

ACACIA SEEDLINGS, PART VIII.

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[With Plates II - V and Text Figure.]

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SYNOPSIS:

VITALITY OF SEEDS IN SEA-WATER.

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 placed in boiling water and planted after having been immersed in sea-water for five years.

Sequence in the Development of Leaves.

In Part VII, (p. 106), it was mentioned that 99 species of *Acacia* had been found to commence with one simply pinnate leaf, while 14 had an opposite pair. The following five may be added to the former list, which brings the total to 104:—*A. acinacea* Lindl., *A. Baueri* Benth. (from Wentworth Falls), *A. hastulata* Sm., *A. rhodoxylon* Maiden, *A. sparsiflora* Maiden.

To the fourteen species commonly having an opposite pair of simply pinnate leaves the following three from Western Australia may be added:—*A. extensa* Lindl., *A. scalpelliformis* Meissn., *A. urophylla* Benth., making the total seventeen.

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 VII, p. 106), the following may be added:—*A. implexa* and *A. Koa*, which may have up to six pairs.

Closing Up of Phyllodes at Night.

In Part VII (p. 106), reference is made to the closing up of the phyllodes of *A. complanata* at night, and the following further observations are now recorded:—

A. conferta—phyllodes 6 mm. long, terminals 9 mm. apart in forenoon, 6 mm. apart at night. Phyllodes 1 cm. long, terminals 1·3 cm. apart in forenoon, 8 mm. apart at night.

A. elongata—phyllodes 7 cm. long, terminals 4·2 cm. apart in forenoon, 1·3 cm. apart at night. Phyllodes 9 cm. long, terminals 8 cm. apart in forenoon, 2·5 cm. apart at night.

A. floribunda—phyllodes 2 cm. long, terminals 2·3 cm. apart in forenoon, 1 cm. apart at night. Phyllodes 4 cm. long, terminals 4·7 cm. apart in forenoon, 2 cm. apart at night.

A. longifolia—phyllodes 16·5 cm. long, terminals 26·7 cm. apart in forenoon, 17·3 cm. apart at night. In this case the movement of the terminals of each phyllode was 4·7 cm., or about $1\frac{7}{8}$ inches.

Flowering Seedlings.

Several examples have been given of *Acacia* seedlings having flowered in 6-inch pots, (Part VII, p. 107), and the following are now added:—*A. Baileyana*, *A. conferta*, *A. decurrens* var. *normalis*, *A. discolor*, *A. doratoxylon*, *A. elongata*, *A. homalophylla* (sparsely), *A. longifolia*, *A. neriifolia*, *A. oxycedrus*, *A. pycnantha* (sparsely, in a 9-inch pot), *A. rigens*, *A. trineura*, *A. Westoni* (where sheltered from frost; one plant about to flower was killed by frost).¹

¹ See Remarks by J. H. Maiden, this Journal, Vol. LIV, 230, (1920).

Description of Seedlings.**PUNGENTES—(Uninerves).**

ACACIA TETRAGONOPHYLLA F.v.M. Seeds from Broken Hill (E. C. Andrews). (Plate II, Numbers 1 and 2).

Seeds black, obovate to almost orbicular, 4 to 5 mm. long, 3 mm. broad, 1·5 mm. thick.

Hypocotyl terete, pale to pinkish-brown, 1·7 to 3 cm. long, 1 mm. thick at base, about ·7 mm. at apex.

Cotyledons sessile, auricled, oval to obovate, 7 to 8 mm. long, 4 to 5 mm. broad, upperside green, underside at first very pale yellow, becoming pale green.

Stem terete, brown, glabrous. First internode ·5 mm.; second 1 to 3 mm.; third 1 to 4 mm.; fourth to seventh 2 to 6 mm.

Leaves—No. 1. Simply pinnate, in two cases an opposite pair appeared, petiole 4 to 9 mm., glabrous; leaflets two pairs, obliquely and irregularly oval to oblong, 4 to 7 mm. long, 3 to 4 mm. broad, upperside green, underside paler, midrib and secondary vein fairly distinct; on one leaf each basal leaflet developed small leaflets on the lower margin, two in one case and one in the other; rachis 2 to 4 mm., with terminal seta; stipules reduced to scales.

No. 2. Abruptly bipinnate, petiole 1·4 to 2 cm., slightly dilated vertically, green, glabrous, with terminal seta; leaflets one to two pairs, oblong-acuminate, mucronate, 4 to 5 mm. long, 1 to 2 mm. broad, upperside green, underside paler; rachis 4 to 5 mm., with terminal seta.

No. 3. Sometimes a phyllode, 1·8 to 4·5 cm. long, 1 mm. broad, or it may be abruptly bipinnate, petiole 1·5 to 2 cm. long, 1·5 mm. broad, with distinct midrib, the upper margin nervelike, with terminal seta; leaflets one to two pairs, in one case the pinna was reduced to a single leaflet, while the other pinna had developed as a leaflet with three small



Acacia tetragonophylla (1 and 2); *A. verticillata* (3 - 5); *A. rigens* (6 - 8);
A. juncifolia (9 - 11); *A. vomeriformis* (12 - 14).

Three-fourths Natural Size.

ones growing from its side; rachis about 3 mm. with terminal seta; stipules reduced to scales.

Nos. 4 to 10. Linear, pungent-pointed, slightly rigid phyllodes, 1·5 to 4·5 cm. long, ·5 to 1·5 mm. broad, with prominent midrib, particularly on the underside, margins nerve-like which together with the prominent midrib give the phyllode a four-angled appearance. The early phyllodes are sometimes flatter and broader than later ones.

This is the seventh seedling described in this series where the No. 3 leaf has been reduced to a phyllode. (See Part VII, pp. 109, 116).

PUNGENTES—(Spicatae).

ACACIA VERTICILLATA Willd. Seeds from Botanic Gardens, Sydney (J. H. Maiden, Cultivated). (Plate II, Numbers 3 to 5).

Seeds greenish-brown, oblong, 3 to 4 mm. long, 1·5 to 2 mm. broad, 1 mm. thick.

Hypocotyl terete, pale green, 6 mm. to 1·5 cm. long, about 1·7 mm. thick at base, 1 mm. at apex, glabrous except sometimes with a few roots.

Cotyledons sessile, auricled, oblong, apex rounded, 5 mm. long, 2·5 mm. broad, upperside green, underside paler, sometimes remaining till the phyllodes appear.

Stem terete, green, sometimes slightly striate, glabrous. First internode ·5 mm.; second 1 mm.; third 1 to 2 mm.; fourth to seventh 1 to 4 mm.

Leaves—No. 1. Abruptly pinnate, petiole 4 to 6 mm., green, glabrous; leaflets three to four pairs, oblong-acuminate, about 4 mm. long, 2 mm. broad, upperside green, underside paler; rachis 3 to 4 mm., with terminal seta; stipules reduced to scales.

No. 2. Abruptly bipinnate, petiole 5 mm. to 1 cm., glabrous, with terminal seta; leaflets four pairs, oblong-

acuminate, 3 to 4 mm. long, 1 to 2 mm. broad, upperside green; rachis 5 to 7 mm., with terminal seta; stipules reduced to scales.

Nos. 3 and 4. Abruptly bipinnate, petiole 6 mm. to 1 cm., slightly dilated vertically, glabrous; leaflets four to five pairs; rachis 5 to 8 mm.

No. 5. Usually a phyllode, but may be abruptly bipinnate and similar to No. 4.

Nos. 6 to 60. Linear, tapering, rigid, pungent-pointed phyllodes, usually verticillate and arranged in whorls of about 6 to 8, about 4 to 5 mm. long, with a rather prominent central nerve.

CALAMIFORMES—(Plurinerves).

ACACIA RIGENS A. Cunn. Seeds from Wyalong. (Plate II, Numbers 6 to 8).

Seeds brown, oblong-oval to ovate, 3·5 to 4 mm. long, 1·5 mm. broad, 1 mm. thick.

Hypocotyl terete, greenish-brown, 1·3 to 2 cm. long, 1·5 mm. thick at base, about ·7 mm. at apex.

Cotyledons sessile, oblong, apex rounded, 4 to 5 mm. long, 1·7 to 2·3 mm. broad, upperside green, underside brownish-red to red, with one or two raised lines.

Stem terete, greyish-green, pilose to tomentose. First internode ·5 mm.; second to fourth ·5 to 1 mm.; fifth and sixth ·5 to 2 mm.; seventh 1 to 3 mm.

Leaves—No. 1. Abruptly pinnate, petiole 2 to 4 mm., green, glabrous; leaflets two to three pairs, oblong-acuminate, 3 to 5 mm. long, 1·5 to 2·5 mm. broad, upperside green, underside pale green to reddish-green; rachis 3 to 5 mm., with terminal seta; stipules reduced to flat scales.

No. 2. Abruptly bipinnate, petiole 7 mm. to 1·2 cm., glabrous, with terminal seta; leaflets three to five pairs,

oblong-acuminate to cuneate, 3 to 4 mm. long, 1 to 2 mm. broad, upper side green, underside pale green sometimes slightly tinged with red; rachis 3 to 5 mm., with terminal seta; stipules reduced to scales.

No. 3. Abruptly bipinnate, petiole 1 to 2.2 cm.; leaflets four to six pairs; rachis 6 mm. to 1 cm.

In one case a No. 3 leaf was strictly tripinnate.¹

Nos. 4 and 5. Abruptly bipinnate, petiole 7 mm. to 2 cm., slightly dilated, glabrous; leaflets four to seven pairs; rachis 6 mm. to 1.1 cm.

In one case a No. 4 leaf was strictly tripinnate.

Nos. 6 to 8. Abruptly bipinnate, petiole 2.4 to 8.5 cm., that of No. 8 being sometimes dilated to .7 mm., with a definite central nerve and a smaller parallel one on each side; leaflets three to seven pairs, oblong-acuminate; rachis 4 mm. to 1.1 cm.; all with terminal seta.

Nos. 6 and 7 may be twice pinnate.

Nos. 9 to 12. These may be phyllodes, or abruptly bipinnate, petiole 6.8 to 13.2 cm., becoming terete, sometimes pilose to shortly tomentose; leaflets five to seven pairs; rachis 6 mm. to 1.4 cm.; stipules reduced to small scales.

Nos. 13 to 20. Linear-subulate, slightly rigid, partly terete, nearly straight phyllodes, usually with a short recurved point, from about 4 or 5 up to 13.5 cm. long.

CALAMIFORMES—(Uninerves).

ACACIA JUNCIFOLIA Benth. Seeds from Eidsvold, Queensland, (Dr. F. L. Bancroft per J. H. Maiden). (Plate II, Numbers 9 to 11).

Seeds mottled black, areola distinct, oblong-oval, 3.5 to 4 mm. long, 2 mm. broad, 1 to 1.5 mm. thick.

¹ This Journal, LIV, 147, (1920).

Hypocotyl terete, at first pale green, becoming reddish-brown, 4 mm. to 2 cm. long, 1 mm. thick at base, .6 to .8 mm. at apex.

Cotyledons sessile, auricled, oblong, apex rounded, 5 mm. long, 2–2.5 mm. broad, upper side at first brownish-green, becoming green, underside brownish-red, glabrous.

Stem reddish to brownish-grey, scaly at base. First internode .5 mm.; second to seventh 1 to 3 mm.

Leaves—No. 1. Abruptly pinnate, petiole 2 to 4 mm., slightly channelled above, reddish, glabrous; leaflets two pairs, oblong-acuminate, 5 to 8 mm. long, 2 to 3 mm. broad, venation obscure, upper side green, underside red; rachis 2 to 3 mm., glabrous, with terminal seta; stipules minute.

No. 2. Abruptly bipinnate, (in one case simply pinnate with one pair of leaflets), petiole 7 mm. to 1.2 cm., reddish-brown, glabrous, with terminal seta; leaflets one to two pairs, irregularly pinnate, oblong-acuminate, the terminal pair sometimes obliquely obovate, 3.5 to 6 mm. long, 3 to 4 mm. broad, venation obscure, upper side green, underside red; rachis 3 to 5 mm., sometimes channelled above, glabrous, with terminal seta; stipules minute.

No. 3. Abruptly bipinnate, petiole 1.7 to 3 cm., with sometimes a faint gland on upper margin; leaflets one or two pairs, up to 6 mm. long, 3 mm. broad, often obovate; rachis 4 to 8 mm.

In two cases leaf No. 3 was simply pinnate, with one pair of abnormal leaflets 6 mm. to 1 cm. long, 4 to 5 mm. broad, as though a pinna had fused into a large leaflet. In one instance the large leaflet was divided at the apex, thus showing the terminals of two leaflets, the lower halves of which were fused.

Nos. 4 to 6. Abruptly bipinnate, petiole 2.6 to 6 cm., in some cases slightly channelled above, sometimes with a

minute gland; leaflets three pairs, oblong-acuminate, 3 to 5 mm. long, 1 to 2 mm. broad, upperside green; underside reddish to red; rachis 4 to 8 mm.

Nos. 7 to 12. Usually linear-subulate phyllodes, with a fairly definite nerve on each side, 2 to 10 cm. long, with a straight or recurved point.

In two cases leaf No. 3 appeared as a small phyllode, but each was succeeded by bipinnate leaves.

UNINERVES—(Triangulares).

ACACIA VOMERIFORMIS A. Cunn. Seeds from Mount Victoria. (Plate II, Numbers 12 to 14).

Seeds dull black, oval to oblong-oval, about 4 mm. long, 2.5 mm. broad, 1.5 mm. thick.

Hypocotyl terete, pale to brownish-pink, 5 mm. to 2 cm. long, 1 to 1.3 mm. thick at base, .8 to 1 mm. at apex.

Cotyledons sessile, auricled, oblong to oblong-oval, 4 to 6 mm. long, 2.5 to 3 mm. broad, upperside dark green, underside brownish-pink to reddish and red, with raised centre line of darker shade.

In one case two stems appeared which were joined as one, with four cotyledons but only one simply pinnate leaf.

Stem terete, brownish-red, pilose to hirsute. First internode .5 mm.; second .5 to 1 mm.; third 1 to 2 mm.; fourth to sixth 1 to 4 mm.

Leaves—No. 1. Abruptly pinnate, petiole 2 to 3 mm., sometimes channelled above, green, glabrous; leaflets one to two pairs, oblong-acuminate to obovate, mucronate, 3 to 4 mm. long, 1.5–2 mm. broad, upperside green, underside paler, midrib distinct; rachis 2 to 3 mm., with terminal seta.

No. 2. Abruptly bipinnate, (in one case simply pinnate with one pair of leaflets), petiole about 5 mm., channelled above, glabrous, with terminal seta; leaflets two pairs,

oblong-acuminate, mucronate, 2–3 mm. long, 1 to 2 mm. broad; rachis 2 to 4 mm., with terminal seta.

Nos. 3 and 4. The latter may be a phyllode, or both may be abruptly bipinnate, petiole 5 to 9 mm., channelled above; leaflets two pairs; rachis 3 to 5 mm.; stipules small, linear.

Nos. 5 to 10. Obliquely-lanceolate to narrowly triangular, rigid, pungent-pointed phyllodes, about 5 to 7 mm. long, 1 to 1·5 mm. broad, with the midrib towards the lower margin, and with a pronounced angle on the upper edge which is channelled below the angle, the channelling becoming gradually less in the succeeding phyllodes.

There appears to be an interesting association between the channelling of the petioles of the leaves and of that of the upper edge of the phyllodes from the base to the angle, as though the channelled portion of the phyllode may represent the petiole of the earlier leaves.¹

Several seeds of this species produced twin plants.

It was noticed that plants of this species growing at Mount Victoria favoured the small area of Narrabeen Shale formation rather than the more siliceous Hawkesbury Sandstone.

UNINERVES—(Racemosæ).

ACACIA PYCNANTHA Benth. Seeds from Potts' Hill, Sydney, and Melbourne (Cultivated). (Plate III, Numbers 1 to 3).

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

Hypocotyl terete, creamy to reddish-brown, 1 to 5 cm. long, 1·5 to 2 mm. thick at base, 7 to 1 mm. at apex.

¹ See a paper by J. J. Fletcher, M.A., B.Sc., "On the correct Interpretation of the so-called Phyllodes of the Australian Phyllodineous Acacias." Proc. Linn. Soc. N.S.W., XLV, 24, (1920).



Acacia pycnantha (1 - 3); *A. Westoni* (4 - 6).

Half Natural Size.

Cotyledons sessile, slightly auricled, oblong, apex rounded, upperside green, underside from creamy, tipped with reddish-brown, to red, striate, 5 to 6 mm. long, 3 mm. broad, soon becoming revolute and cylindrical.

Stem terete, brown, glabrous. First internode .5 mm.; second to fourth .5 to 1 mm.; fifth to eighth 1 to 4 mm.

Leaves—No. 1. Abruptly pinnate, petiole 3 to 4 mm., glabrous to faintly pilose, sometimes with marginal gland; leaflets three to five pairs, oblong-acuminate, 5 to 8 mm. long, 1.5 to 3 mm. broad, upperside green, underside paler, margins often red; rachis 4 mm. to 1.2 cm., glabrous, with terminal seta.

No. 2. Abruptly bipinnate, petiole 5 mm. to 1.1 cm., faintly pilose, sometimes with small gland on upper margin, with terminal seta; leaflets three to five pairs, oblong-acuminate to cuneate, 4 to 6 mm. long, 1.5 to 3.5 mm. broad; rachis 4 mm. to 1.2 cm., with terminal seta; stipules reduced to scales.

Nos. 3 and 4. Abruptly bipinnate, petiole 1 to 2 cm., faintly pilose, No. 4 sometimes dilated to 2 mm. broad, often with gland on upper margin near base; leaflets four to eight pairs, sometimes mucronate, margins often red; rachis 9 mm. to 2.8 cm.; stipules small.

No. 4 may have two pairs of pinnæ.

Nos. 5 to 7. Abruptly bipinnate, sometimes with two pairs of pinnæ, petiole 9 mm. to 4.4 cm., 1 to 5 mm. broad in No. 5, 2 to 8 mm. in Nos. 6 and 7, with strong nerve along lower margin, upper edge nerve-like, often faintly pilose, gland near base, with terminal seta; leaflets six to nine pairs, rachis 1.2 to 3.9 cm.

Nos. 8 and 9. Sometimes abruptly bipinnate, similar to No. 7, or they may be phyllodes.

Nos. 10 to 12. Ovate-falcate to lanceolate-falcate phyllodes, up to 8 cm. long and 3.5 cm. broad, prominent midrib towards the lower margin, penninerved, margins nerve-like, with a prominent gland near the base.

The largest phyllode on a plant 6 inches high was $5\frac{3}{4}$ inches long, by $2\frac{3}{4}$ inches wide, and on a plant 13 inches high was $6\frac{1}{2}$ inches long, and $3\frac{1}{4}$ inches wide.

UNINERVES—(Racemosæ).

ACACIA WESTONI Maiden.¹ Seeds from Queanbeyan (J. H. Maiden). (Plate III, Numbers 4 to 6).

Seeds black, oblong to oblong-obovate, about 5 mm. long, 2.5 mm. broad, 1 to 1.2 mm. thick.

Hypocotyl terete, reddish-brown, about 1.7 to 3 cm. long, about 1.5 to 2 mm. thick at base, 1 mm. at apex.

Cotyledons sessile, auricled, oblong, apex rounded, 6 mm. long, 3 mm. broad, upperside brown, underside reddish to red, soon becoming revolute and cylindrical.

Stem terete, reddish-brown, glabrous. First internode .5 to 1 mm.; second 2 mm. to 1.1 cm.; third to fifth 2 mm. to 1.3 cm.; sixth 4 mm. to 1.6 cm.; seventh 7 mm. to 2.3 cm.; eighth 1 to 3.7 cm.

Leaves—No. 1. Abruptly pinnate (in a few cases an opposite pair appeared), petiole 3 to 5 mm., glabrous, sometimes with a small gland; leaflets three to four pairs, oblong-acuminate, 4 to 6 mm. long, 1 to 2 mm. broad, upperside green, underside paler; rachis 6 to 8 mm., with terminal seta.

No. 2. Abruptly bipinnate, petiole 8 mm. to 1.6 cm., gland on upper margin, with terminal seta; leaflets three to four pairs, oblong-acuminate, apical pair often cuneate, 3 to 5 mm. long, 1 to 3 mm. broad; rachis 8 mm. to 1.2 cm., with terminal seta.

¹ This Journal Vol. LIV, p. 227, (1920).



Acacia elongata (1 - 3); *A. implexa* (4 - 6).

Three-sevenths Natural Size.

Nos. 3 and 4. Abruptly bipinnate, petiole 1·2 to 1·7 cm., with marginal gland; leaflets four to seven pairs, similar to those of No. 2; rachis 9 mm. to 2·1 cm.; stipules reduced to scales.

One No. 3 leaf was abnormal, having three pairs of leaflets, irregularly pinnate, but although bipinnate there was no terminal seta on the petiole, and above the middle of the petiole were a pair of large leaflets, one being 8 mm. long and 3 mm. broad.

Nos. 5 and 6. Usually abruptly bipinnate, (though No. 6 may sometimes be a phyllode), petiole 1·4 to 5·4 cm. long, from 1 mm. to 1·7 cm. broad, with marginal gland, and with a strong nerve along or near the base, the upper margin nerve-like, the lamina penninerved; leaflets six to nine pairs, rachis 1·5 to 2·7 cm.

In one case leaf No. 6 had two pairs of pinnæ.

Nos. 7 to 10. Lanceolate-falcate phyllodes, narrowed towards the base, up to 7·5 cm. long, 2·5 cm. broad, the midrib a little below the centre, the margins nerve-like, the lamina penninerved, glabrous.

Phyllodes with as many as three glands are not uncommon on plants a few feet high. The largest phyllode on a plant 13 inches high was scarcely 4 inches long, by $1\frac{1}{8}$ inches wide.

PLURINERVES—(Oligoneuræ).

ACACIA ELONGATA Sieb. Seeds from Brookvale near Manly, Pigeon House near Milton, Woodford on the Blue Mountains, all in New South Wales. (Plate IV, Numbers 1 to 3).

Seeds shiny black, often brown when not quite ripe, Brookvale seeds oval to oblong-oval, 3 to 4 mm. long, 2 to 2·5 mm. broad, about 1·3 mm. thick; Pigeon House seeds oblong to oblong-oval, 3·5 to 4 mm. long, 2 to 3 mm. broad,

about 1·5 mm. thick; Woodford seeds oblong to oblong-oval, 4 to 4·7 mm. long, about 2·3 to 2·7 mm. broad, about 1·3 mm. thick.

Hypocotyl terete, pale below soil, reddish to reddish-brown above, 1 to 2·5 cm. long, 1·3 to 2 mm. thick at base, about ·7 or ·8 mm. at apex.

Cotyledons sessile, sagittate, oblong, apex rounded, about 5 mm. long, 2 mm. broad, upperside green, underside greenish-red to reddish and red, with one or two raised lines along centre.

Stem terete, showing striations from decurrent leaf-stalks, green to greenish-brown, glabrous or with a few scattered hairs in the Brookvale and Woodford examples, pilose to pubescent in the Pigeon House specimens. First internode ·5 mm.; second ·5 mm. to 1·6 cm.; third to fifth 1 mm. to 4 cm.; sixth to ninth 3 mm. to 4 cm.; tenth to fourteenth 5 mm. to 3·7 cm.

The shortest internodes are found among the Pigeon House plants, and the longest among the Brookvale and Woodford seedlings.

Leaves—No. 1. Abruptly pinnate, petiole 4 to 7 mm., green, glabrous; leaflets three to five pairs, oblong-acuminate, 6 to 9 mm. long; 2 to 3 mm. broad, the apical pair sometimes cuneate and up to 4 mm. broad; rachis 6 mm. to 1·3 cm., with terminal seta.

No. 2. Abruptly bipinnate, petiole 1 to 2·4 cm., slender, glabrous, or rarely with a few scattered hairs, with terminal seta; leaflets four to five pairs, oblong-acuminate, 3 to 6 mm. long, 1 to 2 mm. broad; rachis 8 mm. to 2·1 cm., with terminal seta; stipules reduced to scales.

Nos. 3 and 4. Abruptly bipinnate, petiole 1·2 to 2·3 cm., sometimes with a faint marginal gland near the base, in some cases slightly dilated and having a prominent midrib,

in the Pigeon House specimens, glabrous or with a few scattered hairs; leaflets five to eight pairs, underside sometimes reddish; rachis 7 mm. to 1·9 cm.

Nos. 5 to 7. Abruptly bipinnate, petiole 7 mm. to 5·5 cm. often slender in the Brookvale and Woodford plants, dilated up to 1 mm. in the Pigeon House specimens and having a prominent midrib on both sides, in a few cases with a faint gland, glabrous to pilose; leaflets seven to twelve pairs; rachis 7 mm. to 3·7 cm.

Nos. 8 to 13. On some of the Pigeon House seedlings these may be linear phyllodes, but on the Brookvale and Woodford plants they may be abruptly bipinnate, petiole 1·3 to 8 cm. long, less than 1 mm. broad, with a prominent midrib in all cases; leaflets seven to fifteen pairs; rachis 7 mm. to 5 cm.

Some of these leaves may be twice pinnate.

Nos. 14 to 23. Often phyllodes, but on Brookvale seedlings may be abruptly bipinnate, in some cases with two pairs of pinnae, petiole up to 8 cm. long, 1 mm. broad; leaflets up to fourteen pairs; rachis up to 5·6 cm.

Nos. 24 to 30. Linear phyllodes, with a prominent midrib, and a finer parallel vein on each side, glabrous to pilose, up to 10 to 12 cm. long, about 1·7 mm., 1 mm., and ·7 mm. broad in the Pigeon House, Brookvale and Woodford seedlings respectively.

The phyllodes of this species close up towards the stem at night.

PLURINERVES—(Nervosæ).

ACACIA IMPLEXA Benth. Seeds from Jervis Bay, Camden, and Howell, New South Wales. (Plate IV, Numbers 4 to 6).

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

Hypocotyl terete, at first creamy, becoming pinkish-green, 1·5 to 3 cm. long, 1 to 2 mm. thick at base, about ·5 to ·8 mm. at apex.

Cotyledons sessile, auricled, oblong, apex rounded, 6 to 7 mm. long, 2·5 to 3·5 mm. broad, upperside green, underside yellowish to pale brown, usually becoming revolute, often with one or two raised lines or protuberances along centre.

Stem terete, slightly striate with decurrent leaf-stalks, brown, glabrous. First internode ·5 to 1 mm.; second to fourth 2 mm. to 1·8 cm.; sixth to eighth 4 mm. to 2 cm.

Leaves—No. 1. Abruptly pinnate, (in one case from Jervis Bay an opposite pair appeared), petiole 3 to 6 mm., green, glabrous; leaflets five to eight pairs, oblong-acuminate, 5 to 9 mm. long, 1·5 to 2·5 mm. broad, basal and apical pairs smaller, midrib distinct, upperside green, underside pale green; rachis 1·1 to 2·2 cm., with terminal seta.

No. 2. Abruptly bipinnate, petiole 5 mm. to 1·3 cm., rarely with faint gland on upper margin, glabrous, with terminal seta; leaflets four to eight pairs, oblong-acuminate, 3 to 7 mm. long, 1 to 2 mm. broad, basal pair smaller; rachis 9 mm. to 1·4 cm., glabrous, with terminal seta.

Nos. 3 and 4. Abruptly bipinnate, petiole 7 mm. to 2·2 cm., sometimes with a faint gland, glabrous; leaflets five to fourteen pairs, oblong-acuminate; rachis 1 to 2·5 cm.; stipules reduced to scales.

Nos. 5 to 7. Abruptly bipinnate, sometimes with two pairs of pinnæ, petiole from 1·5 cm. in No. 5, to 7·5 cm. in No. 7, from 1 to 5 mm. broad in some cases, midrib towards lower margin, and one or two finer parallel veins above, and sometimes one below, small gland on upper margin; leaflets nine to seventeen pairs, rachis 1·6 to 4 cm.

Nos. 8 to 12. These may be phyllodes, or abruptly bipinnate, very similar to those of No. 7, sometimes with two pairs of pinnæ, petiole 3·6 cm. in No. 8, to 11 cm. in No 12, up to 6 mm. broad, with a few fine longitudinal somewhat indistinct veins in addition to three or four fairly prominent, usually with a small gland; leaflets twelve to nineteen pairs; rachis 2·3 to 4·7 cm.

Nos. 13 and upwards are usually phyllodes, but after the advent of several phyllodes bipinnate leaves may reappear with from one to six pairs of pinnæ, the latter having occurred on a Jervis Bay seedling; some of these pinna have up to twenty-one pairs of leaflets.

One remarkable bipinnate leaf with one pair of pinnæ had one pinna intact with nineteen pairs of leaflets, while the other pinna, with twenty-one pairs of leaflets, had divided leaflets in four cases, viz Nos. 8 to 11. In the case of No. 8 one leaflet was divided into small leaflets along the

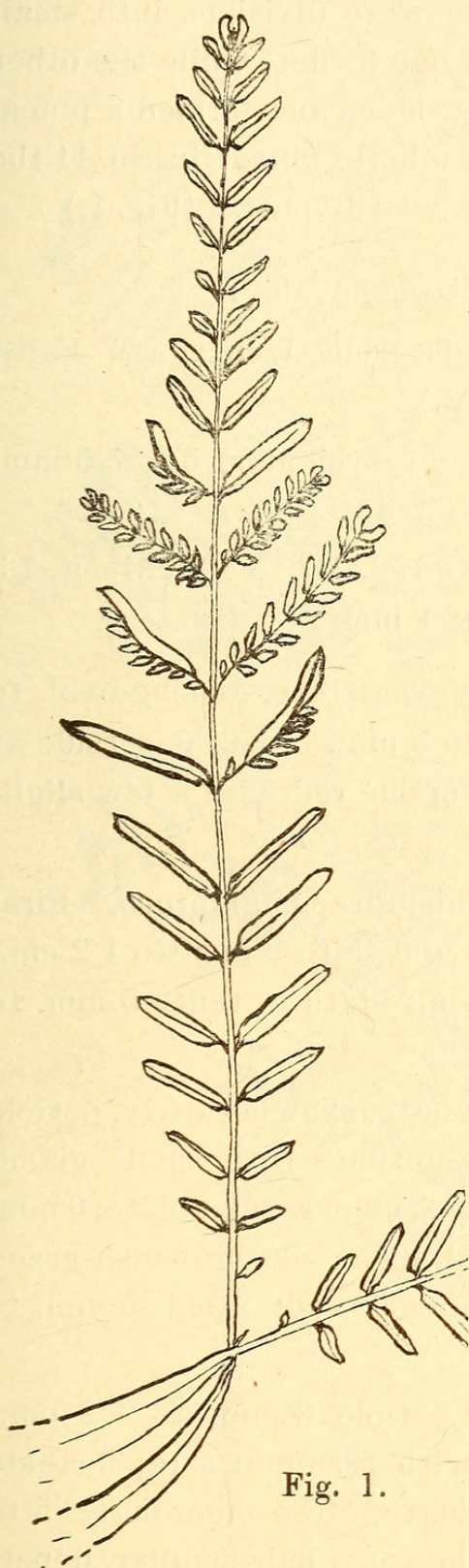


Fig. 1.

A. implexa. × 2.

lower margin; in No. 9 there were divisions into small leaflets on the lower margin of one leaflet, while the other of the pair was divided on both sides and formed a pinna; in No. 10 each leaflet formed a minute pinna; in No. 11 the lower margin of one leaflet was divided. (Fig. 1.)

BIPINNATÆ—(Botryocephalæ).

ACACIA ELATA A. Cunn. Seeds from Wentworth Falls, Blue Mountains. (Plate V.)

Seeds black, obovate to nearly orbicular, 5 to 5.5 mm. long, 4.5 to 5 mm. broad, 1.5 to 2 mm. thick.

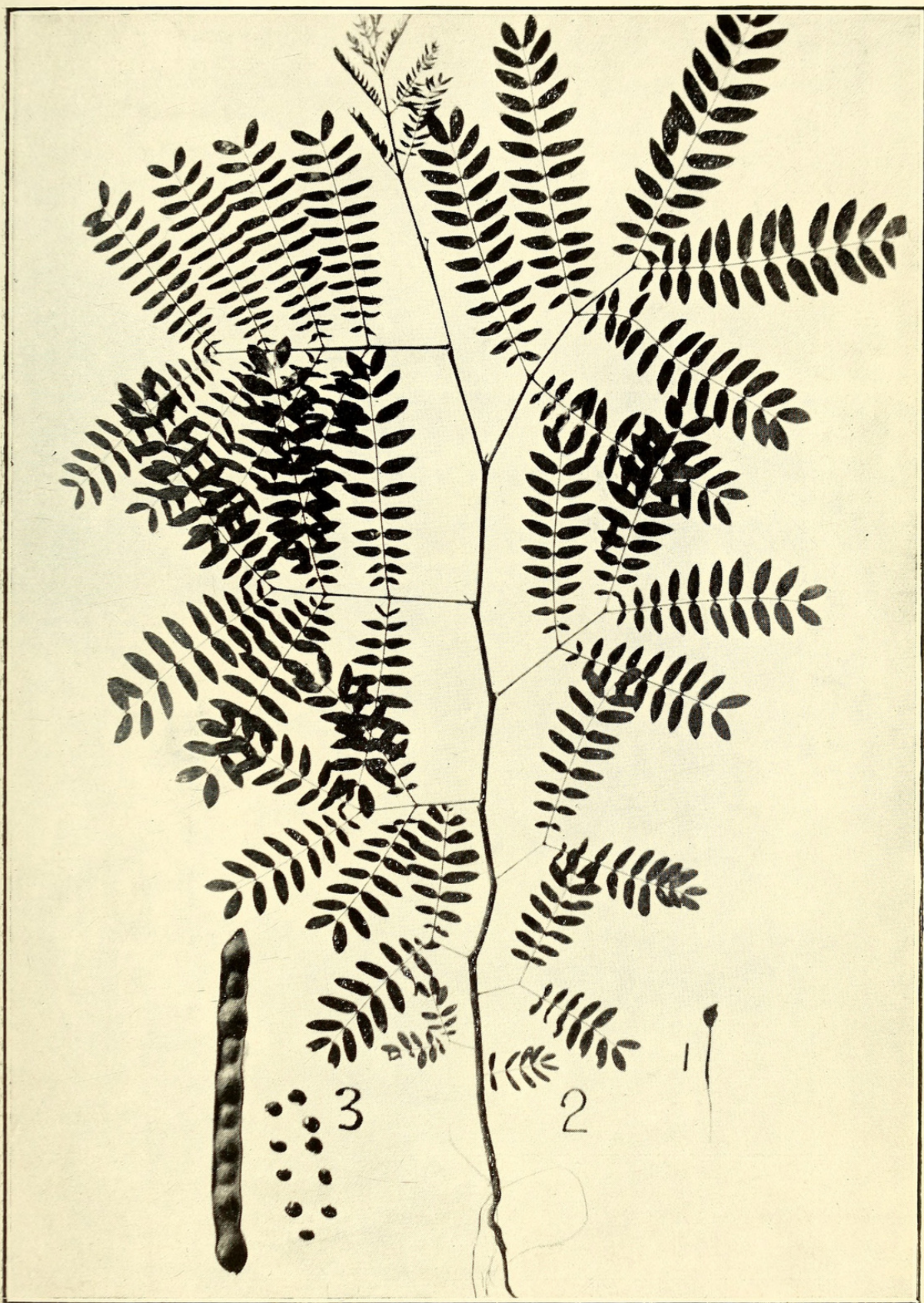
Hypocotyl terete, pale red to red, 1.7 to 4 cm. long, 1.3 to 2.5 mm. thick at base, about 1 mm. at apex.

Cotyledons sessile, slightly sagittate, oblong-oval to obovate, 6 to 6.5 mm. long, 4 to 5 mm. broad, upper side at first red, becoming green, underside red with a few slight longitudinal ridges.

Stem terete, green to brownish-green, glabrous. First internode .5 to 1 mm.; second and third 2 mm. to 1.2 cm., fourth and fifth 4 mm. to 1.7 cm.; sixth to tenth 5 mm. to 4.5 cm.

Leaves—No. 1. Abruptly pinnate, showing early, petiole 4 to 5 mm., reddish-green, sometimes with small gland, glabrous; leaflets four to six pairs, oblong-acuminate, 6 mm. to 1 cm. long, 2 to 3 mm. broad, upper side brownish-green to green, underside reddish to dark red; rachis 5 mm. to 1.7 cm., with terminal seta.

No. 2. Abruptly bipinnate, petiole 8 mm. to 1.2 cm., often with gland, glabrous, with terminal seta; leaflets four to six pairs, oblong-acuminate, often mucronate, 5 to 7 mm. long, 2 to 3 mm. broad, the basal pair smaller, upper side green, underside reddish; rachis 1.6 to 2.2 cm., with terminal seta.



Acacia elata.

About One-third Natural Size.

Nos. 3 and 4. Abruptly bipinnate, sometimes with two pairs of pinnæ, petiole 1·2 to 2·5 cm., with gland, glabrous; leaflets five to nine pairs, on No. 4 up to 1·1 cm. long, 4 mm. broad, upperside green, underside paler, venation distinct; rachis 2 to 4·8 cm.

Nos. 5 and 6. Abruptly bipinnate, often with two pairs of pinnæ, petiole 2 to 4 cm., with gland towards base and sometimes also at base of terminal pair of pinnæ, glabrous; leaflets eight and nine pairs, up to 1·3 cm. long, 4 mm. broad, basal pair small, upperside dark green, underside pale green; rachis 4 to 5·6 cm.

Nos. 7 to 10. Abruptly bipinnate, with from two to four pairs of pinnæ, petiole 3 to 7·5 cm., with terminal seta; leaflets nine to thirteen pairs, up to 1·5 cm. long, 5 mm. broad; rachis 3·5 to 8 cm.

On a plant 5 feet high, with sometimes seven pairs of pinnæ, the petiole may be 8 cm. long, with one, and in a few cases two glands, the common petiole reaching 27·5 cm. and the pinnæ up to 18 cm. long; leaflets lanceolate-acuminate, underside pale green, minutely silky, sometimes eighteen pairs, up to 3·6 cm. long, 8 mm. broad.

On a mature tree a leaflet may reach 8 cm. ($3\frac{1}{8}$ inches) long, and 1 cm. broad. This species appears to produce the largest leaflet of any in the genus *Acacia*.

EXPLANATION OF PLATES.

PLATE II.

Acacia tetragonophylla F.v.M.

1. Cotyledons, pinnate leaf, bipinnate leaves and phyllodes.
Broken Hill, (E. C. Andrews).
2. Pod and seeds.

Acacia verticillata Willd.

3. Cotyledons and pinnate leaf, Botanic Gardens, Sydney.
4. Pinnate leaf, bipinnate leaves and phyllodes.
5. Pod and seeds.

Acacia rigens A. Cunn.

6. Cotyledons. Wyalong, New South Wales.
7. Pinnate leaf, bipinnate leaves and phyllodes.
8. Pod and seeds.

Acacia juncifolia Benth.

9. Cotyledons. Eidsvold, Queensland, (Dr. T. L. Bancroft, per J. H. Maiden).
10. Pinnate leaf, bipinnate leaves and phyllodes.
11. Seeds.

Acacia vomeriformis A. Cunn.

12. Cotyledons. Mount Victoria, New South Wales.
13. Pinnate leaf, bipinnate leaves and phyllodes.
14. Pod and seeds.

PLATE III.

Acacia pycnantha Benth.

1. Cylindrical cotyledons and pinnate leaf. Potts' Hill, near Sydney.
2. Pinnate leaf, bipinnate leaves and phyllodes.
3. Pod and seeds. Bermagui, New South Wales, (W. Dunn per J. H. Maiden).

Acacia Westoni Maiden.

4. Cotyledons and part of pinnate leaf. Queanbeyan, (J. H. Maiden).
5. Pinnate leaf, bipinnate leaves and phyllodes.
6. Pod and seeds.

PLATE IV.

Acacia elongata Sieb.

1. Cotyledons. Woodford, New South Wales.
2. Pinnate leaf, bipinnate leaves and phyllodes. Pigeon House, Milton.
3. Pod and seeds. Brookvale near Manly.

Acacia implexa Benth.

4. Cotyledons and portion of pinnate leaf. Howell, N. S. Wales.
5. Pinnate leaf, bipinnate leaves and phyllodes. Jervis Bay.
6. Pod and seeds, Jervis Bay.

PLATE V.

Acacia elata A. Cunn.

1. Cotyledons. Wentworth Falls, New South Wales.
2. Pinnate leaf and bipinnate leaves.
3. Pod and seeds.



Cambage, Richard Hind. 1922. "Acacia seedlings, Part VIII." *Journal and proceedings of the Royal Society of New South Wales* 56, 130–148.

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