nos. 7 to 10 having from three to five pairs of pinnæ, common petiole from 8 mm. in No. 5 to 5.4 cm. in No. 10, pilose to hirsute, gland on petiole and sometimes at base of apical pair of pinnæ; leaflets eleven to seventeen pairs; rachis up to 4 cm.

A well grown seedling of a few feet may often have ten and eleven pairs of pinnæ and rarely up to thirteen pairs.

EXPLANATION OF PLATES.

PLATE II.

Acacia asparagoides A. Cunn.

1. Cotyledons and pinnate leaf. Medlow.
2. Pinnate leaf, bipinnate leaves and pungent pointed phyllodes.
3. Pod and seeds.

Acacia Bancrofti Maiden.

4. Cotyledons with portion of pinnate leaf showing. Eidsvold, Queensland, (Dr. T. L. Bancroft).
5. Seeds.
6. Pinnate leaf, bipinnate leaf and phyllodes.

Acacia difformis R. T. Baker.

7. Cotyledons. Wyalong.
8. Pinnate leaf, bipinnate leaves, phyllodes, and root nodules.
9. Pod and seeds.

PLATE III.

Acacia cultriformis A. Cunn.

1. Cotyledons with tip of pinnate leaf showing. Wyalong.
2. Pinnate leaf, bipinnate leaves and phyllodes.
3. Pod and seeds.

Acacia trineura F.v.M.

4. Pinnate leaf, bipinnate leaves and phyllodes. Wyalong.
5. Pod and seeds.

Acacia Oswaldi F.v.M.

6. Cotyledons and tips of opposite pair of pinnate leaves. Tottenham.



Acacia asparagoides (1-3); *A. Bancrofti* (4-6); *A. difformis* (7-9).
Three-fourths Natural Size.



Acacia cultriformis (1 - 3); *A. trineura* (4 and 5); *A. Oswaldi* (6 - 8).
 Three-fourths Natural Size.



Acacia pendula (1 – 3); *A. polybotrya* (4 – 6).

One-third Natural Size.



Acacia longifolia (1 - 3); *A. floribunda* (4 - 6); *A. discolor* (7 - 9).

Two-thirds Natural Size.

7. Opposite pair of pinnate leaves, abnormal bipinnate leaf and phyllodes. Boggabri.
8. Pod and seeds. Boggabri. (Mrs. F. C. S. Holt).

PLATE IV.

Acacia pendula A. Cunn.

1. Cotyledons. Boggabri. (Mrs. F. C. S. Holt).
2. Pinnate leaf, bipinnate leaves and phyllodes.
3. Pod and seeds.

Acacia polybotrya Benth.

4. Cotyledons. Mudgee. (J. H. Maiden).
5. Pinnate and bipinnate leaves.
6. Pod and seeds.

PLATE V.

Acacia longifolia Willd.

1. Cotyledons, pinnate leaf and tip of bipinnate leaf. Dundas.
2. Pinnate leaf, bipinnate leaves and phyllodes.
3. Pod and seeds.

Acacia floribunda Willd.

4. Cotyledons and pinnate leaf. Dundas.
5. Pinnate leaf, bipinnate leaves and phyllodes.
6. Pod and seeds.

Acacia discolor Willd.

7. Cotyledons. Medlow.
 8. Pinnate and bipinnate leaves.
 9. Pod and seeds.
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