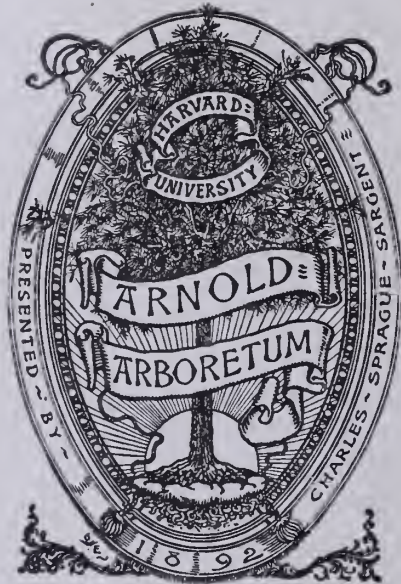




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THE FOREST FLORA OF  
NEW SOUTH WALES.

BY

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SYDNEY.

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# INDEX.

[The names of Synonyms or Plants incidentally mentioned are in *italics*. The page containing the description is printed in heavier type where there is more than one page.]

	PAGE.		PAGE.
Aboriginal cement ... ..	23	<i>Acacia linifolia</i> Willd. ... ..	29, 33, 97, 114
method of producing fire ... ..	191	var. <i>prominens</i> F.v.M. Herb.	29, 31
Acacia ... ..	41	<i>longifolia</i> Willd. ... ..	63
<i>Acacia accola</i> Maiden and Betche ... ..	116	<i>lunata</i> F.v.M. ... ..	63
<i>adunca</i> A. Cunn. ... ..	113	Sieb. ... ..	78, 82
<i>amœna</i> Sieb. ... ..	166	Lunate-leaved ... ..	79
<i>amœna</i> Wendl. ... ..	131, 182	<i>melanoxylen</i> R.Br. ... ..	8, 41, 45
<i>brevifolia</i> Lodd. ... ..	80	<i>neglecta</i> Maiden and Baker ... ..	82
<i>buxifolia</i> A. Cunn. ... ..	78, 97	<i>neriifolia</i> A. Cunn. ... ..	117
<i>Cambagei</i> R. T. Baker ... ..	42, 46	<i>obtusata</i> Sieb. ... ..	130
<i>complanata</i> A. Cunn. ... ..	31	var. <i>Hamiltoni</i> Maiden	114, 132, 153
<i>conferta</i> Cunningh., MSS. ... ..	78	<i>oleaifolia</i> A. Cunn. ... ..	81
<i>crassiuscula</i> Benth. non Wendl. ... ..	117, 154	Olive-leaved ... ..	81
Meissner ... ..	114, 153	<i>pendula</i> A. Cunn. ... ..	42, 45
Sieb. ... ..	114, 153	<i>penninervis</i> Sieb. ... ..	190
Wendl. ... ..	113, 153	var. <i>angustifolia</i> ... ..	190
β <i>adunca</i> ... ..	115	<i>prominens</i> A. Cunn. ... ..	29, 61, 79
Crescent-leaved ... ..	80	var. ... ..	31
<i>dealbata</i> A. Cunn. ... ..	81	<i>pycnophylla</i> Benth. ... ..	113, 153
<i>decora</i> Reichb. ... ..	82, 97	<i>rostelifera</i> Benth. ... ..	114
<i>decurrens</i> Willd., var. <i>mollis</i> Lindl. ... ..	190	<i>rubida</i> A. Cunn. ... ..	131, 166, 182, 185
<i>Dorothea</i> Maiden ... ..	131	<i>suarcorens</i> Willd. ... ..	30
<i>falcinella</i> Tausch. ... ..	81	<i>tripteri</i> Benth. ... ..	159
<i>fimbriata</i> A. Cunn. ... ..	29, 62, 63, 83	<i>uncinata</i> Lindl. ... ..	81
<i>furfuracea</i> G. Don ... ..	82	<i>Achras australis</i> R.Br. ... ..	51
<i>gladiiformis</i> A. Cunn. ... ..	131	<i>Pohlmimiana</i> F.v.M. ... ..	51
<i>hakeoides</i> A. Cunn. ... ..	84	Aceridity of <i>Grevillea robusta</i> ... ..	187
<i>homalophylla</i> A. Cunn. ... ..	42, 46	<i>Acronychia acidula</i> F.v.M. ... ..	50
"    "    Pod and seed		American Ash ... ..	43, 47
figured ... ..	186	Hickory ... ..	43, 47
<i>implexa</i> Benth. ... ..	8	<i>Amorpha canescens</i> Nutt. ... ..	142
Lanky ... ..	84	<i>Angophora</i> ... ..	42
<i>linearifolia</i> Cunn. ... ..	115	<i>lanceolata</i> Cav. ... ..	144, 189

	PAGE.		PAGE.
Apple ... ..	51	Belah ... ..	75
Black ... ..	51	Belbourie ... ..	188
Logan ... ..	50	Bembil ... ..	127
Smooth-barked ... ..	189	Berigora ... ..	94
Tree ... ..	42	Bimbil ... ..	127
White ... ..	12	Bimble Box ... ..	75, 127
Arau-ang ... ..	24	Bitter Wood ... ..	51
<i>Arau aria</i> <i>Bulwilli</i> Hook. ... ..	136	Black Apple ... ..	51
<i>Cunninghamii</i> Ait. ... ..	41	Bean ... ..	188
Arrongg ... ..	21	Box ... ..	72, 94
Ar-roo-in ... ..	21	Mallee ... ..	5, 6
Aru-in ... ..	24	Myrtle ... ..	51
Ash, American ... ..	43, 47	Sassafras ... ..	51
Mountain ... ..	42, 43, 47, 48	Wattle ... ..	63, 84, 110
White ... ..	48	Blackbutt ... ..	42, 46, 190
Australian timber—Twist in ... ..	15	Blackwood ... ..	8, 41, 45
Australian timber: for carriage building ... ..	40	<i>Blandfordia nobilis</i> Sm. ... ..	115
Axeman's Carnival, Wyong ... ..	19	Blind-Your-Eyes ... ..	176
		Bloodwood ... ..	189
		Red ... ..	189
		Blue Bush ... ..	84
		Fig ... ..	43, 49
<i>Bacillus pseudarabinitis</i> R. G. S.M. ... ..	108	Gum ... ..	41, 47
Bacteria and the gum of <i>Hakea saligna</i> ... ..	108	Mallee ... ..	26
Balloons of gold ... ..	98	Blunted-leaved Acacia ... ..	130, 131
<i>Banksia dactyloides</i> Gaertner ... ..	147	Bolly Gum ... ..	33, 51, 87, 101, 135
<i>integrifolia</i> L.f. ... ..	1	Booligal ... ..	73
var. <i>paludosa</i> Benth. ... ..	1, 2	Boorman, John Luke ... ..	95
<i>latifolia</i> R.Br. var. <i>minor</i> ... ..	2	Bosisto, Joseph ... ..	57
<i>marginata</i> Cav. ... ..	1, 2	Bosisto's Box ... ..	56
<i>oleifolia</i> Salisbury ... ..	147	Box, Bastard ... ..	57
<i>paludosa</i> R.Br. ... ..	1	Bimble ... ..	75, 127
Barilgora ... ..	94	Black ... ..	72, 94
Baringa ... ..	98	Brush ... ..	42
Bastard Box ... ..	57	Drooping ... ..	72
Myall ... ..	9	Dwarf ... ..	73
Bat and Ball ... ..	12	Flooded ... ..	72
Bean, Black ... ..	188	Glossy-leaved ... ..	127
Red ... ..	174	Grey ... ..	5, 57, 73
Bech, Brown ... ..	41	Gum ... ..	5
Bully ... ..	41	Ironbark ... ..	6, 95
Colonial ... ..	41	Mallee ... ..	5
Negro-head ... ..	43, 49	Minty ... ..	127
Scaly ... ..	101	Narrow-leaved ... ..	5
Tasmanian Red ... ..	50	Poplar-leaved ... ..	127
Yellow ... ..	101	Red ... ..	57
Beefwood ... ..	21	River ... ..	72
Western ... ..	21	Round-leaved ... ..	127
Behr, Dr. Hans Hermann ... ..	111		



	PAGE.		PAGE.
Box, Scrub ... ..	73	<i>Casuarina tortuosa</i> Hortul. ... ..	157
Shiny-leaved ... ..	127	<i>truncata</i> Willd. ... ..	157
Small-fruited Grey ... ..	5	Cedar ... ..	40, 45
Swamp White ... ..	73	Red ... ..	187
White ... ..	5, 59, 73, 127	<i>Cedrela australis</i> F.v.M. ... ..	40, 187
Yellow ... ..	57, 75	<i>Toona</i> Roxb. ... ..	45
Box-leaved Wattle ... ..	78	<i>Ceratopetalum apetalum</i> Don ... ..	41, 43, 50, 171
Box-tree, Grey ... ..	56	<i>gummiferum</i> Sm. ... ..	169, 191
Ironbark ... ..	56	Cherry, White ... ..	41
Bringing in logs to Wyong sawmills ... ..	19	<i>Chloroxylon Swietenia</i> DC. ... ..	174, 177
Broad green-leaf Mallee... ..	112	Chloroxylonine ... ..	174
Broad-leaf Mallee ... ..	110	Christmas Tree or Bush ... ..	169, 191
Broad-leaved Ironbark ... ..	46	Cinnamomum Oliveri, Bailey ... ..	35, 66
Messmate ... ..	189	<i>ovalifolium</i> Wight ... ..	66
Tea-tree ... ..	187	<i>propinquum</i> Bail. ... ..	67
<i>Broussonetia papyrifera</i> Vent. ... ..	157	<i>Tamala</i> Nees ... ..	66
Brown Beech ... ..	41	<i>virens</i> R. T. Baker ... ..	66
Mallee ... ..	151	<i>zeylanicum</i> Nees ... ..	66
Brush Box ... ..	42	Cinnamon, Wild ... ..	87
Bull Oak ... ..	75	Ciruelillo ... ..	92
Bully Beech ... ..	41	Coachwood ... ..	41, 43, 50
Bully Gum ... ..	102	Coast She-oak ... ..	155
Bunn-ya ... ..	135	Colonial Beech ... ..	41
Bunya-Bunya ... ..	136	Pine ... ..	41
Burma Teak ... ..	46	<i>Conchium dactyloides</i> Vent. ... ..	147
Burryagro ... ..	94	<i>nerosum</i> Donn. ... ..	147
Bush-road near Wyong ... ..	51	<i>salicifolium</i> Gaertn. ... ..	107
		<i>salignum</i> Sm. ... ..	107
		<i>Convolvulus althæoides</i> L. ... ..	142
		Coolabah ... ..	73
		Copal Tree ... ..	67
Caley, George ... ..	94	Copper Plant ... ..	143
Camphor Laurel, Native ... ..	66	Cork-bark Tree ... ..	159
<i>Cargillia pentamera</i> F.v.M. ... ..	51	Cork-tree, Western ... ..	159
Carriage building—Australian timbers for ... ..	40	Crescent-leaved Acacia ... ..	80
Carrot Wood ... ..	50	<i>Cryptocarya glaucescens</i> R.Br. ... ..	51, 101
<i>Carya tomentosa</i> Nutt ... ..	43, 47	<i>microneura</i> R.Br. ... ..	51
<i>Castanospermum australe</i> A. Cunn. ... ..	175, 188	<i>obovata</i> R.Br. ... ..	51
<i>Casuarina Cambagei</i> R. T. Baker ... ..	75	<i>triplineris</i> R.Br. ... ..	51
<i>Cunninghamiana</i> Miq. ... ..	189	Cunoniaceæ ... ..	169
<i>distyla</i> Vent. ... ..	157	<i>Cupania anacardioides</i> A. Rich. ... ..	50
<i>equisetifolia</i> Forst., var. <i>incana</i> , Benth. ... ..	155	Curra Curra ... ..	73
<i>excelsa</i> Dehnh. ... ..	155	<i>Cylicodaphne Fawcettiana</i> F. Muell. ... ..	102
<i>glauca</i> Sieb. ... ..	157	<i>Leejeana</i> F.v.M. ... ..	120
<i>incana</i> A. Cunn. Herb. ... ..	155		
<i>Luehmanni</i> R. T. Baker ... ..	75	Dalgan ... ..	156
<i>sparsa</i> Tausch. ... ..	157	<i>Daphnandra micrantha</i> Benth. ... ..	51
<i>stricta</i> Ait. ... ..	144		

	PAGE.		PAGE.
Darjan ... ..	56	<i>Eucalyptus dealbata</i> A. Cunn. ... ..	143
Derrobary ... ..	94	<i>delegatensis</i> R. T. Baker ... ..	43, 47, 48
Difference between <i>Tetranthera</i> and <i>Litsæa</i> ...	102	<i>drepanophylla</i> F.M. ... ..	56
Distribution of desert plants in relation to soil	143	<i>eugenioides</i> Sieb. ... ..	43, 49
Drooping Box ... ..	72	<i>fastigata</i> Deane and Maiden ... ..	48
Dwarf Box ... ..	73	flowers, two-coloured ... ..	72
<i>Dysoxylon alliaceum</i> Seem. ... ..	174	<i>fraxinoides</i> Deane and Maiden	43; 47, 48
<i>Fraserianum</i> Benth. ... ..	41, 174	fruticetorum F.v.M. ... ..	26
<i>Muelleri</i> Benth. ... ..	41, 174	<i>goniocalyx</i> F.v.M. ... ..	42
<i>Richii</i> C. DC. ... ..	174	<i>gracilis</i> F.v.M., var. <i>Thozetiana</i>	
		F.v.M. ... ..	164
East Indian Satin-wood ... ..	174	<i>hemiphloia</i> F.v.M. 4, 56, 60, 94, 175	
<i>Echinocarpus australis</i> Benth. ... ..	51	var. <i>albens</i> F.v.M. ... ..	99
Edible and non-edible Red Gum leaves		var. <i>microcarpa</i> ... ..	5
( <i>Eucalyptus rostrata</i> ) ... ..	74	<i>incrassata</i> Sieb. ... ..	111
Egolla ... ..	128	var. <i>angulosa</i> Maiden	111
<i>Elæocarpus emundi</i> Bail. ... ..	51	<i>lævopinea</i> R. T. Baker ... ..	43, 49
<i>grandis</i> F.v.M. ... ..	43, 49	<i>largiflorens</i> F.v.M. ... ..	57, 73
<i>obovatus</i> G. Don ... ..	51	<i>leucocylon</i> F.M. ... ..	59
<i>Embothrium coccineum</i> R. & G. Foster ...	92	<i>macrorrhyncha</i> F.v.M. ... ..	49
<i>emarginatum</i> Ruiz & Pav. ... ..	92	<i>maculata</i> Hook. ... ..	42, 47, 175, 188
<i>lanceolatum</i> Ruiz & Pav. ... ..	92	<i>marginata</i> Sm. ... ..	175
<i>salicifolium</i> Vent. ... ..	107	<i>melliodora</i> A. Cunn. ... ..	57, 179
<i>salignum</i> Andr. ... ..	107	<i>Morrisi</i> R. T. Baker ... ..	143
Wickhami Hill & F.v.M., var.		<i>microcorys</i> F.v.M. ... ..	42, 47
<i>pinnata</i> Maiden & Betche ...	91	<i>obliqua</i> L'Herit. ... ..	189
<i>Endiandra globosa</i> Maiden and Betche ...	13	<i>ochrophloia</i> F.v.M. ... ..	164, 179
,, Fruit and endocarp figured	186	<i>odorata</i> Behr and Schlecht 4, 7, 27, 56,	
<i>pubens</i> Meissn. Fruit figured ...	186	110	
<i>virens</i> F.v.M. ... ..	12	var. <i>calcicultrix</i> F.v.M. ... ..	5
<i>Eriogonum ovalifolium</i> Nutt. ... ..	143	var. <i>linearis</i> Maiden ... ..	151
<i>Eucalyptus acacioides</i> A. Cunn. ... ..	150	var. <i>purpurascens</i> Maiden	5
<i>acmenioides</i> Schau. ... ..	43, 49	var. <i>Woolfsiana</i> Maiden	4
<i>Bancrofti</i> Maiden ... ..	145	<i>oleosa</i> F.v.M. ... ..	151
<i>Behriana</i> F.v.M. ... ..	110	<i>oreades</i> R. T. Baker. ... ..	43, 47, 48
var. <i>purpurascens</i> F.v.M.	110	<i>paniculata</i> Sm. ... ..	42, 46, 188
<i>bicolor</i> A. Cunn. ... ..	72	<i>pendula</i> A. Cunn. ... ..	73
<i>bicolor</i> Woolls ... ..	57	<i>pilularis</i> Sm. ... ..	42, 46, 190
<i>Boormani</i> Deane and Maiden ... ..	94	<i>piperita</i> Sm. ... ..	191
<i>Bosistoana</i> F.v.M. ... ..	56	<i>polyanthemos</i> Schauer ... ..	127
<i>botryoides</i> Sm. ... ..	190	<i>polybractea</i> R. T. Baker ... ..	26
<i>calycogona</i> Turcz., var. <i>Thozetiana</i>		<i>populifolia</i> Hook. ... ..	75, 127
Maiden ... ..	164	<i>propinqua</i> Deane and Maiden ...	43, 49
<i>carnea</i> R. T. Baker ... ..	43, 49	<i>punctata</i> DC. ... ..	42
<i>cordata</i> Labill. ... ..	145	<i>regnans</i> F.v.M. ... ..	43, 47, 48
<i>corymbosa</i> Sm. ... ..	189	<i>resinifera</i> Sm. ... ..	42, 47, 169
<i>crebra</i> F.v.M. ... ..	42, 46	<i>Risloni</i> Hook. f. ... ..	145
<i>Dawsoni</i> R. T. Baker ... ..	43, 49	<i>rostrata</i> Schl. ... ..	42, 47, 73

INDEX.

vii

	PAGE.		PAGE.
<i>Eucalyptus saligna</i> Sm.	... 41, 47	Geral	... 128
var. <i>pallidivalvis</i> R. T.		Giant Gum	... 43, 48
Baker and H. G. Smith	42, 46	Gidgee	... 42, 46
<i>salubris</i> F.v.M.	... 164	Gimlet Wood (Western Australia)	... 164
seed for food	... 75	Gippsland Waratah	... 69
<i>siderophloia</i> Benth.	... 42, 46, 56, 94	Glossy-leaved Box	... 127
<i>sideroxyton</i> A. Cunn.	... 142	<i>Gmelina Leichhardtii</i> F.v.M.	... 41
<i>Sieberiana</i> F.v.M.	... 42, 43, 49	Gramma-rock Plants	... 143
<i>tereticornis</i> Sm.	... 42, 47, 143	Goborro	... 73
Thozetiana F.v.M.	... 163, 179	Golden Wattle	... 98
<i>umbra</i> R. T. Baker	... 43	Green Mallee	... 150
<i>viridis</i> R. T. Baker	... 151	Grey Box	... 5, 57, 73
<i>Eucryphia Moorei</i> F.v.M.	... 41	Box-tree	... 56
<i>Evodia erythroccca</i> Benth.	... 50	Gum	... 42, 43, 49, 175
<i>micrococca</i> F.v.M.	... 50	Ironbark	... 46, 188
<i>octandra</i> F.v.M.	... 50	Myrtle	... 51
<i>sp.</i>	... 50	Wattle	... 63
<i>Excæcaria agallocha</i> L.	... 176	<i>Grevillea gibbosa</i> R.Br.	... 106
<i>parvifolia</i> Muell. Arg.	... 176	<i>hakeoides</i> Meissn.	... 106
Eye-blinding plant	... 176	Hilliana F.v.M.	... 53, 191
		,, Pinnatifid leaf figured	... 189
<i>Fagus Cunninghamiana</i> Hook.	... 43, 50	<i>lineata</i> R.Br.	... 21
<i>Moorei</i> F.v.M.	... 43, 49	<i>lorea</i> R.Br.	... 160
Fig, Blue	... 43, 49	<i>pinnatifida</i> Bail.	... 54
Queensland Blue	... 51	<i>robusta</i> A. Cunn.	... 42, 47, 54, 93, 187
Finger-leaved Hakea	... 148	<i>striata</i> R.Br.	... 21
Fire—Aboriginal method of producing	... 191	Gum, Blue	... 47
Fish Poison	... 9	Bolly	... 38, 51, 87
Wattle	... 9	Box	... 5
Flax-leaved Wattle	... 33	Giant	... 43, 48
<i>Flindersia australis</i> R.Br.	... 42, 46	Gimlet (Western Australia)	... 164
<i>Brayleyana</i> F.v.M.	... 50	Grey	... 42, 43, 49, 175
<i>maculosa</i> F.v.M.	... 42	leaves as fodder for stock	... 180
Flindosa	... 101	leaves sometimes edible, sometimes not	74
Flooded Box	... 72	Mountain (New South Wales)	... 42
Gum	... 42, 46	Murray Red	... 42, 47
Foley handles	... 107	Peppermint	... 7
Wood	... 107	Red	... 42, 47, 189
“Forest Twins”	... 188	Spotted	... 42, 47, 175, 188
<i>Fraxinus americana</i> L.	... 43, 47	Spotted (Victorian)	... 42
Fringed Wattle	... 29	Sydney Blue	... 42, 47
		White	... 175
<i>Galmeiveilchen</i>	... 143	Hake, Baron Christian Lewis	... 106
<i>Geijera parviflora</i> Lindl.	... 42	<i>Hakea</i> and <i>Grevillea</i>	... 105
Geological formation and the vegetation which		<i>Hakea Cunninghamii</i> R.Br.	... 159
grows upon it	... 138	<i>dactyloides</i> Cav.	... 147, 191

	PAGE.		PAGE.
<i>Hakea</i> dactyloides var. <i>angustifolia</i> Maiden	147	Lanky Acacia	84
<i>eriantha</i> R.Br.	125	Laurotetanine	136
<i>ferruginea</i> Lodd.	148	Leopard Tree	42
<i>florulenta</i> Meissner	106, 107	Light Wood	170
<i>lorea</i> R.Br.	159	Lignum Vitæ	9, 163
var. <i>fissifolia</i> F.v.M.	160	<i>Litsæa chrysocoma</i> Bl.	136
<i>mimosoides</i> A. Cunn.	106, 107	<i>dealbata</i> Nees	86, 135
<i>nervosa</i> Knight	148	<i>ferruginea</i> F.v.M.	120
<i>platysperma</i> Hook.	106	<i>glaucescens</i> H.B.K. var.	136
<i>purpurea</i> Hook.	160	<i>hexanthus</i> Juss.	119
<i>ruscifolia</i> Labill.	106	var. <i>ferruginea</i> F.v.M.	120
<i>saligna</i> R.Br.	105	var. <i>lanceolata</i> Meissn.	119
<i>suberea</i> S. le M. Moore	159	<i>reticulata</i> Benth.	101-
<i>ulicina</i> Br.	147	<i>zeylanica</i> Nees	86
willow-leaved	105	Logan Apple	50
<i>Halfordia drupifera</i> F.v.M.	50	<i>Lomatia longifolia</i> R.Br.	107
<i>scleroxylon</i> F.v.M.	50	Lunate-leaved Acacia	79
Hamilton, Arthur Andrew	154	<i>Maba fasciculosa</i> F.v.M.	51
Hamilton's Wattle	153	Mahogany	42, 47
Hauling Pine on a timber waggon	19	White	43, 49
<i>Hexanthus umbellatus</i> Loureiro	120	Maiden's Blush	51
Hickory	8, 42, 46	Mallee	26
American	43, 47	Black	5, 6
Hill, Walter	54	Blue	26
Honeysuckle	1	Broad green-leaf	112
Silvery	21	Broad-leaf	110
Hybrid, A natural	94	Brown	151
Hybridisation	94	Green	150
Indian Teak	43, 48	Red	151
Ironbark	42, 46	Whipstick	27
Ironbark Box	6, 94	Box	5, 151
Ironbark Box-tree	56	Maotamea	174
Broad-leaved	46	Maple	51
Grey	46, 188	Queensland	48
Narrow-leaved	46	Mararie	50
Victorian	142	Mari-mari	24
White	46, 188	Marsh Banksia	1
Irritant woods	177	Marura	73
Ivy, Poison	175	<i>Melaleuca leucadendron</i> L.	187
<i>Juniperus sabina</i> L.	176	<i>Melampsora nesodaphnes</i> B. and Br.	36
Kaow	128	<i>Melia Azedarach</i> L. var. <i>australasica</i> C. DC.	190
Kappundya	179	Messmate, Broad-leaved	189
Karrapari	76	Millewah	9
		Minty Box	127
		Mountain Ash	42, 43, 47, 48
		Mountain Gum of New South Wales	42

	PAGE.		PAGE.
Murray Red Gum ... ..	42, 47	Poison Ivy ... ..	174, 175
Myall ... ..	42, 45	Oak ... ..	175
Bastard ... ..	9	Poisonous woods ... ..	176
Myndee ... ..	102	<i>Polycarpæa spirostylis</i> F.v.M. ... ..	143
Myrtle ... ..	43	Pomegranate, Native ... ..	12
Black ... ..	51	Poplar-leaved Box ... ..	127
Grey ... ..	51	Prominent Glanded Wattle ... ..	61
Tasmanian Red ... ..	50	<i>Prostanthera Leichhardtii</i> Benth. ... ..	139
Napunyah ... ..	164, 179	Queensland Blue Fig ... ..	51
Narrow-leaved Box ... ..	5	Maple ... ..	48, 50
Ironbark ... ..	46	Sassafras ... ..	36
Native Camphor Laurel ... ..	66		
Orange ... ..	12	<i>Ratonia anodonta</i> F.v.M. ... ..	50
Pomegranate ... ..	12	<i>stiptata</i> Benth. ... ..	50
Negro-Head Beech ... ..	43, 49	<i>tenax</i> Benth. ... ..	50
<i>Nephelium distyle</i> F.v.M. ... ..	50	Red Bean ... ..	41, 174
<i>leiscarpum</i> F.v.M. ... ..	50	Bloodwood ... ..	189
<i>Nesodaphne obtusifolia</i> Benth. ... ..	36	Box ... ..	57
Notra ... ..	92	Cedar ... ..	187
Nucarn ... ..	51	Gum ... ..	42, 47
		Gum. Showing branch used for hanging	
		a school bell ... ..	189
Oak, Poison ... ..	175	Mallee ... ..	151
River ... ..	189	Silky Oak ... ..	91
Silky ... ..	42, 47	Stringybark ... ..	49
Officer Plant ... ..	170	Red-leaved Wattle ... ..	166
Ol-da ... ..	24	Reddish Acacia ... ..	166
Olive-leaved Acacia ... ..	81	Relations between the geological formation and	
Oliver, Prof. Daniel ... ..	36	the vegetation which grows upon it ... ..	138
Oliver's Sassafras ... ..	35	<i>Rhus radicans</i> L. ... ..	175
Onion Wood ... ..	41	Ringbarked forest, A ... ..	19
Orange, Native ... ..	12	River Oak ... ..	189
<i>Orites excelsa</i> R.Br. ... ..	42, 47, 54, 93	Box ... ..	72
Otwarla ... ..	24	Rosewood ... ..	41
<i>Owenia cepiodora</i> F.v.M. ... ..	41	Round-leaved Box ... ..	127
<i>Panax elegans</i> C. Moore and F.v.M. ... ..	38	Sallow ... ..	31
Paper Mulberry ... ..	157	Sally ... ..	31, 63
Peppermint ... ..	5, 27	Saponin ... ..	9
Gum ... ..	7	Saponins in Acacias ... ..	9
Sydney ... ..	191	Sassafras ... ..	35, 102
Western ... ..	4	Black ... ..	51
Pine, Colonial ... ..	41	Oliver's ... ..	35
Plants and Geological formations ... ..	11		
Plum Wood ... ..	41		

	PAGE.		PAGE
Sassafras, Queensland ... ..	36	Tallow Wood ... ..	42, 47
White ... ..	120	Tasmanian Red Beech ... ..	50
Satin Wood ... ..	50	Myrtle ... ..	50
East Indian ... ..	174	<i>Taxus baccata</i> L. ... ..	176
Savin ... ..	176	Tea-tree, Broad-leaved ... ..	187
Sealy Beech ... ..	101	White Prickly ... ..	188
<i>Scenopæetes dentirostris</i> ... ..	136	Teak ... ..	42, 46
<i>Schizomeria ovata</i> Don ... ..	41	Burma ... ..	46
Scrub Box ... ..	73	Indian ... ..	43, 48
Seasoned colonial timbers true to name. Sup-		Teams from bush sawmills near Wyong ...	51
ply of ... ..	87	<i>Tectona grandis</i> L.f. ... ..	43, 48
Seasoning Depots ... ..	88	Telopea oreades F.v.M. ... ..	69
She Beech ... ..	38, 51, 101	<i>speciosissima</i> R.Br. ... ..	69, 70
She Ironbark ... ..	95	<i>Tetranthera dcalbata</i> R.Br. ... ..	136
She-Oak, Coast ... ..	155	<i>Fawcettiana</i> F.v.M. ... ..	102
Shiny-leaved Box ... ..	127	<i>ferruginea</i> R.Br. ... ..	119
Sieber's botanical travels ... ..	132	var. <i>lanccolata</i> Meissn. ...	120
Silky Oak ... ..	42, 47, 54	<i>nesogona</i> F.v.M. ... ..	120
Red ... ..	91	<i>reticulata</i> Meissn. ... ..	38, 41, 51, 101
Silver Wattle ... ..	63, 98	Thickish-leaved Acacia ... ..	113
Silver-top Stringybark ... ..	49	Thorny Yellow Wood ... ..	50
Silvery Honeysuckle ... ..	21	Thozet, Anthelme ... ..	163
Slaty Gum ... ..	43, 49	Thozet's Gum ... ..	163
Small-fruited Grey Box ... ..	5	<i>Thuja Douglasii</i> Carr. ... ..	176
Smooth-barked Apple ... ..	189	Timbers which cause irritation of the skin and	
Soap Box ... ..	50	mucous membrane ... ..	174
Soapwood ... ..	50	Togoygora ... ..	57
<i>Sporobolus actinocladius</i> F.v.M. ... ..	76	Tooth-billed Bower Bird ... ..	136
Spotted Gum ... ..	42, 47, 175, 188	<i>Tristania conferta</i> R.Br. ... ..	42
of Victoria ... ..	42	Tunggaro ... ..	24
Spotted Tree ... ..	42	Turraie ... ..	21
<i>Stenocarpus sinuatus</i> Endl. ... ..	54, 92	Twist in Australian timber ... ..	15
Stringybark ... ..	43, 49		
forest, Tasmania ... ..	189	Ugaulbie ... ..	119
Red ... ..	49	Ullagal Mabbie ... ..	13
roofing, New England ... ..	51	<i>Uredo angiosperma</i> Thüm. ... ..	126
Silver-top ... ..	49		
White ... ..	49	Vertical growth of trees ... ..	123
Stunted Eucalyptus growth, Cowan Bay, Haw-		Victorian Ironbark ... ..	142
kesbury River ... ..	51	<i>Villaresia Moorci</i> F.v.M. ... ..	51
Supply of seasoned colonial timbers true to		<i>Viola calaminaria</i> Lej. ... ..	143
name ... ..	87		
Swamp White Box ... ..	73	Waratah, Gippsland ... ..	69
Syeamore ... ..	38	Sydney ... ..	70
White ... ..	101	Wattle, Black ... ..	63, 84, 190
Sydney Blue Gum ... ..	42, 47		
Peppermint ... ..	191		
Waratah ... ..	70		

INDEX.

xi

	PAGE.		PAGE.
Wattle, Box-leaved ... ..	78	White Yiel Yiel ... ..	...53, 191.
Fish ... ..	9	Wickham, Captain John Clement ... ..	92
Flax-leaved ... ..	33	Wild Cinnamon ... ..	87
Fringed ... ..	29	Wilga ... ..	42
Grey ... ..	63	Willer ... ..	21
Golden ... ..	98	Willow-leaved Hakca ... ..	105
Hamilton's ... ..	153	Wul Wul ... ..	56
Prominent glanded ... ..	61	Wunna-wunnarumpa ... ..	156
Red-leaved ... ..	166	Wunna-wunnarumpin ... ..	156
Silver ... ..	63, 98		
Western Silver ... ..	97		
Wee-tjellan ... ..	9	Yapunya ... ..	164, 179
Western Beefwood ... ..	21	Yarra ... ..	73
Cork-tree ... ..	159	Yarran ... ..	42, 46
Peppermint ... ..	4	Yellow Beech ... ..	101
Silver Wattle ... ..	97	Box ... ..	57, 75
Whipstick Mallee ... ..	27	Jacket ... ..	179
White Apple ... ..	12	Wood ... ..	51
Ash ... ..	48	Wood, Thorny ... ..	50
Box ... ..	5, 59, 73, 127	Yew ... ..	176
Cherry ... ..	41	Yiel Yiel ... ..	54
Gum ... ..	175	White ... ..	53, 191
Ironbark ... ..	46, 188	Yill Gill ... ..	54
Mahogany... ..	43, 49	Yipunya ... ..	179
Prickly Tea-tree ... ..	188		
Sassafras ... ..	120	<i>Zanthoxylum brachya anthum</i> F.v.M. ... ..	50
Stringybark ... ..	49	Zinc Violet ... ..	143
Sycamore ... ..	101		
Wood ... ..	51		





*Title + Index to come*

510

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 1.*

*Published by Authority of the*

*GOVERNMENT OF THE STATE OF NEW SOUTH WALES.*



*PART XLI* *OF THE*  
*COMPLETE WORK.*

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANDONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Iagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus gonicalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).
- THE CYPRESS PINES OF NEW SOUTH WALES (Genus *Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muelleri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleæfolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
- 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
- 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
- 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).

(N.B.—The numbers of Part XIV are given erroneously in the text.)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxyton*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.)
- 62.—THE RIVER OAK (*Cusuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)

#

THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLI.

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## *Banksia paludosa*, R.Br.

### A Honeysuckle.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Banksia*. (See Part VIII, p. 169.)

**Botanical description.**—Species, *B. paludosa*, R.Br.

Robert Brown, in his *Prod.* No. 394, has the following description :—“*B. paludosa*, foliis subverticillatis cuneato-oblongis subtruncatis basi attenuatis extra medium dentato-serratis margine subrecurvis : subtus costatis reticulato-venosis, petiolis ramulisque glabris perianthis sericeis, caule fruticoso.”

In *Bot. Reg.* t. 697, this plant is still called *B. paludosa* or the “Marsh Banksia.” It was introduced into England by Brown in 1805, who found it in the marshes of Botany Bay, where it is far from abundant, and may be reckoned as one of the rarer species.\* It is described as “an upright shrub, somewhat more than 3 feet high,” and the plant is more fully described than by Brown.

Meissner, in *DC. Prod.*, xiv, 457, still calls the plant *B. paludosa*, but Bentham (*B. Fl.* v, 554) makes it var. *paludosa* of *B. integrifolia*, and has the following note :—“Flowers scarcely larger than in *B. marginata*, the perianth 7 to 8 lines long, but the leaves of one of the common short-leaved forms of *B. integrifolia*.”

The plant may be redescribed as follows (from perfectly fresh specimens) :—

A dwarf, spreading, much-branched shrub, from 1 foot to nearly 3 feet high, with glabrous branches.

Leaves with much recurved margins, generally in rather uneven whorls, usually of three or four, from 1½ inches to 3 inches or a little longer, and from very narrow to about ¾-inch in their broadest part ; not spreading, but pointing upwards at an angle of about 45° ; very distinctly obovate or almost spatulate somewhat truncate, or obtuse, or sometimes bluntly pointed, gradually narrowed into the very short petiole, or sometimes almost sessile ; stiffly coriaceous ; irregularly toothed on the upper half ; the mid-vein prominent, the smaller veins very plainly reticulate, the interspaces only slightly white tomentose.

Spikes cylindrical, usually from 2 to 4 inches long, and 1½ inches wide between the stigmatic tips, very distinctly rufous, which appearance is especially marked before the splitting of the corollas.

Styles not more than 8 lines long, and inserted strictly at right angles to the axis of the spike, quite straight and needle-like, except sometimes the stigmatic end, which is slightly bent ; the base away from the rather contracted point of insertion, very slightly flattened ; the stigmatic end scarcely thickened.

The segments of the corolla-tube very obtuse, with very short, shining, and closely appressed hairs from base to summit. (Maiden and Camfield in *Proc. Linn. Soc. N.S.W.*, xxiii [1898], 267.)

#### Difference from *B. integrifolia* (see Part VIII, p. 170).

The whorled arrangement of its leaves and their similarity in shape to *B. integrifolia* place it near to that species. In the latter, however, the young branches are densely tomentose, while the secondary veins of the leaves are almost transverse and comparatively straight. In *B. paludosa* the young branches are almost glabrous, and the secondary veins of the leaves are much more oblique, with apparently a greater tendency to curve upwards. But the principal differences are in the flowers. In *B. integrifolia* the styles

\* This remark appears still to hold good.

in the fully developed inflorescence stand away very prominently from the split segments of the corolla-tubes, more than half an inch, while also there is a very decided tendency for them to curve downwards. Its corolla-segments also cohere; they also adhere to the style, so that it is very easy to pull them out altogether in a little bundle. In *B. paludosa* this usually seems not possible, as when the floral organs are pulled away from the rhachis they come in detached pieces; the styles also, as previously mentioned, are quite straight and exactly at right angles to the rhachis; nor in the freshly developed flowers do the styles stand so far away comparatively from the corolla-segments.

We may also draw attention to the young inflorescence of *B. integrifolia* in which the unsplit corolla-segments have an almost perpendicular habit caused by the bending of the elongated style. In *B. paludosa* this feature is very much less present, and often entirely wanting; when the segments split both they and the styles appear to be of the same length.

The only description of the cones of *B. paludosa* we can find is by Meissner, in DC. *Prod.* xiv, 457:—“Folliculi valde compressi, circ. semipollicares, lanâ rufâ hirsuti, margine glabrescentes.”

But we are of opinion that the cones thus described are probably those of our var. *minor* of *B. latifolia*; they certainly do not apply to *B. paludosa*.

In reality the cones of *B. paludosa* are not very dissimilar to those of *B. integrifolia*, and alone furnish a strong argument for the close affinity of the two species. In *B. integrifolia* the fruitlets deliſce at an early stage; in *B. paludosa* the reverse is the case, according to our observations. At present we are inclined to attach some practical importance to this in the discrimination of cones obviously so closely allied.

We have been exercised in deciding for ourselves whether *B. paludosa* is a true species or only a variety of *B. integrifolia*, but it is worthy of note that there is what may be termed the *paludosa* type, having varieties of its own, readily distinguishable from *B. integrifolia*, which is in reality one of the most distinct species of the genus. *B. integrifolia* has been considered far more protean than it really is by having other species constantly confused with it, and it is one of the objects of this paper to elucidate two of the plants which have been so confused. Mere size of a plant of course counts but little; at the same time it may be pointed out that *B. integrifolia* is a tree of 30 or 40 feet high, while *B. paludosa* is a stunted bush of scarcely 3 feet. (Maiden and Camfield, *op. cit.*)

#### Differences from *B. marginata* (see Part XXXVI, p. 83).

The only other Port Jackson species closely related to it is *B. marginata*, but here again the differences are very pronounced. Its young branches are very villous. The secondary veins of the leaves, if looked at carefully in a strong light, will be seen to be straight, fine, and quite parallel, while their teeth are also longer, more slender, and sharper than in *B. paludosa*. Their shape also is decidedly oblong.

The styles also of *B. marginata* are very much longer, and as in the case of *B. integrifolia*, stand away from the split corolla-segments a long distance, nor are they straight, but decidedly bent. The tips of the corolla-segments are also almost acuminate.

Returning to *B. paludosa*, we observe variation in the size of the leaves, which are much smaller in one form and more woolly-tomentose beneath; the reticulation is not quite so apparent as in the form figured in *Bot. Reg.* t. 697. The flower spike of this form is also from 2 to 3 inches long, and under an inch broad, in place of the form figured in *Bot. Reg.* which is  $4\frac{1}{4}$  inches long and nearly  $1\frac{1}{2}$  broad.

In another form we have the flower-spike of about the same length as that figured in *Bot. Reg.* t. 697, but only  $\frac{7}{8}$  inch wide. In other respects these forms show remarkable similarity.

In fine, we are of opinion that *B. paludosa* is a good species, and we therefore recommend that Brown's name be restored. (Maiden and Camfield, *op. cit.*)

**Botanical Name.**—*Banksia*, already explained (see Part VIII, p. 170); *paludosa*, Latin, marshy, or that lives in a marshy place.

**Vernacular Name.**—I know of none.

**Synonym.**—*Banksia integrifolia*, L.f., var. *paludosa*, Benth. (*B. Fl.* v, 554), under which name (*integrifolia*) it is probably mixed up in many collections.





A HONEYSUCKLE.  
(*Banksia paludosa*, R.Br.)



**Timber.**—A small shrub ; I have never seen it of timber size.

**Size.**—I do not think I have seen it larger than 5-6 feet high (J. L. Boorman).

**Habitat.**—It is a native of New South Wales and Queensland. Sydney district localities are :—

Maroubra Bay Swamps and La Perouse (*J. H. Camfield*), Labour Farm, Bunnerong, La Perouse Road (*J. L. Boorman*), Centennial Park (*W. Forsyth*).

South I have collected it at Jervis Bay, Barber's Creek, and Eden to Pambula. Eden is close to the Victorian border, and it is inconceivable that search will not find it in Victoria.

West I have gathered it at Mount Wilson in the Blue Mountains.

But I have no New South Wales locality north of Sydney, showing that it has not been looked for since I collected it in March, 1909, at Bundaberg, Queensland, a shrub of 4-5 feet. This is the first occasion on which it has been recorded from Queensland.

**Propagation.**—This is certainly a pretty species, worthy of cultivation.

#### EXPLANATION OF PLATE 151.

- A. Inflorescence (flowering spike).
- B. Young flower.
- C. Flower—
  - (a) Four-lobed corolla with stamens.
  - (b) Pistil.
- D. Corolla lobes.
  - (a) Showing stamen (sessile anther) in the concave laminae.
  - (b) Back view.
  - (c) Side view.
- E. Stigma.
- F. Fruiting spike, showing the prominent capsules containing the winged seeds.
- G. Seeds (with dissepiment).
  - (a) Plate (dissepiment) separating the two winged seeds (*bb*).
- H. Flowering spike of smaller form from Centennial Park.

No. 148.

*Eucalyptus odorata*, Behr and Schlecht.

Western Peppermint.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. odorata*, Behr and Schlechtendal in *Linnea* xx, 547 and 657 (1847).

A small or moderate-sized tree, with a dark grey, rough, persistent bark. (*F. Mueller.*)

*Leaves* lanceolate, usually narrow, but sometimes broad, rarely above 4 inches long, rather rigid, the veins oblique and sometimes very much so, and not close, the intramarginal one at some distance from the edge.

*Peduncles* mostly axillary, rather thick and short, but scarcely angular.

*Pedicels*, sometimes scarcely any, and rarely as long as the calyx-tube.

*Calyx-tube* campanulate, about  $2\frac{1}{2}$  lines long, and as much in diameter.

*Operculum* hemispherical or obtusely conical, shorter than the calyx-tube.

*Stamens* 2 to 3 lines long, all perfect, very flexuose and slightly inflected in the bud; anthers very small, with globular distinct cells, opening in pores or short oblong slits.

*Ovary* flat-topped.

*Fruit* obovoid-truncate, about 2 lines diameter, slightly contracted at the orifice or almost urceolate, tapering at the base, the rim not broad; the capsule deeply sunk. (B.Fl. iii, 215.)

Variety *Woolfsiana*, Maiden in *Crit. Rev. genus Euc.*, Vol. ii, 32 (1910).

A medium-sized tree.

*Bark.*—Whitish-grey like that of *E. hemiphloia*, and persistent, as in that species, on the trunk and main branches.

*Timber.*—Brown-coloured and interlocked.

*Juvenile leaves.*—Linear-lanceolate, say 4 inches long and  $\frac{1}{4}$  inch broad, dull on both sides, venation distinct though not conspicuous, except as regards the midrib. Intramarginal vein a little distant from the edge, venation spreading.

*Mature leaves.*—Narrow lanceolate, say 4 inches long and up to  $\frac{1}{2}$  inch broad, shining or dull-shining (egg-shell lustre) on both sides; venation as in juvenile leaves.

*Buds.*—Not angular, with conical operculum, the calyx tapering into the pedicel.

*Flowers.*—Anthers identical with those of the type; the stigma slightly dilated.

*Fruits.*—Small, conoid to subcylindrical,  $\frac{1}{3}$  inch long, tapering to a pedicel rather exceeding that length to a common peduncle of  $\frac{2}{3}$  inch; rim distinct, sometimes white; valves usually four, well sunk.



W. Gill, photo.

BLACK MALLEE (*Eucalyptus odorata*), NACKARA CREEK, SOUTH AUSTRALIA.



W. Gill, photo.

*Eucalyptus odorata* GROWING ON MT. BROWN FOREST RESERVE, NEAR QUORN, SOUTH AUSTRALIA.



*R. H. Cambage, photo.*

SAPLINGS OF *Eucalyptus odorata* VAR. *Woolsiana*, GILGANDRA, N.S.W.

There are two other varieties of this species, viz., *calcicultrix*, F.v.M., and *purpurascens*, Maiden, but they are both confined to South Australia as far as is known at present. Full particulars of these forms may be obtained from my "Critical Revision of the genus *Eucalyptus*," Vol. ii, Part 1.

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *odorata*, Latin, smelling, hence sweet-smelling or odoriferous.

The original describers say: "Its leaves are filled with abundant volatile oil, and smell strongly when it is inclined to rain."

**Vernacular Names.**—In South Australia the typical form is most generally known as "Peppermint" and sometimes as "Box Gum."

A scrubby form of the typical species is known about Adelaide as "Black Mallee."

The typical form has been sent to me from the Wyalong district as "Mallee Box" or "Box Mallee," also as "Grey Box," but it must not be confused with *Eucalyptus hemiphloia*, var. *microcarpa* (the small-fruited Grey Box). I have recommended the name "Western Peppermint" for typical *odorata*.

The *Woolfsiana* variety has also been sent under the names of "Mallee Box" (e.g., from the Cobar district), and "White or Grey Box" from Gilgandra. But the commonest name for this variety, and the one I recommend for adoption, if it be desired to discriminate between the two forms (which is not easy, as they run into each other), is "Narrow-leaved Box."

**Leaves.**—The tree was named, as has already been indicated, because of the odour of the oil extracted from its leaves. Following is a brief account of some observations on the oil.

Baron von Mueller found that 1,000 lb. of twigs of this tree (comprising, perhaps, 500 lb. of leaves) yielded 112½ oz. of essential oil. Bosisto (*Trans. Roy. Soc. Vict.*, vol. vi, 54, 1861-4), in part, however, gives the following figures:—100 lb. of leaves from trees growing on elevated spots yielded 4 oz. 13 drs. of oil, of specific gravity .922, while the same quantity of leaves from trees growing on low, swampy lands, yielded only 5½ drs. of oil, of specific gravity .899. It is pale yellowish, with a greenish tinge, and an aromatic, somewhat camphoraceous smell. It boils between 157° and 199°.\*

Quoting my book, Messrs. Schimmel & Co. say that the yield of oil from fresh leaves amounts to 1.4 per cent. The light yellow oil has an aromatic camphor-like taste and smells after cineol and Roman Carroway oil. Specific gravity 0.899 to 0.925; slightly lævogyrate. It boils from 157°-199° (Bosisto), and is often so rich in cineol (identified by the hydrobromic acid compound) that it solidifies in a freezing mixture without being fractioned.

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\* Quoted in my "Useful Native Plants of Australia" (1889).

From the rectification residue a considerable amount of cuminic aldehyde was separated by means of its bisulphite compound. It was identified by oxidation to cuminic.\*

Messrs. Schimmel & Co's. own figures, obtained from a South Australian specimen, are, specific gravity of crude oil .093 at 16° C., rectified oil .909 at 18° C. No phellandrene could be detected.

In Schimmel's Semi-Annual Report of October–November, 1903, p. 36, is a discussion as to whether an oil of this class does (Schimmel) or does not (H. G. Smith) contain cuminic aldehyde.

Messrs. Baker and Smith† give the following result of examination of this oil:—

Specific Gravity at 15°C.	Specific Rotation $[\alpha]_D$	Saponification Number.	Solubility in Alcohol.	Constituents found.
0.9642	+ 2.43°	3.41	1 vol. 80 per cent.	Eucalyptol, pinene, aromadendral.

**Bark.**—Hard, scaly, or sub-fibrous, furrowed in the case of larger trees. Branches smooth or nearly so. It is often of that peculiar character known as “Peppermint.” It is very commonly intermediate in character between that of an Ironbark and a Box, hence the name “Ironbark Box,” which is sometimes applied to it in New South Wales, and which is descriptive. The height to which the scaly or sub-fibrous bark occurs up the trunk varies.

**Timber.**—The timber is pale or fawn brown in colour, though sometimes darker, with sap-wood of a dull white where present—old trees often showing no difference in colour. It is heavy, dense, and hard to work with plane or any other tools. Being usually cross-grained it makes the very best of mauls, and is one of the most valuable of firewoods. It is used for posts which last—when obtained from trees of fair size—for about fourteen years, though the scrub form, called often “Black Mallee,” is comparatively worthless for that purpose.

Trees of this Gum are in most instances too hollow to give timber for construction purposes of any size, but it is well adapted for bearing considerable strain in all directions, where obtainable in large dimensions. Sound mature timber weighs 70 lb. per cubic foot seasoned. (W. Gill.)

**Exudation.**—Friable and brownish.

**Size.**—A shrub or medium-sized tree, rarely a very large tree. Sometimes mallee-like, but not a true Mallee.

\* Bericht von Schimmel & Co., April, 1889, p. 19. See also *Pharm. Journ.*, (3) xix, 843 (April 20th, 1889).

† “Research on the Eucalypts,” p. 286. See also pp. 210–211 for a fuller account of the oil.





WESTERN PEPPERMINT.  
(*Eucalyptus odorata*, BEHR.)



**Habitat.**—This tree is chiefly found in South Australia, where it is one of the commonest trees, and is usually an indication of good wheat-growing land.

The Peppermint Gum (*Euc. odorata*) has a wide distribution in South Australia, being found as far north as the Flinders Ranges, near Quorn and Port Augusta, 180 miles north of Adelaide, as the bird flies, and as far south as Bordertown, on the overland line to Melbourne, 160 miles south-east of Adelaide, while the distance from west to east over which it occurs, taking Spencer's Gulf as a starting base, will usually not exceed 100 miles in width.

It also occurs on Eyre's Peninsula, near Pt. Lincoln, and likewise on Kangaroo Island.

In some places, notably Mount Remarkable and Adelaide neighbourhoods, it grows into a fine tree, but in others merely develops a stunted form which degenerates into mere scrub in many of the Mallee districts.—(Extract from letter from W. Gill, Conservator of Forests, Adelaide.—3/3/10.)

It also occurs in north-western Victoria, but as regards New South Wales its range requires to be more clearly defined. It is a "dry country" species. It has been recorded from Deniliquin, Wyalong, Cobar, Nymagee, and other places.

The variety named after the Rev. Dr. Woolls has been received from Mount Boppy near Cobar, Girilambone to Condobolin, Dubbo to Baradine and the Castle-reagh River, Narrabri, Pilliga, and Denman.

**Propagation.**—It readily grows from the stools after coppicing, and therefore proves profitable for firewood within easy range of a good market. (W. Gill.)

#### EXPLANATION OF PLATE 152.

Variety *Woollsiana*, Maiden.

- B. Sucker leaves from type, Narrabri, New South Wales.
- C. Twig with young buds and small fruits, from type.
- D. Anther.

#### TYPICAL FORM.

- A. Sucker leaf from Wirrabara, near Mount Remarkable, South Australia.
- E. Flowering twig from Cobar, New South Wales.
- F. Fruits from St. Vincent's Gulf, South Australia (W. Gill).
- G. Anther.
- H. Buds from type, "Sud Australie, 1848."
- K. Juvenile leaf from type.
- L. Juvenile leaf from the National Park, near Adelaide (W. Gill), nearly orbicular in outline. The juvenile leaves are usually narrow, and a specimen like this shows that the juvenile leaf varies like other characters in *Eucalyptus*.
- M. Mature leaf.

NOTE.—The mature leaf of (A) normal form, cannot be separated from that of (C) type of variety *Woollsiana*.

#### PHOTOGRAPHIC ILLUSTRATIONS.

"Black Mallee" (*Eucalyptus odorata*). Nackara Creek, Hundred of Coglin, South Australia.—(W. Gill, photo.)

*Eucalyptus odorata* growing on Mount Brown Forest Reserve, about 9 miles south of Quorn, South Australia.—(W. Gill, photo.)

Saplings of *Eucalyptus odorata*, var. *Woollsiana*, at Gilgandra, New South Wales.—(R. H. Cabbage, photo.)

B

No. 149.

## *Acacia implexa*, Benth.

### A Hickory.

(Family LEGUMINOSÆ: MIMOSÆÆ.)

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)

**Botanical description.**—Species, *A. implexa*, Benth., in Hooker's *London Journal of Botany*, Vol. 1, p. 368 [1842.]

156. *A. implexa* (sp. n.), glabra subglauca, ramulis subteretibus, phyllodiis elongato-falcatis obtusiusculis basi longe angustatis subcoriaceis tenuiter multinerviis et venulosis, racemis oligocephalis laxis subramosis, capitulis dense multifloris, calyce corolla subtriplo brevior, legumine longe et anguste lineari arcuato contorto marginato glauco-pruinoso. Phyllodia semipedalia iis *A. heterophyllae* potius quam *A. melanoxyli* similia. Capitula parva. Legumina semipede longiora, vix 2 lin. lata, post semina delapsa valde contorta et implexa.—Ravines of Shoalhaven River, E. Coast, *Cunningham*.

It was redescribed by Bentham in the following words:—

A glabrous tree, sometimes slightly glaucous; branchlets terete or nearly so.

*Phyllodia* lanceolate-falcate, more acuminate, more narrowed at the base and thinner than in *A. melanoxylin*, mostly 5 or 6 inches long or more, with several slender longitudinal nerves and fine veins.

*Peduncles* few, in a very short raceme, more slender than in *A. melanoxylin*, bearing each a small dense head of numerous flowers, mostly 5-merous.

*Calyx* scarcely half as long as the corolla, turbinate.

*Petals* smooth, united to the middle.

*Pod* narrow-linear, much curved and twisted, 2 or rarely nearly 3 lines broad, contracted between the seeds.

*Seeds* ovate-oblong, longitudinal; funicle dilated and coloured almost from the base, much folded under the seed, but not encircling it. (B.Fl. ii, 389.)

#### Differences between this tree and the Blackwood.

The closest affinity of this tree is with *Acacia melanoxylin*, the Blackwood. See Plate 57, Part XV, Vol. 2, of this work.

The pod of *A. melanoxylin* is sometimes broader, but by no means always. The pod of *A. implexa* is more twisted, sometimes very twisted. The funicle encircling the seed is a double fold in *A. melanoxylin*, while in *A. implexa* the funicle is folded under the seed. This character is of great importance.

The phyllodia of *A. implexa* are more acuminate, and more narrowed at the base than in *A. melanoxylin*. (See plate.) They are mostly 5 or 6 inches long or more in *A. implexa*.

The peduncles are more slender in *A. implexa* than in *melanoxyton*, but this is not easy to bring out in the plates.

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *implexa*, Latin, folded. This refers to the folded, twisted pods, which often form a tangled mass. In the plate a single pod only is shown, for the sake of clearness.

**Vernacular Names.**—In the early days this was known as “Hickory” and “Lignum Vitæ” because of its tough, hard wood; also “Fish Wattle” because it was one of the trees whose bark was used by the aborigines for throwing into the water and stupefying fish.

I have occasionally known it to be called “Bastard Myall.”

**Aboriginal Names.**—“Wee-tjellan” of the aborigines of the Counties of Cumberland and Camden, according to the late Sir William Macarthur. “Millewah” is an aboriginal name formerly in use.

**Leaves.**—Mr. W. Baeuerlen informed me that in southern New South Wales, near Delegate, cattle have been known to eat the leaves of this tree, stripping off all within reach; although grass in the paddock was abundant.

**Bark.**—The first account of the use of this bark I can find is the following:—

Containing much tannin, used by the aborigines to poison fish, and to make embrocations for the cure of cutaneous diseases. (Sir William Macarthur in *Cat. N.S.W. Products for Paris Exhibition*, 1855.)

The bark of young trees contains a bitter, doubtless owing to the presence of a saponin. The fringe of this subject has alone been touched, and a not too difficult, yet a very important, subject for research is open to our young Australian chemists. Who will systematically examine our *Acacias* for saponins?

I analysed a sample of this bark (*Proc. Roy. Soc. N.S.W.*, 1888, p. 270). It gave 7·82 per cent. of tannic acid, and 20·54 per cent. of extract. It is slightly bitter to the taste, owing to the presence of a saponin, but this sample is from an old cultivated tree, and the bitterness is less noticeable; hoary-looking, in layers and flakes; average thickness,  $\frac{1}{4}$  inch.

Bark of this species from Deception Bay has been sent to me by Dr. T. L. Bancroft, of Brisbane, and found to contain 14·16 per cent. of tannic acid, and 33·51 per cent. of extract. It was from a tree 15 feet in height and 4 inches in diameter. It was stripped in May, and analysed in July.

**Timber.**—Wood hard and close-grained, dark brown, with yellowish stripes; much in demand for turnery, cog-wheels, and other purposes which need tenacity and strength. (Diekiuson.) The wood is very similar to that of *A. melanoxyton*. Specific gravity, 711, *i.e.*, weight 44 lb. per cubic foot of dry wood. (Mueller.)

At Myrtle Creek, about 8 miles from Candelo, N.S.W., it grows to a diameter of 2 feet, and is there sawn into boards for making furniture.

Under the name of "Bastard Myall," Taree, it is used for jaws of hand-screws, marking-gauges, and turnery generally.

It has much in common with our harder coast wattle-timbers generally. They are usually used for fuel, but the tide of inquiry into the merits of our native timbers has assuredly set in, and I look for increased demand for this member of the Myall class.

**Size.**—A medium-sized tree, attaining in the well-watered, good soil creek-banks of the South Coast, a trunk-diameter of 2 feet.

At the other end of the State (Macpherson Range), it attains a height of 30 feet (W. Dunn).

**Habitat.**—The following localities are mentioned in the "Flora Australiensis":—

*Queensland.*—Moreton Bay, Dawson and Burnett Rivers (*F. Mueller*).

*New South Wales.*—Port Jackson (*R. Brown, Woolls*); northward to Clarence River (*C. Moore*); Mount Lindsay (*W. Hill*); southward to Shoalhaven River and Illawarra (*A. Cunningham*).

*Victoria.*—Open river banks and grassy ridges scattered over the Colony; Yarra River, Bacchus Marsh, Snowy River, &c. (*F. Mueller*).

The type was collected by Allan Cunningham on the Shoalhaven River, N.S.W., and the drawing was made from a plant from a locality not far distant.

It is chiefly a coast species, and common on eastern mountain slopes. Intermittently it extends a considerable distance westerly.

Following are some localities represented in the National Herbarium, Sydney:—

#### NEW SOUTH WALES.

Kogarah and Woniora River (*J. H. Camfield*); Lane Cove (*W. Forsyth*); Stanwell Park (*J. L. Boorman*); all localities near Sydney.

Clyde River (*W. Baeuerlen*); Weddin (*J.H.M.*); Jenolan Caves (*W. F. Blakeley*); Portland, Mudgee Line (*J. Geddes*); Sappa Bulga Ranges, Narromine district (*A. R. Samuels*); "Hickory," Nymagee (*R. H. Cambage*), (most westerly locality recorded); Hudson's Peak, Lochinvar; Andesite formation (*R. H. Cambage*); Scone (*J.H.M.*); Anderson's Sugar Loaf, Macleay River (*J. L. Boorman*); Copmanhurst (*Rev. H. M. R. Rupp*); Lismore (*W. Baeuerlen*); Horton River (*E. J. Hadley*); Guyra-Tingha Road (*R. H. Cambage*); Tenterfield to Sandy Flat (*J.H.M.*); Acacia Creek, Macpherson Range (*W. Dunn*); Walcha (*A. R. Crawford*).

#### QUEENSLAND.

Tallebudgera (*F. M. Bailey*); Stanthorpe (*A. Murphy*); Toowoomba (*J.H.M.*); Bundaberg (*J.H.M.*).





HICKORY.

(*Acacia implexa*, BENTH.)

As regards Victoria, Mueller records it for every district into which he botanically divided this State.

The following botanico-geological note is of considerable interest:—

A few trees of *Acacia implexa*, Benth. (Hickory), were found on the top of the igneous hill (just north of Nymagee). This is the most north-westerly locality in which I have found this species. It was next seen at a point about 80 miles south-easterly from Nymagee, towards Trundle, and here again it was on the top of a hill composed of igneous rock, a very fine granite, there being not more than half-a-dozen trees. The question suggested by the position of these isolated representatives of a species which is known to extend southerly through New South Wales and Victoria, is whether these trees have once been more plentiful in the north-west, and have been reduced by geological and climatic agencies, or whether they are only now finding their way out in that direction. Judging from the surroundings I incline to the former suggestion, but the solution of the question seems full of interest to both botanists and geologists. (R. H. Cabbage, *Proc. Linn. Soc. N.S.W.*, xxvi, [1901] p. 202.)

#### EXPLANATION OF PLATE 153.

- A. Flowering twig.
- B. Flower-head.
- C. Individual bud.
- D. Flower.
- E. Bract found at the base of each flower.
- F. Flower opened out, showing—
  - (a) Calyx.
  - (b) Corolla.
  - (c) Pistil (stamens removed).
- G. Pods.
- H. Seed.

All from the Clyde River, New South Wales.

No. 150.

*Endiandra virens*, F.v.M.

A White Apple.

(Family LAURACEÆ.)

**Botanical description.**—Genus, *Endiandra*. (See Part XXXV, p. 79.)

**Botanical description.**—Species, *E. virens*, F. Muell., in *Fragm.* ii, 90 (1860); Meissn. in DC. *Prod.* xv (1), 509.

A tall shrub or a tree attaining a considerable height, glabrous in all its parts.

*Leaves* oblong, usually narrow, rarely broader and elliptical, obtuse, contracted at the base, 2 to 3 inches long in some specimens, twice that size in others, not thick, green and reticulate on both sides, somewhat shining above, a few of the primary veins more prominent than the others.

*Panicles* slender, glabrous, much shorter than the leaves.

*Pedicels* rather long.

*Flowers* small.

*Perianth-tube* very thick, broadly turbinate, nearly one line in diameter, forming a thick projecting ring round the base of the lobes which are shorter than the tube, broad and connivent, the three inner ones rather smaller than and quite enclosed in the outer ones.

*Stamens* of the outer row entirely deficient, of the inner row three, without glands at their base, but alternating with sessile staminodia.

*Fruit* globular,  $\frac{1}{2}$  to  $\frac{3}{4}$  inch\* diameter, resting on thickened pedicels of  $\frac{1}{2}$  inch or more. (B.Fl. v, 302.)

**Botanical Name.**—*Endiandra*, already explained (see Part XXXV, p. 79); *virens*, Latin, youthful and green, hence a bright clear green, referring to the leaves.

**Vernacular Name.**—Mr. A. H. Lawrence, Forest Guard, Coff's Harbour, who put himself to much trouble to obtain suitable specimens for figuring, informs me that this tree is locally called "White Apple," because of the fruit, which, however, turns yellowish when fully ripe.

The late Mr. Charles Moore collected specimens of this tree for the London International Exhibition of 1862, under the number, in the New South Wales Catalogue, Northern Woods, of XLIII. It was given the provisional name (afterwards confirmed) of *Endiandra virens*, and Mr. Moore called it "Bat and Ball, Native Orange? Native Pomegranate."

\* It will be seen that the fruit figured is much larger, viz.,  $2\frac{1}{4}$  inches in diameter.



**Aboriginal Name.**—Mr. Moore, in sending the specimens just referred to, gives the aboriginal name “Ullagal Mabbie” as in use on the Clarence and Richmond for this tree.

**Leaves.**—Mr. Moore speaks of its sparse, shining, light green foliage.

**Fruit.**—Whitish to yellowish when ripe. The late Mr. Charles Moore speaks of this tree with a “large pomegranate-like fruit, which is borne in great abundance.”

The fruits strongly resemble those of *E. globosa* (see plate 138, Part XXXVI), the only difference being in size.

**Bark.**—Rough and corky (J. L. Boorman).

**Timber.**—Mr. Moore, the original discoverer of this tree in 1861, said “timber not used.”

The timber when fresh is yellowish and fissile. It is toughish, “fuzzy” to cut, and displays very little figure.

A very hard wood, not a good outside timber (G. Tingcombe).

Mr. Bailey speaks of its wood as of a grey colour, close-grained, and firm; useful for many purposes.

**Size.**—On the Comboyne, about 80 feet high and 3 feet in diameter (G. Tingcombe).

A small tree of 30–40 feet, with a girth of 2–3 feet, at Coff’s Harbour (J. L. Boorman).

**Habitat.**—*New South Wales.*—Clarence and Richmond Rivers (*Beckler, C. Moore*). (B.Fl. v, 302.)

The type came from the Clarence River—or, rather, Clarence and Richmond Rivers—in open brush forests, where it “is general.” We have a specimen growing in the Botanic Gardens, Sydney.

It has been received from the Comboyne from Mr. George Tingcombe, also from Coff’s Harbour (Mr. A. H. Lawrence).

The Comboyne locality brings this species a good deal further to the south.

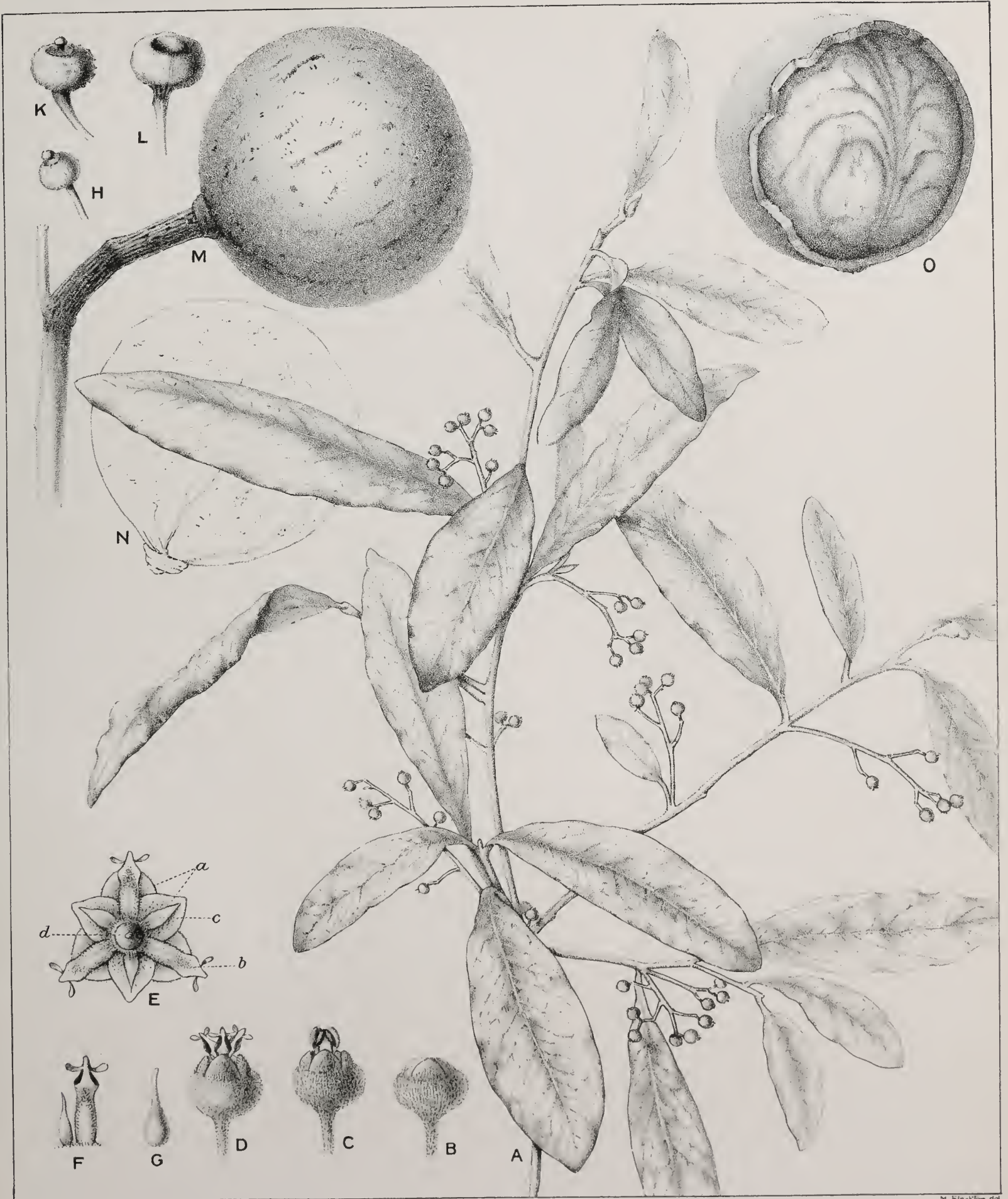
Bailey, speaking of Queensland, says that “it is common along creek-sides in southern localities,” but does not quote specific places.

It is a brush-forest tree—and such trees are the most difficult of all trees to discriminate.

**Propagation.**—The cultivation of this tree appears desirable, if only because of the large, handsome, yellowish, spherical fruit, borne (in its native habitat) in great profusion.

## EXPLANATION OF PLATE 154.

- A. Flowering twig.
- B. Bud.
- C. Young flower.
- D. Mature flower.
- E. Flower, opened out, showing—
  - (a) Calyx (perianth segments).
  - (b) Stamens (extrorse anthers).
  - (c) Stamnodia.
  - (d) Pistil.
- F. Stamen, front view, with staminode.
- G. Pistil.
- H. } Young fruits.
- K. }
- L. Immature fruit, folding up before falling off.
- M. Globular fruit, resting on the thickened pedicel.
- N. Fruit, more pear-shaped.
- O. Fruit, epicarp removed (and broken open to show the cotyledons).



WHITE APPLE.  
(*Endiandra virens*, F.v.M.)



### Twist in Australian Timber.

The subject of twist in standing trees and felled logs is especially familiar to Australians resident in the country, for the felling and utilisation of timber is brought home to every dweller "on the land." To the professional timber-getter and saw-mill hand the matter is also well known; but it does not appear that anything has been written in Australia on the subject. To elicit data on what is a really important matter, I publish a letter received from Canada from Dr. Bell, and also some correspondence from friends who answered my letters.

I want, particularly, references to definite kinds of trees.

With further data, we shall be in a position to reconcile conflicting statements.

Dr. Robert Bell, Chief Geologist, Geological Survey of Canada, wrote to me, early in 1908, as follows:—

In Canada, a large proportion of the forest trees have a more or less pronounced twist in the grain of the wood, which in, say, 90 per cent. is to the left—*i.e.*, if you look either up or down the trunk, the twist is in the opposite direction to the movement of the hands of a watch. It is supposed to be due to the prevailing wind. It has occurred to me that any theory as to the cause would be helped if we knew if a similar phenomenon occurs in Australia.

May I therefore ask how this is—to which direction the grain of the wood turns, and what you consider to be the cause? In what species of trees is it most marked?

It will be seen that in Canada the twist is stated to be *right to left*, and the cause has been attributed to the *wind*.

The following is a reference in a standard work:—

Trees with twisted fibre are specially hard to split, and it is found that those twisting from *left to right* (against the sun's apparent course) are harder to split than those twisting in the opposite direction.—(*Schlich's Manual of Forestry, Vol. V, by W. R. Fisher (1896), p. 39.*)

I have arranged the following replies, according to direction of twist and attributed cause:—

#### 1. *Right to Left.—The Sun.*

W. H. Birrell, near Carinda, April, 1908:—

I have had much to do in the line of splitting different timbers for fencing, and have noticed the curl is more to be found in Pine (*Callitris*) than in any other tree, although it is usually believed to be a very free splitting tree. On a Pine the branches will be found to be the heaviest on the north side. In a Pine the curl will be found to run from *East to West round by North*, and naturally the West side will be the higher side of the grain. No matter how curly a tree is in the grain the knots go straight to the heart; they do not work in—"or is it out?"—with the grain. Fencing on Connaparia one year I came across what I considered would be a lovely tree, and after putting a man to cut it down and saw it in lengths it had to be left, as it was an impossibility to get a decent post out of it. Now that tree had two seams running full length, and as straight as possible from the ground to the top, and fully an inch deep. If the curl is caused by the wind, how did it happen that, for 2 inches in, the grain was perfectly straight, and when the shell was knocked off that tree was useless for splitting? I have also found the denser the forest the more even the growth of the trees, and the better they will split. Again, stripping bark, it will be found the north side will come off when you cannot shift the south side. Some will claim the wind as the cause of the curl. But I am afraid the bush geologists will find in favour of the sun. The first piece of warped timber you see follow the grain with your eye, and if it does not run as Dr. Bell says, keep that wood as it will be a curio.

“Bushwhacker,” in *Evening News*, Sydney, 13th April, 1908 :—

I notice that about 90 per cent. of the Australian forest trees are twisted from *right to left*. The Box (*Eucalyptus*, but the species not stated.—J.H.M.) seems to be the most affected. I ascribe the cause to the influence of the sun, as the trees are twisted from east to west, or following the sun's course, as it were. I further notice that nearly all trees that are twisted the opposite way are those that have been damaged by storms, and overbalanced to such an extent as to withstand the sun's action. I cannot see how the wind can have anything to do in twisting them.

J. McFarlane, M.L.A., Sydney, 14th April, 1908 :—

So far as New South Wales timber is concerned, my experience is that the twist (or “wind,” as it is termed by bushmen) in trees is from *right to left*. There are a few exceptions where the twist is in the opposite direction, but it is of rare occurrence in well-developed straight trees. Many years ago I remember hearing the cause of the twist discussed. The prevailing winds were in some instances put forward as a reason; but I am rather sceptical as to that theory, as in the most dense of our brushes where the trees are completely protected we find that trees with a twist in the grain are quite common. While a considerable proportion of our trees are perfectly straight in the grain, I think that every variety is susceptible to the “twist,” particularly Box, Grey Gum, Ironbark, Bloodwood, and Stringybark. I can offer no opinion as to the cause.

Sydney Smith, Campbelltown, 13th April, 1908 :—

As I have had considerable experience in splitting timber, the twist in question has often been brought under my notice.

All the local varieties of timber trees are subject to it more or less, it being more pronounced in the varieties locally known as Blackbutt (*Eucalyptus pilularis*) and Bloodwood (*Eucalyptus corymbosa*), and also in timber growing on elevated level country, those growing in sheltered gullies being much straighter in the grain. The twist is always from *east to west*, or following the sun's motion, which would suggest the possibility of the sun's action being the cause.

William Thompson (West Wyalong), in *Sydney Morning Herald*, 24th April, 1908 :—

My experience, as far as this district is concerned, is that fully 90 per cent. of the trees have the twist in the grain from *east to north*, these being indigenous to our district. My explanation of such, and reason for so thinking, is that all vegetation grows to the light; therefore the foliage of trees, saplings, or flowers follow the morning sun, or are drawn by the rising sun from the east to the north. The greater part of the branches of forest trees are on the north-east side of the barrel of the tree, as evidence that the morning and forenoon sun is what is cause of effect. I at one time thought the cause of twist was the whirlwinds, but as these whirlwinds go round both ways they could not possibly be the cause. I have noticed the trees with a grain from east to south would split straight in the heart, but the outside grain would break across the opening when splitting the log.

## 2. *Left to right.—The Sun.*

T. V. R. Gorringe, Neville, Orange district, 12th June, 1908 :—

I am an old bushman of forty years' experience, and I have almost invariably found more or less twist in all timber in this part, and always from *left to right*, or as the sun travels round. Have always thought it was something to do with the sun.

J. Gray, Vineyard, P.O., *viâ* Riverstone (between Sydney and Blue Mountains), 8th April, 1908 :—

Most forest trees in this locality, viz., Grey Gum, Box, Ironbark, and Stringybark, show a decided *twist to the right*, sometimes as much as one complete turn in from 12 to 15 feet.

A log cut off square and split into posts generally twists enough to leave the post anything up to 2 inches longer on one corner than the square; for this reason bushmen endeavour to allow for this by setting their crosscut on an angle thus (Sketch not reproduced.—J.H.M.) An examination of any splitting fence or split-shingle roof will show this.

One sometimes sees a tree with a left twist, but this tree always splits straight, breaking across the grain as it goes.

I have seen a double tree twisted inwards on the sides facing the morning sun.

My idea is the twist is caused by the tree drawing towards the sun, and this idea seems to be borne out by the trees in the Northern Hemisphere being twisted in the opposite way.

To account for the tree with a left-hand twist, growing as it always does (in my experience,) side by side with others of the opposite twist, it may be that this tree was only exposed during its growing period to the direct sun in the afternoon—that is, being completely shaded by larger trees on all sides except south-west.

Some Grey Gums have alternate layers about 1 inch or more thick, every other one, with an opposite twist. In these cases the twist each way sometimes amounts to one turn in 3 feet in a tree 18 inches diameter.

This last appears to disprove the sun theory, but I mention it so as not to convey a wrong impression.

W. N. Greally-Hincksman, in *Sydney Morning Herald*, 15th April, 1908 :—

*Re* remarks by "Native" (Mulgoa), in your issue of 10th instant, in which he ascribes the right-hand twist of grain in timber to the action of the wind, "Native" may be right as far as he goes; but I also take into consideration the fact of the sun's paramount influence over all vegetation, and the fact of the sun passing from right to left of each sapling daily on the northern side, would have the effect of giving a pronounced *right-hand twist* to any growth which happened to have any tendency that way owing to uneven distribution of foliage.

J. Marsh, Eugowra, Lachlan River, 14th April, 1908 :—

I have noticed that a large majority of trees *twist to the right*, or in other words, the twist follows with the travelling sun. An old experienced bushman first drew my attention to the phenomenon when a boy, and becoming interested, I soon found that he was correct. You will find White and Yellow Box, Stringybark, Lachlan Pine, Spotted Gum, and other timbers, the majority with the twist to the right. Some of these timbers when drying will untwist, and the Lachlan Pine is most remarkable for this. I have repeatedly observed that green Pine posts or rafters (in the round) as they become dry untwist so much so that the nail has been drawn out of the wood to which they had been nailed to. Whatever is the cause of the trees twisting to the right I have never heard explained, and Dr. Bell's article has been the first that I have noticed dealing with the subject, and he tells us that in Canada the trees twist to the left. Several old bushmen whom I have inquired from could not give any tangible reason, excepting one, and he believed the sun had some influence with the twisting. One point I have noticed frequently in splitting timber, and that is, that the wood is more brittle and splits easier on its south side. This occurs no doubt through the sun not having its full power focused on that portion of the tree.

A. E. Watt, Glanmire, near Bathurst, 15th June, 1908 :—

My informant states that with rare exceptions all the timber in the district—in which there is a twist—makes the turn similar to an ordinary screw, taking the *butt* of the tree as being the *head* of the screw; in other words, the twist *rises* from *left to right*, in looking at the tree as it stands.

As to the reason for this twist, which is very pronounced in some instances, but not confined to any particular class of timber, my informant could offer no suggestion; he was merely acquainted with the fact.

I cannot think that this twist can be produced by wind in this district, as our prevailing winds are all from the *one* direction, S.W., W., or N.W., and once a tree gets the least bit wind-blown, it is impossible for it to come round against this westerly force.

My own idea is that the twist is produced in some way either by the light or heat of the sun. There may possibly be an inclination for the top shoots of a sapling to follow the sun round, as we notice is the case with certain flowers, and the *least* tendency of this kind would of course be ample to account for the twist in the grain.

Nelson Freeborn, Temora, 14th June, 1909, in *Australian Agriculturist*, of 1st July :—

I noticed in the issue of your paper dated 1st May, 1908, a letter from Mr. Maiden drawing attention to an inquiry from Dr. Bell, of Canada, asking if Australian timber showed the same twist in the grain from left to right as is to be found in Canadian timbers. In this connection I might inform

Mr. Maiden and your readers that the same twist exists in the timber here, the twist being in the same direction that Dr. Bell shows is to be found in the timber in Canada. It is quite common to find this twist so bad on one side of the tree as to render it almost useless for splitting on that side, whilst on other the opposite obtains. As to the cause of this twist it seems to me that it cannot be due to any effect the prevailing winds could have on the timber during growth, as the prevailing winds in this portion of Australia are from the west. I might say this question is not by any means new to bushmen in this part. However, I cannot say that I have heard anyone outside my own immediate circle express an opinion as to the cause of this peculiarity in the growth of timber. The opinion I hold myself is that it is due to the sun's influence. It is said that certain flowers follow the sun in its course, and I am of opinion the same applies to our timber. One thing is certain, we do not see any twist in a tree on the south side, which seems to me to be fairly good ground to assume that the sun is the predisposing cause of this peculiarity in growth.

### 3. *Left to right.—The Wind.*

“Native,” Mulgoa, Hawkesbury River, in *Sydney Morning Herald*, 10th April, 1908:—

His experience is “that the twist in about 90 per cent. of the forest trees is *to the right, and not to the left*,” as mentioned in the Chief Geologist's (of Canada) letter to Mr. Maiden. An old bushman will fell a tree for splitting rails, &c., with a “left-hand twist,” but will pass on a tree with a “right-hand twist,” as showing more twist in the split timber. The prevailing winds have a lot to do with the twist in the growth of the young tree sapling, but one would need to take into consideration the heaviest side of the top or branches of the sapling, and which will give the greatest impetus or strain on the young timbers. The twist is seldom noticed in hardwood, such as Ironbark or Box, Stringybark, Turpentine, Gum, and in most cases Messmate.

### 4. *Equal number each way.—The Wind.*

J. McColgan (Forest Lodge), in the *Star*, Sydney, 9th April, 1908:—

Very much of our timber here is affected that way (twist in grain)—so much so that a large percentage is rendered useless for splitting purposes, because when a log is split the crack follows the twisted grain, with the result that you get your posts or rails with a curl in them like a piece of board that has been warped with the sun. It does not matter so much when cutting heavy timber, such as railway sleepers, for in case of a tough or twisted tree, the usual practice is to cut grooves lengthwise in the log with a broad axe to a depth of 4 or 5 inches, so that the split has to run straight. But some trees have such a twist as to be altogether useless. I have seen some that the twist made a complete circuit of the barrel of the tree in a length of 10 feet. As to the cause, I am quite satisfied, from close observation, that the wind is accountable for it. If you take the trees growing on the hills in the Picton district that are exposed to the heavy westerly winds you will find that fully half of them are more or less twisted; while in the gullies, where they are sheltered, this feature is entirely absent.

Now, as to the statement that 90 per cent. of the twisted trees turn to the left, I think there must be some mistake here, for in all my experience I have found that about *an equal number turn each way*, and now I will explain the cause. Say the heavy winds come from the west, and a tree has an even quantity of branches on both sides. Well, that tree would not be affected at all; but if it has more limbs on the northern or left-hand side the great and continued pressure of the wind gradually turns it partly round, which would cause a twist to the left, while if it had more limbs and branches on the southern side the twist would be to the right. Mr. Maiden asks if this twist is peculiar to any particular kind of tree. No, it is not; any tree in an exposed position, and not having an evenly-balanced head, is liable to be warped by the heavy winds.

### 5. *Right and left twist.—Sun, wind.*

Dr. Cleland contributed a “Note on Twists in the Bark of the Jarrah (*Eucalyptus marginata*, Sm.)” Of one hundred trees observed in the neighbourhood of Perth, W.A., four showed a decided left twist, sixteen a slight left twist, forty-four were straight, twenty-four showed a slight right twist, nine a marked right twist, and in three the twist was undecided (*i.e.*, irregular). As there appeared to be no indication of a tendency to tree-growth in a spiral direction, the explanation was offered that, when young, a



predominant branch probably extended to one or other side, and, being played on by the prevailing wind, caused the young stem to become twisted to some extent. Later such a branch may have died and disappeared. The explanation offered seems to be favoured by the fact that contiguous trees are often twisted in opposite directions.—(*Proc. Linn. Soc. N.S.W.*, 27 May, 1908.)

R. Kaleski, Liverpool, N.S.W., 15th April, 1908:—

(1) That the twist is first caused by the young plant striving to shelter itself from too much sunlight by twisting from it, or *vice versa*; (2) that when a sapling, and becoming exposed to the winds by reason of its higher growth, it will twist if left unsheltered. The twist varies in different timbers; 90 per cent. of the Gums, for instance, twist from *left* to *right*; Apple and Stringybark, growing in between them on the same ridge will twist (about 70 per cent.) from *right* to *left*. Again, I have on my place, at mouths of gullies (very windy), trees in which the grain is so alternately left and right that they could be split into short lengths, with a little chopping, easier than sawing. They are mostly Blackbutts, which twist like the Gum. When I say the plant sheltering itself from too much sun, I should really have said the trunk sap. The sap, on ascending, will burn by going up spirally, as there is always a cool (south) side. Have never noticed twisty-grained trees in sheltered pockets (free from sun and wind); have always noticed them on exposed ridges.

D. G. Munro, Trangie, Western Plains, 17th April, 1908:—

I have found that about 40 per cent. of the Pine trees have a wind in the grain. Some wind to the right, and others to the left. In choosing a tree for the purpose of splitting up into posts, I have found that a left-hand twist will split fairly easy, and sometimes fairly straight. But a right-hand twist is quite useless for splitting posts, being very tough to split, and the posts are always windy, &c. Box and Gum that grow in this district, I think about 90 per cent., have a twist in the grain, some to the left and some to the right, both twists being quite useless for splitting purposes.

#### SUPPLEMENTARY PHOTOGRAPHIC ILLUSTRATIONS.

Hauling Pine (*Araucaria Cunninghamiana*) on a timber waggon. Notice the solid wood wheels.—(Kerry, photo.)

A Ringbarked Forest, N.S.W. The trees have been destroyed for grass.—(Kerry, photo.)

Bringing in big logs to Wyong Sawmills. Bullock traction is common in the timber districts of New South Wales. Notice the temporary log bridge.—(F. A. Kirton, photo.)

Axemen's Carnival, Wyong. These competitions are now common in all the States. Logs of Eucalyptus timber are usually selected.—(F. A. Kirton, photo.)

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets):—

<i>Eucalyptus acacioides</i> , A. Cunn. (XI). „ <i>acmenioides</i> , Schauer (IX). „ <i>amygdalina</i> , Labillardière (VI). „ <i>Andrewsi</i> , Maiden (VII). „ <i>apiculata</i> , Baker and Smith (IX). „ <i>Behriana</i> , F.v.M. (X). „ <i>bicolor</i> , A. Cunn. (XI). „ <i>Boormani</i> , Deane and Maiden (X). „ <i>Bosistoana</i> , F.v.M. (XI). „ <i>calycogona</i> , Turczaninow (III). „ <i>capitellata</i> , Smith (VIII). „ <i>Consideniana</i> , Maiden (X). „ <i>coriacea</i> , A. Cunn. (V). „ <i>dives</i> , Schauer (VII). „ <i>eugenioides</i> , Sieber (VIII). „ <i>fruticetorum</i> , F.v.M. (XI). „ <i>hæmastoma</i> , Smith (X). „ <i>hemiphloia</i> , F.v.M. (XI). „ <i>incrassata</i> , Labillardière (IV). „ <i>Luehmanniana</i> , F.v.M. (IX).	<i>Eucalyptus macrorrhyncha</i> , F.v.M. (VIII). „ <i>microcorys</i> , F.v.M. (IX). „ <i>microtheca</i> , F.v.M. (XI). „ <i>Muelleriana</i> , Howitt (VIII). „ <i>obliqua</i> , L'Héritier (II). „ <i>ochrophloia</i> , F.v.M. (XI). „ <i>odorata</i> , Behr and Schlechtendal (XI). „ <i>pilularis</i> , Sm. (I). „ <i>piperita</i> , Smith (X). „ <i>Planchoniana</i> , F.v.M. (IX). „ <i>populifolia</i> , Hooker (X). „ <i>regnans</i> , F.v.M. (VII). „ <i>siderophloia</i> , Bentham (X). „ <i>Sieberiana</i> , F.v.M. (X). „ <i>stellulata</i> , Sieber (V). „ <i>umbra</i> , R. T. Baker (IX). „ <i>virgata</i> , Sieber (IX). „ <i>vitellina</i> , Naudin (VII). „ <i>vitrea</i> , R. T. Baker (VII).
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.

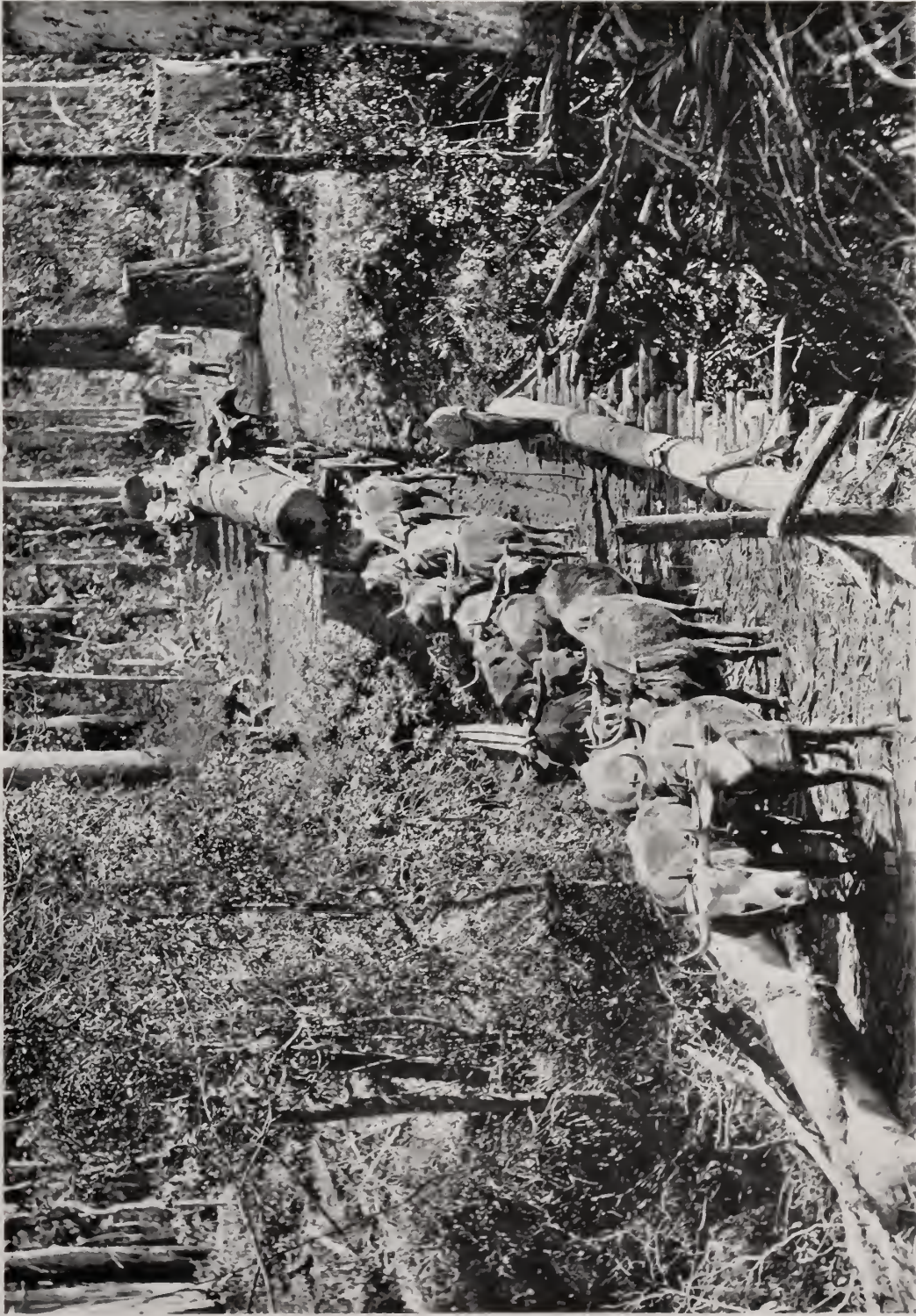


*Kerry, photo.*

HAULING PINE ON A TIMBER WAGGON.



Kerry, photo.



*F. A. Kirton, photo.*

BRINGING IN BIG LOGS TO WYONG SAWMILLS.



*P. A. Kerrison, photo.*

AXEMEN'S CARNIVAL, WYONG, N.S.W.







## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (Two Plates.)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andrewsii*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (Two Plates.)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (Two Plates.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (Two Plates.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muelleri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu)  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya foetida*, R. T. Baker)

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations.)*  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muelleriana*, Howitt)  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus aemnioides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L. f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betche).

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hæmastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

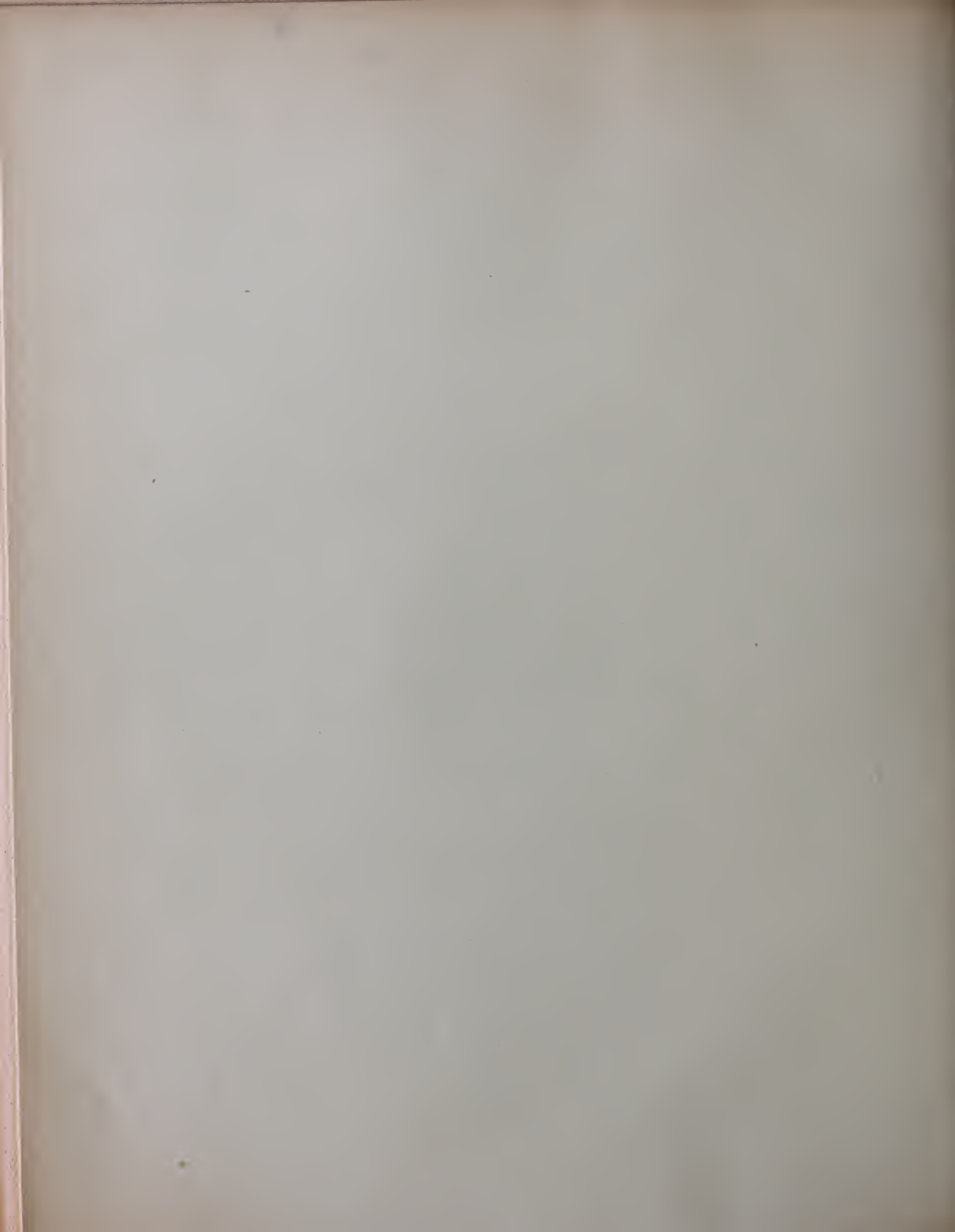
- 139.—A HONEYSUCKLE (*Banksia collina*, B.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

*Recapitulatory. (Fifty-seven Plates.)*



*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 2.*

*Published by Authority of the*  
*GOVERNMENT OF THE STATE OF NEW SOUTH WALES.*



*PART XLII* OF THE  
COMPLETE WORK.

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANDONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniocalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphaera rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).
- THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muellieri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleaefolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
- 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
- 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
- 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).

(N.B.—The numbers of Part XIV are given erroneously in the text.)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxylon*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.)
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)

THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLII.

*Published by the Forest Department of New South Wales, under authority of  
The Honourable the Secretary for Agriculture.*



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*Grevillea striata*, R.Br.

Western Beefwood.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Grevillea*. (See Part I, p. 1.)

**Botanical description.**—Species, *G. striata*, R.Br. in *Trans. Linn. Soc.*, x, 177; *Prod.* 380.

A small or large tree, the branches closely tomentose, the foliage minutely and sometimes sparingly silky-pubescent.

*Leaves* undivided, linear or linear-lanceolate, 6 to 18 inches long, often curved, 2 to 5 lines broad, obscurely veined above, striate underneath, with 9 to 13 raised parallel nerves, separated by intervals much narrower than the nerves themselves.

*Flowers* small, in slender spike-like erect racemes of 2 or 3 inches, shortly pedunculate, and usually several together in a leafless panicle shorter than the leaves, the rhachis tomentose.

*Pedicels* scarcely 1 line long.

*Perianth* silky-pubescent outside, glabrous inside, the tube about 2 lines long, narrow, revolute under the globular limb.

*Torus* small.

*Gland* semiannular, prominent.

*Ovary* glabrous, on a slender stipes; style not very long, the stigmatic cone straight.

*Fruit* broad, very oblique, compressed, about  $\frac{3}{4}$  inch long. (B.Fl. v, 462.)

**Botanical Name.**—*Grevillea*, already explained (see Part I, p. 2); *striata*, Latin, channelled, fluted,—in botany, striate, in reference to the longitudinal markings of the leaves.

**Vernacular Names.**—“Beefwood” is a name of well-nigh universal application in the districts in which it is found. The appearance of the fresh timber resembles that of raw beef a good deal. I have known it to be called “Silvery Honeysuckle” by reason of its glaucous or silvery foliage when young.

**Aboriginal Names.**—“Turraie” of some Queensland aborigines. Mr. F. M. Bailey quotes Wedd as the authority for the name “Willer” at St. George, and Dr. Roth for the names “Ar-roo-in” at Princess Charlotte Bay and “Arrongg” on the Palmer River, all Queensland localities.

**Synonym.**—*G. lineata*, R.Br., *App. Sturt Exped.*, 24; Meissn. in D.C. *Prod.*, xiv, 385.

In describing *G. lineata*, Brown quotes Captain Sturt as saying that this plant "takes the place of the gum-tree in the creeks about lat. 29° 30' S." Brown says:—

It is difficult to distinguish this species, which, according to Captain Sturt, forms a tree about 20 feet in height, from *Grevillea striata*. I have endeavoured to do so in the above specific difference, contrasted with which the leaves of *G. striata* have always more than 10 striae, which are hardly twice the breadth of the pubescent interstices, and the cicatrices of whose leaves are longer than broad, and more or less acute, both above and below. (*Loc. cit.*, also "Miscellaneous Botanical Works of Robert Brown," Vol. i, p. 335.)

**Leaves.**—The long leaves are eaten by stock, including horses; but the foliage is rather sparse and woody, and it cannot be regarded as a very good fodder plant. (Peacock.)

Following is an analysis:—

Water ... ..	37.11
Ash ... ..	2.85
Fibre ... ..	26.58
Ether Extract (oil, &c.) ... ..	0.90
Albuminoids ... ..	5.62
Carbo-hydrates ... ..	26.94
Nutrient value ... ..	34½
Albuminoid ratio ... ..	1:5
Tannin (oak bark) ... ..	1.5

(F. B. Guthrie, in *Agric. Gazette, N.S.W.*, October, 1899.)

**Flowers.**—The long spikes of creamy, yellow flowers are very handsome. It often flowers in December.

**Timber.**—Its appearance has already been described. It is the best fencing timber in much of the country in which it grows. It is very durable, and it never rots, according to some authorities. It is better, however, in split, rather than in round posts.

Mr. R. J. Dalton, of Wanaaring, says of it:—

Very useful, as it stands well in the ground. Have used it for house-blocks, posts, furniture, strong flooring, well-slabs, picture-frames. It is not much good for bullock-yokes, although extensively used, as it is very liable to split. It should be very good for railway sleepers, as it lasts well in the ground. Have also seen it used for roofing shingles, as it is a fine splitting wood. No good for firewood.

The timber is used for gate-making, and also for panelling of various kinds.

Dr. Roth says the charcoal of this is employed to stop the hæmorrhage in certain spear-wounds. (*North Queensland Ethnography*, Bull. No. 5.)

**Exudations.**—The following is from a paper\* by me:—A sample from Whittabranah, Wilcannia, New South Wales, weighed several pounds, and was obtained in large pieces from two average trees without using a ladder. Out of reach there was about an equal quantity to be seen, and which was left on the trees; a large quantity was also found lying on the ground, partially decomposed. It was so hard on the trees that a hammer and chisel were necessary to remove it.

\* "Gums and a resin produced by Australian Proteaceæ."—*Trans. and Proc. Roy. Soc. S.A.*, xii, p. 56.



It is quite free from odour, and has a dark reddish colour. When pure it has a bright fracture, but much of it is mixed with woody matter in a fine state of division. The warmth of the hand is sufficient to cause the resin to adhere to it. It sticks to the teeth, but is without taste. It is reduced to powder with the utmost facility, forming a dull powder. It is rather opaque-looking.

In cold water the substance whitens slightly. If the water be boiled, the liquid becomes very turbid, reminding one of coffee with excess of milk and with abundant "grounds." No odour is developed.

Petroleum spirit extracts 5.2 per cent. of a hard, transparent, brownish resin.

The residue is acted upon by alcohol, which extracts 60.1 per cent. of a brownish resin.

This residue is then digested in water, which extracts 5.6 per cent. of a yellowish substance, consisting chiefly of arabin. The residue consists of 26.5 per cent. of a brownish substance, which swells enormously in water, and which consists of metarabin (14 per cent.), while the remainder is accidental impurity.

#### SUMMARY.

Resin soluble in petroleum spirit	...	...	...	...	5.2
"    "    alcohol	...	...	...	...	60.1
Soluble in water (arabin)	...	...	...	...	5.6
Metarabin	...	...	...	...	14.0
Accidental impurity	...	...	...	...	12.5
Moisture ...	...	...	...	...	1.7

The presence of metarabin in this exudation is remarkable, in view of the fact that pararabin is the main constituent of gums of this family. It contains no tannic acid.

The present is the first occasion in which a resin (or to speak more correctly, a substance consisting mainly of resin) has been recorded from any Protead, so far as the author is aware, and certainly from any Australian species.

The Western (Q.) blacks make use of the resin of *G. striata* to manufacture a kind of asphalt wherewith to cement on flints to the adzes and carvings. (Dr. T. L. Bancroft in a letter to me.)

Dr. Lauterer\* has also examined the resin from this tree.

Dr. Roth gives the following account of the collection and utilisation of this resin by North Queensland aborigines.

The cement is obtained from the roots of young trees only, that from the older ones not being removable. Convenient lengths, from 10 to 12 inches, having been cut away from the underground saplings, they are heated over a fire, and their outer sticky bark scraped off with a sharp-edged stone.

---

\* "The Gums and Resins exuded by Queensland plants chemically and technologically described." From pages 35 to 80 of F. M. Bailey's Botany Bulletin No. xiii (April, 1896), "Contributions to the Queensland Flora."

These little scraped-off chips are now tied up in a sheet of tea-tree bark, the bundle being next baked for some ten minutes or so, when it is opened and the sticky bits removed and pressed together with the fingers and hands to render them sufficiently intercoherent. The mass so formed is then ready to be pounded between two stones, which, as in the case of the *Erythrophloeum*, are at Cape Bedford, Cooktown, &c., greased with the *Calophyllum* nut. After the hammering, the mass is stuck on to any convenient stick, whereby it is held over a fire; it is again hammered and heated, and so on for some considerable time until the required consistency is obtained. The consensus of opinion among the natives is that it is the strongest and most durable of all their cements. I have seen it employed along the same areas as the *Erythrophloeum*; at Cooktown, however, it is getting very scarce now, all the trees in the close vicinity having been destroyed. (Middle) Palmer River, "Otwarla," Hinterland and coast of Princess Charlotte Bay, "Arú-in" Hinterland and coast of Princess Charlotte Bay, "Arau-ang," Cooktown, "Mari-mari," GUN, "Ol-da." At Cloncurry, along the Georgina, and on the Diamantina, a species of *Grevillea* is utilised as follows:—Pieces from the inside core of a dead tree are collected and roasted over a fire, when the melting blobs of gum are allowed to run out below on to a sheet of bark or into the sand; after cooling, these are collected, warmed up, and hammered together, and, while still pliable, mixed with charcoal. The Cloncurry name for this cement is "Tunggaro."

This specimen is a crudely manufactured cement consisting of a portion of a flattened finger-shaped mass. It is of a Vandyke-brown colour, and has a dull fracture. On heating, it readily melts, soon ignites, and burns with a very smoky flame, leaving a somewhat large amount of a ferruginous sandy clay residue (17.08 per cent.). A slight heat is sufficient to soften the mass, which can then be moulded into any form, but becomes hard on cooling; the heat of water at about 50 degrees C. is quite sufficient to make it soft enough for moulding, but on removal it soon becomes hard again. The greater portions of the resin are soluble in petroleum ether (boiling below 50 degrees C.), the dissolved resin being soft, and of a dark colour. It is but slightly acted upon by concentrated sulphuric acid. It is also readily soluble in ether, but is mostly precipitated by alcohol. Alcohol had little action upon the original mass. A considerable amount of the carbonaceous matter was present, together with the clay as an admixture, and was removed by ignition after removal of the resin (*H. G. Smith*). (Mr. Smith states, however, that the specimen of resin forwarded him by me does not agree with the specimens in the Technological Museum, Sydney).—(*North Queensland Ethnography Bull.* No. 7.)

**Size.**—This is a tree which attains a height of 30 or 40 feet or more. A trunk diameter of 2 feet is by no means uncommon.

**Habitat.**—The following localities are quoted in the *Flora Australiensis*:—

*N. Australia.*—Victoria River (*F. Mueller*); Islands of the Gulf of Carpentaria (*R. Brown*). (Robert Brown's words are "In Novæ Hollandiæ orâ septentrionali; Carpentaria: prope littora."—J.H.M.)

*Queensland.*—Wide Bay (*Bidwill*); Port Denison (*Fitzalan*); Kennedy district (*Daintree*); Flinders and Dawson Rivers (*Sutherland*); in the interior (*Mitchell*).

*New South Wales.*—Darling Desert (*Victorian Expedition*); Bogan River (*C. Stuart*).

*S. Australia.*—Cooper's Creek (*Howitt's Expedition*).

It is an interior species as far as New South Wales is concerned. We have it from such localities as Ivanhoe, *viâ* Hay, Nyngan and Coolabah, White Cliffs, Narrabri. It extends over enormous areas, but has been much cut down during the last twenty-five years for fodder and other purposes.





*C. J. McMaster, photo.*

BEEFWOOD (*Grevillea striata*. R.Br.), FORT BOURKE,  
NEAR BOURKE, N.S.W.



*R. W. Peacock, photo.*

BEEFWOOD, COOLABAH, N.S.W.





WESTERN BEEF-WOOD.  
(*Grevillea striata*, R.BR.)

M. FlossKlan. del.

## EXPLANATION OF PLATE 155.

- A. Branch with flowering spikes (Coolabah, N.S.W.).
- B. Unopened flower.
- C. Expanded flower, showing—
  - (a) Four-lobed corolla with stamens.
  - (b) Pistil.
- D. Corolla-lobe, with stamen.
- E. Part of corolla-lobe larger, showing stamen (sessile anther) on the concave laminae.
- F. Showing—
  - (a) Pedicel.
  - (b) Disc.
  - (c) Stipitate ovary.
  - (d) Stigma.
- G. Stigma.
- H. Follicles (Coolabah, N.S.W.).
- K. Seed, winged all round.
- L. Portion of leaf enlarged, showing 9 veins.

The specimen figured is the common New South Wales tree, but it is not typical *G. striata*; it is that form described by Brown as *G. lineata*.

## PHOTOGRAPHIC ILLUSTRATIONS.

- (a) "Beefwood," Fort Bourke, near Bourke, N.S.W., about 25 feet high -- (C. J. McMaster, photo.)
- (b) "Beefwood," Coolabah, N.S.W.—(R. W. Peacock, photo.)

No. 152.

## *Eucalyptus fruticetorum*, F.v.M.

### Blue Mallee.

(Family MYRTACEÆ).

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. fruticetorum*, F.v.M., Miq. in *Ned. Kruidk. Arch.* iv, 131 (1856).

The amplified description given by Mueller in *Fragm.* ii, 57, will be found at p. 40, Part xi, of my “Critical Revision of the genus *Eucalyptus*.” That work also contains the botanical history of the species, including a number of details which need not be repeated here.

The plant has been redescribed by Mr. R. T. Baker in the *Proceedings of the Linnean Society of New South Wales*, Vol. xxv, p. 692, as *E. polybractea*.

Following are his words :—

A glaucous Mallee, with quadrangular branchlets.

*Leaves* lanceolate (those on the early shoots lanceolate to oblanceolate), erect, rarely falcate, not oblique; narrow, under 6 lines broad, mostly 3 inches long, acuminate, often with a recurved point; midrib raised on the underside, giving the leaf a strong resemblance to that of an *Olea*, not shining; intramarginal vein removed from the edge, lateral veins oblique, spreading, finely marked, only occasionally distinctly pronounced; petiole about 3 lines long. Oil glands very numerous.

*Peduncles* axillary, short, 2–3 lines long, angled, with from 8–12 flowers.

*Buds* in the early stage of development angular, surrounded by numerous acuminate, glabrous, ribbed, whitish bracts, short, 1 to 1½ lines long, glaucous.

*Calyx* conical, tapering into an exceedingly short pedicel.

*Operculum* obtuse, or only very slightly acuminate, hemispherical.

*Ovary* flat-topped.

*Stamens* all fertile; anthers parallel, opening by longitudinal slits.

*Fruits* hemispherical to pear-shaped, 2 lines in diameter, glaucous; rim thin, slightly contracted; valves deeply set, not exserted.

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *fruticetorum*, the genitive plural of the Latin word *fruticetum*, a place where many shrubs grow, in reference to the way in which this species occurs as a dense growth of shrubs. The construction of the word is unusual in botanical names.

**Vernacular Name.**—“Blue Mallee” is a very good name, the bluish cast of the foliage being in well-marked contrast to those species with which it is usually associated.

**Synonym.**—*E. polybractea*, R. T. Baker.



**Leaves.**—This is little more than a shrub, and its timber is of no economic importance. But because of the richness of its leaves in oil (say, 1·35 per cent.), and of the fact that this oil is rich in Cineol (Eucalyptol), a constituent deemed, at present, to be of special importance as regards the therapeutic value of Eucalyptus oil, the Blue Mallee is in especial demand, and thus large areas of Mallee, looked upon only a few years ago as quite worthless, are now of considerable value.

Messrs. Baker and Smith (“Research on the Eucalypts”) give the following particulars in regard to the oil of this species:—

Species.	Whence Collected for Oil.	Specific Gravity at 15° C.	Specific Rotation [ $\alpha$ ] D.	Saponification Number.	Solubility in Alcohol.	Constituents found.
<i>polybractea</i>	Wyalong, N.S.W.	0·9143	- 2·13°	4·5	1½ vols 70 %	Eucalyptol, pinene, aromadendral

There is a short paper entitled “Oil of *Eucalyptus polybractea*,” by John C. Umney and C. T. Bennett, in the *Pharm. Journ.* of 4th February, 1905, p. 143, and a brief letter in the issue of the 11th February, 1905, p. 211, by E. M. Holmes, commenting on the paper.

**Timber.**—A Mallee, and not a large one, either. The only use to which the timber is applied is that the root-stocks are used for fuel, and excellent they are.

**Habitat.**—I give the few localities recorded in detail, as there are so few of them, and the Eucalypt, being commercially valuable, should be further searched for.

#### SOUTH AUSTRALIA.

Flinders Range, near Quorn (Max Koch).

Road from Gladstone to Beetaloo, Flinders Range. “The tree (scarcely more than a shrub) had the appearance of a ‘Whipstick Mallee’ or ‘Peppermint’” (J. M. Black).

#### VICTORIA.

Lower Avoca Scrub, Wedderburn; also Mildura (W. Percy Wilkinson) (both labelled *E. fruticetorum* by Mueller).

Wedderburn (J. Blackburne). This specimen is from trees used for oil-distilling, and is certainly intermediate between *E. fruticetorum* and *E. odorata*. Inglewood (J. Blackburne). With broad juvenile leaves. Another form intermediate between *E. fruticetorum* and *E. odorata*.

“Mallee,” Rushworth (A. W. Howitt, J. Blackburne); “Mallee,” St. Arnaud (A. W. Howitt).

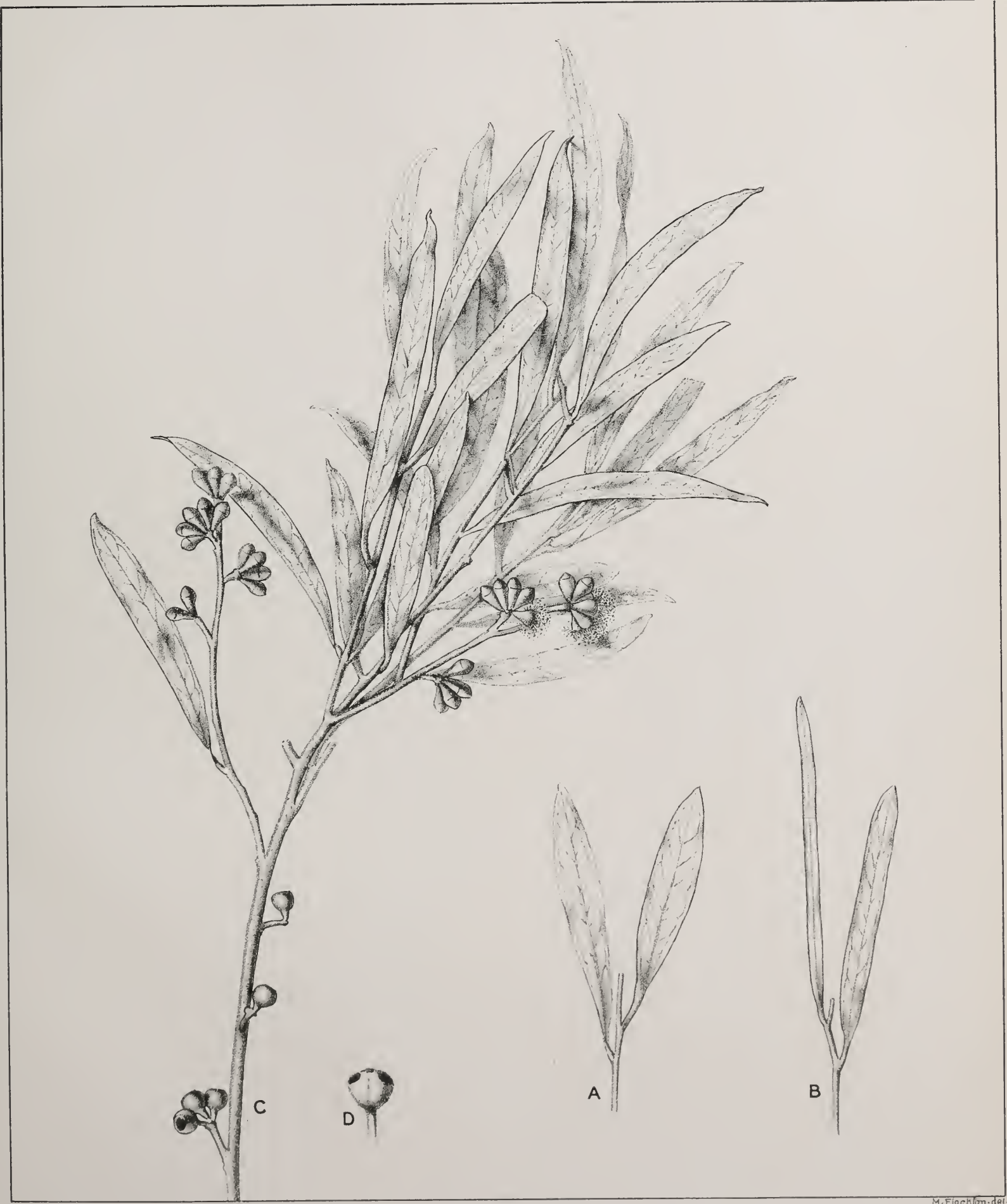
## NEW SOUTH WALES.

“Blue Mallee.” Locality for type of *E. polybractea* (R. T. Baker), West Wyalong. “Willowy, light-coloured stems” (W. S. Campbell). “Mallee,” Wyalong (Forester J. G. Postlethwaite, March, 1900). Bluish, glaucous cast, narrow leaves, very similar to *E. fruticetorum*, but with hemispherical fruits.

“Blue Mallee,” Wyalong (R. H. Cambage), September, 1900. Type of *E. polybractea*, R.T.B., kindly supplied by Mr. Baker. See R. H. Cambage in *Proc. Linn. Soc. N.S.W.*, xxvii, 192 (1902).

## EXPLANATION OF PLATE 156.

- A and B. Two pairs of juvenile leaves, both from Wyalong, N.S.W.
- C. Twig in the Melbourne Herbarium, labelled in Mueller's handwriting, “*Euc. fruticetorum*, F.v.M., Lower Avoca (Wedderburn) Scrub, W. Percy Wilkinson, 1892.” This is a Victorian locality.
- D. Anther.



BLUE MALLEE.

(*Eucalyptus fruticetorum*, F.v.M.)



No. 153.

*Acacia fimbriata*, A. Cunn.

The Fringed Wattle.

(Family LEGUMINOSÆ: MIMOSEÆ).

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)

**Botanical description.**—Species, *A. fimbriata*, A. Cunn. in G. Don, *Gen. Hist. of the Dichlamydeous Plants*, Vol. ii, 406.

The original description is as follows:—

Phyllodia straight, linear, obtuse, mucronulate, 1-nerved in the middle, and furnished with one gland on the upper margin at the base; branches angular, the angles fringed, as well as the phyllodia; heads of flowers racemose, axillary. Native of New South Wales. Phyllodia  $1\frac{1}{2}$  inch long and 2 lines broad.

*Fringed Acacia*. Shrub 4 to 6 feet.

It may be more fully described as follows:—

A small shrub or small tree (up to 25 feet), more or less covered with short hairs, particularly in young specimens or newer growth.

*Phyllodia* linear to linear-lanceolate, or occasionally slightly falcate, softly mucronate,  $1-1\frac{3}{4}$  inch long, 1-3 lines broad, or rarely more than 3 lines broad, but varies somewhat in width and length of phyllodes, with a nerve-like margin more or less minutely ciliate, but the cilia absent or few in old specimens. Central and marginal nerves rather prominent, the lateral nerves somewhat obscure. Gland usually present, but mostly small and situated near the base of the phyllodia.

*Racemes* axillary, variable in length, but usually slightly exceeding the phyllodia, with 8-10 flower heads. The individual flower-heads usually with from 9-12 flowers.

*Calyx* pubescent, with five rather deeply cleft, obtuse crenate lobes, with a small protuberance near the apex.

*Petals* smooth, glabrous, separating nearly to the base, the apex slightly reflexed.

*Pod* linear, flat,  $2-2\frac{3}{4}$  or rarely exceeding 3 inches long, and 3-5 lines broad.

*Seeds* arranged longitudinally along the centre of the pod, with a very slight fold in the funicle, which eventually is thickened into a club-shaped aril.

**The confusion between *A. fimbriata*, A. Cunn., *A. prominens*, A. Cunn., and *A. linifolia*, Willd.**

Such a confusion has been made, amongst botanists, for many years. *A. fimbriata*, A. Cunn., appears to me to be a very distinct species, but it has been looked upon as a broad-leaved form of *A. linifolia*, and often goes under the name of *A. linifolia*, var. *prominens*.

*A. prominens*, A. Cunn., is, as I shall show in Part XLIII of this work, a sufficiently distinct species, and there seems no adequate reason why *A. linifolia*, Willd., *A. fimbriata*, A. Cunn., and *A. prominens*, A. Cunn., should be confused with each other.

Bentham (*B.Fl.* ii, 371), under *A. linifolia*, says :—

“The broad-leaved forms of this species, with the margins less ciliated or not perceptibly so, connect it with the following—*A. prominens*”; and again under *A. prominens*, “This species (*prominens*, in which he includes *fimbriata*) may prove to be a broad-leaved variety of *A. linifolia*.”

I will try and clear the matter up, and incidentally, I pay a tribute to Allan Cunningham’s discrimination.

Following are copies of labels on a sheet of specimens in Herb. Kew :—

(a) “120. *Acacia prominens*, A. Cunn. (*A. fimbriata*, A.C.), *Bot. Mag.* t. 3502. Benth. in *Lond. Journ. Bot.*, i, 357.

Nepean River, Sept.,  $\frac{413}{1817}$ .

Brisbane River, Sept.,  $\frac{158}{1828}$ .

New South Wales. A. Cunningham.”

(b) “*Acacia fimbriata* phyllodiis anguste lanceolatis uninerviis mucronatis margine antico uniglanduloso, junioribus margine ciliato-fimbriatis, racemo elongato axillari duplo longioribus, ramulis angulatis villosis. In rocky courses in forest ground on the Brisbane River. Flowering in Sept., 1828. 158/1828.”

I will now deal with the references in the above labels :—

(1) *Bot. Mag.* t. 3502 gives a figure and description of *A. prominens*, A. Cunn., which I shall deal with in Part XLIII when I come to that species. At the end, Sir W. J. Hooker gives a full description (in Latin) of *A. fimbriata*, which he calls a “closely allied but very distinct species.”

(2) Bentham in *Lond. Journ. Bot.*, i, 357 (1842), does not take up *A. fimbriata*, A. Cunn., placing it under *A. prominens*, A. Cunn., as a synonym. He adds the note “Vix non var. latifolia *A. linifoliae*.” By that he means, I take it, that he considers *A. prominens* and *A. fimbriata* hardly the broad-leaved form or forms of *linifolia*.

Bentham thus suppressed *A. fimbriata* as far back as 1842. He continued this in *B.Fl.* ii, 371, while Mueller followed his example in his “Second Census.”

(3) Nepean River. This means that the specimen was Allan Cunningham’s No. 413, collected by him in September, 1817.

I have a drawing of this specimen made by Miss Smith, of Kew, with Colonel Prain’s permission, and also a fragment of the specimen itself. I then turned to Allan Cunningham’s MS. Journal, and find under folio 354, and date 7th September, 1817 :—

We left Springwood about 8 o’clock in order to cross the Nepean River at about 1 o’clock. In our road I gathered the following specimens. *Acacia*, allied to *A. suaveolens*, leaves linear and sulcated, capitulum globose in racemis, branches 3-angular.

Specimens identical with those collected by Cunningham still grow about the locality, *e.g.*, at Lapstone Hill. They are *A. fimbriata*, A. Cunn., as figured by me.

(4) Brisbane River. This is, of course, near the capital of modern Queensland. We know Cunningham's specimens, and where he collected them. The plant is common about Brisbane, and is not to be distinguished from the Nepean River specimens.

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *fimbriata*, Latin, fringed, in botany *fimbriate*, in reference to the hairs of the phyllodes.

**Vernacular Name.**—This Wattle in tree form is often known as "Sally," *i.e.*, in reference to its drooping character, reminding the old colonists of the Sally or Sallow (Willow) of Britain. We have, however, so many trees named "Sally" that I venture to recommend the name "Fringed Wattle," the meaning of which has been already explained.

**Aboriginal Name.**—I know of none.

**Synonyms.**—(a) *Acacia linifolia*, Willd., var. *prominens*. (b) *Acacia prominens*, A. Cunn. var. I cannot trace authorities for these names; but they have been supplied freely both by the late Baron von Mueller and myself, and the present note is given that the necessary corrections may be made in the herbaria of my correspondents.

**Leaves.**—Particularly note what I have said about the fringed or eye-lash appearance of the phyllodia.

**Bark.**—Dr. T. L. Bancroft, of Brisbane, was kind enough to send me bark of this tree from Enoggera, near that city, and furnished the following note:—

In gullies this species grows to the height of 20 feet or more, but on dry ground is only a whip stick; the same remarks also apply to *A. complanata*. Both these species grow on the edge of the scrub, and there thrive well. Height, 20 feet; diameter, 6 inches. [Memo.: The tree never attains this size within the Sydney district.] Stripped in May; analysed in July; and found to contain 11.13 per cent. of tannic acid and 28.15 per cent. of extract.

The bark analysed was poor, thin, and flaky externally. It is inclined to be fibrous, the thickness is under  $\frac{1}{8}$  inch, and altogether it is not a promising bark.

**Timber.**—I know of no value for this timber, except for fuel, and, except in northern localities, it never attains timber size.

**Size.**—The original description says this is a shrub of 4 to 6 feet, and so it is in the original locality from which it was collected. On the Northern Rivers of New South Wales it attains a height of over 20 feet and a stem-diameter of 9 inches.

**Habitat.**—This species, one of the most beautiful of all Wattles, is confined to New South Wales and Queensland, so far as we know at present. It is a denizen of the Coast districts and table-lands, but its range has by no means been fully defined up to the present. It attains its best development near watercourses, but it is by no means confined to such moist, good-soil localities.

I have it in the National Herbarium, Sydney, from the following localities :—

#### NEW SOUTH WALES.

Barber's Creek (H. J. Rumsey); Badgery's Crossing to Nowra (W. Forsyth and A. A. Hamilton), and these remain the most southerly records so far; Bullio, between Bowral and Wombeyan Caves (R. H. Cambage and J.H.M.).

St. Mary's (E. Bêche).

Shrub of 3–4 feet; patch of 1–2 acres. Junction of Nepean and Warragamba Rivers. (No. 1923. R. H. Cambage.)

Lapstone Hill, ascent of Blue Mountains from Nepean River (W. Forsyth). This is just about where Allan Cunningham found it.

But it is on the Northern Rivers, and to a less extent on the northern table-lands, that *A. fimbriata* commonly occurs.

Some localities are :—

Near Woodford, Lower Hunter (Jesse Gregson); South Woolgoolga on gravelly ridge (E. H. F. Swain); Tia Canon, Walcha district (J.H.M., W. Forsyth, E. Cheel); between 27 and 28 mile posts, Tingha to Guyra, No. 998 (R. H. Cambage); Cow Flat, 25 miles north-west of Deepwater, No. 12 (E. C. Andrews); Shrubs of 6–8 feet on rich alluvial soil, Emmaville (J. L. Boorman); Bolivia (E. Bêche, J. Vernon); "Sally Wattle," Unkya, Macleay River (No. 502, Forest Ranger G. R. Brown); "shrubby or arborescent," narrow phyllodes. Upper Copmanhurst (Rev. H. M. R. Rupp); Wallangarra (New South Wales—Queensland border) (J. L. Boorman and J.H.M.).

#### QUEENSLAND.

Collected originally by Cunningham on the Brisbane River. Enoggera, near Brisbane (F. M. Bailey); Toowong and other places near Brisbane. A tall bushy shrub, common (J.H.M.). It would be desirable to ascertain its range in the northern State.

I now proceed to make it clear what *Acacia linifolia*, Willd., really is, since it is the species which has been most commonly confused with *A. fimbriata*.



## The Flax-leaved Wattle.

**Botanical description.**—Species, *Acacia linifolia*, Willd., *Sp. Pl.* iv, 1051.

It has been described in the following words by Bentham:—

A tall shrub, glabrous or minutely pubescent, sometimes glaucous when young; branchlets angular.

*Phyllodia* linear or linear-lanceolate, narrowed at each end, 1 to  $1\frac{1}{2}$  inches long,  $1\frac{1}{2}$  to 2, rarely  $2\frac{1}{2}$  lines broad, rather thin, 1-nerved, slightly veined, the slender nerve-like margins and midrib often minutely ciliate, with a small gland above the base.

*Racemes* scarcely exceeding the phyllodia or shorter, comprising several small globular heads of about 8 to 12 flowers, mostly 5-merous.

*Calyx* short, broadly lobed.

*Petals* smooth, separating nearly to the base.

*Pod* linear, very flat, 2 to 4 inches long, 4 to 6 lines broad, and not contracted between the seeds; valves thinly coriaceous, with nerve-like margins.

*Seeds* longitudinal along the centre of the pod, the last fold of the funicle thickened into a club-shaped lateral aril, the other folds minute. (*B.Fl.* ii, 371.)

*A. linifolia* is never more than a spindly shrub.

The flowers of *A. linifolia* are loose, and six or nine or rarely more in the head. They are paler than those of *A. fimbriata*. The phyllodes vary a little in width.

**Habitat.**—The species appears to be confined to New South Wales, but range requires much inquiry yet.

It is very common in the Sydney district, and is represented by the following specimens in the National Herbarium, Sydney:—

Bargo, Picton district (J.H.M.). I would like specimens from further south.

Going west, it is common in the Blue Mountains, *e.g.*, Springwood (J. L. Boorman), Woodford (J.H.M.), Leura Falls (A. A. Hamilton), north of Wolgan Shale Mine, top of mountain (R. H. Cambage), which remains the most westerly locality recorded.

Going north, I have it also from Woodford, Lower Hunter (Jesse Gregson).

The western forms are close to the type; some of those from the coastal districts have phyllodes a little broader and coarser.

## EXPLANATION OF PLATE 157.

*A. fimbriata*, A. Cunn.

- A. Flowering twig drawn from a specimen collected by W. Forsyth at Lapstone Hill, whence Allan Cunningham obtained the type, and compared with a drawing of the type and a portion of the type, both from Kew.
- B. Flower-head.
- C. Individual bud.
- D. Flower. (The calyx in the mature flower is smooth.)
- E. Bract found at the base of each flower.
- F. Flower, opened out, showing—
- (a) Calyx.
  - (b) Corolla.
  - (c) Pistil (stamens removed).
- G. Portion of stem.
- H. Tip of phyllode, showing fimbriate margin. Compare τ.
- K. Pod.
- L. Seed.

*A. linifolia*, Willd.

- M. Tip of long flowering spray, taken from Fig. 16, Bonpland's "*Jardin Malmaison*." It is probably very near the type.
- N. Flower-head.
- O. Individual bud.
- P. Flower.
- Q. Bract found at the base of each flower.
- R. Flower, opened out, showing—
- (a) Calyx.
  - (b) Corolla.
  - (c) Pistil (stamens removed).
- S. Portion of stem.
- T. Tip of phyllode, with smooth margin. Compare η.
- U. Pod.
- V. Seed.

The details from specimens collected in the Port Jackson district.



FRINGED WATTLE.

(*Acacia fimbriata*, A. CUNN. A—L.)

(*A. linifolia*, WILLD., is also depicted, M—V.)

M. F. H. K. de



No. 154.

*Cinnamomum Oliveri*, Bailey.

## Oliver's Sassafras.

(Family LAURACEÆ).

**Botanical description.**—Genus, *Cinnamomum*, Burm.*Flowers* usually more or less unisexual.*Perianth-segments* 6, equal or nearly so.*Stamens* of the outer series 6, all perfect with introrse anthers, of the inner series 3 perfect, with extrorse anthers, alternating with 3 short staminodia; anthers 4-celled, or the inner ones rarely 2-celled; glands 6, at the base of the inner perfect stamens.*Ovary* not immersed.*Berry* seated on the somewhat enlarged truncate or 6-lobed perianth-tube, the segments wholly or partially deciduous. Trees or shrubs.*Leaves* opposite or often more or less alternate on the same tree, 3-nerved or rarely 5-nerved.*Flowers* in axillary panicles, more or less unisexual, the females usually rather larger and fewer in the panicle with the stamens slightly imperfect, the males smaller and more numerous with a sterile ovary.The numbers of parts of the perianth and of the stamens liable to occasional variation, especially in the females. (*B.Fl.* v, 303.)**Botanical description.**—Species, *C. Oliveri* (after Prof. D. Oliver), Bail. *Bot. Bull.* v, 25 (May, 1892).

"Sassafras."—A tall tree, glabrous, except the inflorescence, trunk erect, bark containing nodules, smoothish, rather thin and fragrant.

*Leaves* opposite or nearly so, lanceolate, attaining about 8 inches in length, and then scarcely over  $1\frac{1}{2}$  inch broad in the widest part, colour pale, the apex blunt or minutely emarginate, on petioles of about  $\frac{1}{2}$  inch which are flattened, the upper surface glossy, the under surface of lighter colour, midrib flattish, the primary lateral nerves very oblique, few, the basal pair faint, and very near the margin until lost in the reticulation about half-way up the leaf.*Inflorescence* terminal, or in the upper axils, in loose elongated panicles 6 to 8 inches long; flowers in twos or threes at the ends of the branchlets, the pedicels about a line long.*Flower* velvety, cream-coloured, perianth-tube slender, about  $2\frac{1}{2}$  lines long, the lobes equal, scarcely as long as the tube, marked by several longitudinal nerves.*Stamens* 9; the six outer ones about as long as the perianth-lobes, filaments flattened and hairy, the 3 inner ones short, with prominent glands upon the hairy filaments.*Staminodia* with sagittate heads and hairy filaments like the stamens.*Style* and ovary nearly or quite glabrous; stigma dilated.*Berry* about 4 lines long, oval, partially sunk in the slightly enlarged calyx-tube from which the lobes have fallen. (Bailey's *The Queensland Flora*, Part iv, p. 1308.)

Mr. R. T. Baker, in the paper quoted below, adds the following description of the fruit:—

Oval in shape, measuring about  $\frac{1}{2}$  inch long and under  $\frac{1}{4}$  inch broad, resting in the enlarged perianth tube, the segments deciduous. They are, however, very often deformed by gall insects or fungus. Some of the "galls" measure as much as 2 inches in diameter, and are coated for  $\frac{1}{8}$  inch or more with a microfungus, *Melampsora nesodaphnes*, B. & Br., which is highly fragrant, and has the appearance of a mealy powder of a canary-yellow colour. Under a one-eighth or one-tenth objective the hyphæ and spores are well brought out, the latter being oval or oblong in shape, with a thick cell-wall, and "delicately granulated." After a time the substance of the "gall" becomes quite woody, and when the fungus is removed the surface is shown to be very irregular.—(p. 276, *op. cit.*)

**Botanical Name.**—*Cinnamomum*, the Latin name for the Cinnamon tree, or cinnamon itself; *Oliveri*, in honour of Professor Daniel Oliver, F.R.S., formerly Keeper of the Kew Herbarium, who devoted much attention to Australian plants.

**Vernacular Name.**—"Sassafras" is a common name, but there are several of them, and this particular one is not confined to Queensland, so that the name "Queensland Sassafras" would not be specially appropriate. I therefore suggest the name "Oliver's Sassafras" for it.

**Aboriginal Name.**—I know of none.

**Bark.**—Following is a note by the late Dr. Joseph Bancroft on *Nesodaphne obtusifolia*, Benth. (the bark was, however, the product of *Cinnamomum Oliveri*), taken from "*A Contribution to Pharmacy from Queensland*," p. 11 (1886), published for the Colonial and Indian Exhibition.

The bark has a strong aromatic odour, and pleasant astringent taste. It is frequently used by bushmen to improve the flavour of their tea, a little bit of bark being infused therewith. The active principles are a volatile oil with an odour like the North American sassafras, and a peculiar tannin. The bark has been used by me as a convenient aromatic astringent in diarrhœa and dysentery, having the properties of cinnamon and catechu in combination. It is most conveniently used in the form of a tincture, made with 2 oz. of the bruised bark in a pint of rectified spirit.

One ton of the dry bark yields 770 oz. of essential oil (Staiger), = 2·15 per cent. The specific gravity is ·978 at 72° F. These figures are criticised by Lauterer.

Reference may also be given to Dr. J. Lauterer's paper on "The Sassafras Trees of Queensland and the Chemistry of *Cinnamomum Oliveri*" (*Proc. Roy. Soc. Qld.*, xi, 20), where he not only clears up the confusion which had gathered around the name of the bark examined by Dr. Joseph Bancroft, but he also adds some original chemical observations of his own in regard to the bark and its constituent oil and camphor.

Now see a paper by R. T. Baker, *Proc. Linn. Soc. N.S.W.* (2), xii, 275, "On the Cinnamomums of New South Wales, with a special research on the oil of *C. Oliveri*, Bail." This paper contains a figure of the species, and also a description of the bark, the oil distilled from it, and a full chemical examination of the oil. This is reproduced here.

It is dark red in colour, brittle, about  $\frac{1}{2}$  inch thick, and aromatic—particularly so when fractured. It was ground in a bark mill, and without any salt water maceration, placed in trays that permitted a

free play of steam both above and below; the layer of bark was about 2 inches, a deeper layer not being so satisfactory in its yield of oil. It was then placed in the still and subjected to a steam distillation of 30 lb. pressure in the boiler and 5 lb. in the still. The distilled water was white and milky in appearance, the oil not separating freely, its specific gravity, of course, accounting for this. The first portion of the oil that came over floated on the top of the water, the second sinking to the bottom; the whole of the water being permeated with suspended globules of oil. Our receivers were much too shallow for this specific purpose, but if a deep receiver were used and fitted with a proper arrangement of taps, a return of over 1 per cent. could be easily obtained.

The first distillation (7th and 8th July, 1897) was made on 84 lb. of ground bark, yielding  $11\frac{1}{2}$  oz. of oil, or .85 per cent.

Second distillation (13th July, 1897) weight of bark 84 lb., yielding  $13\frac{1}{2}$  oz. of oil, or 1.005 per cent.

Third distillation (15th July, 1897) weight of bark 120 lb., yielding  $14\frac{1}{2}$  oz. of oil, or .75 per cent.

Total quantity of bark 288 lb., giving a yield of  $39\frac{1}{2}$  oz. of oil, or .86 per cent.

As the oil contained impurities such as dirt and particles of bark, &c., it was strained first through a piece of calico and then through a filter paper, by which means I obtained a clear, light golden-coloured oil with a tinge of green, and possessing a delicious odour.

The following chemical research on this oil was next undertaken by Mr. Henry G. Smith, F.C.S., Chemist of this Museum. The oil obtained in the three distillations gave the following results, severally and when mixed together:—

*Specific gravity.*—

The oil of the first distillation	=	1.0011	@	16° C.
„ second „	=	1.0012	„	„
„ third „	=	1.0010	„	„

The whole oil obtained when mixed together had a specific gravity of 1.00105 @ 16° C.

These determinations were made with a delicate pycnometer holding about 12 grams.

*Specific rotation.*—This was taken in a tube 200 mm. long; using the sodium flame, the oils were found to be dextro-rotatory as follows:—

First oil—angle observed	+	22.3	therefore	[a] <sub>D</sub>	+ 11.137.
Second oil— „	+	22.2	„	[a] <sub>D</sub>	+ 11.080.
Third oil— „	+	22.0	„	[a] <sub>D</sub>	+ 11.000.

These were then mixed, when the rotation was + 22.1, or a specific rotation [a]<sub>D</sub> + 11.038. All taken at 16° C.

*Redistillation.*—100 c.c. of the oil were distilled at the ordinary atmospheric pressure with the following results. Only a few drops had been obtained at 185° C., the mercury then rapidly rose to 204° C.; between this and 213° C., 5 per cent. had been obtained:—

		Below 213° C.*	...	...	...	...	5 per cent.
First fraction collected	{	Between 213	and 217.2° C.	...	...	=	7 „
		„ 217.2	„ 221.4° C.	...	...	=	8 „
		„ 221.4	„ 224.6° C.	...	...	=	7 „
		„ 224.6	„ 226.7° C.	...	...	=	7 „
		„ 226.7	„ 229.8° C.	...	...	=	7 „
		„ 229.8	„ 235° C.	...	...	=	16 „
Second fraction	...	{	„ 235	„ 240.3° C.	...	...	= 17 „
Third fraction	...	{	„ 240.3	„ 245.6° C.	...	...	= 11 „
			„ 245.6	„ 253° C.	...	...	= 10 „
			Residue boiling above 253° C.	...	...	=	5 „

Evidently better fractions could be obtained by changing at 230° C., as 54 per cent. distils between that temperature and 253° C.

The fractions obtained as above gave the following results:—First fraction, between 213° C. and 235° C., had a specific gravity of .995 @ 16° C., being thus lighter than water. It had a specific rotation of [a]<sub>D</sub> + 15.86, or half as much again as that obtained for the whole oil.

\* These temperatures have been corrected to the nearest decimal.

Second fraction, between 235 and 245.6° C., had a specific gravity of 1.0166 @ 16° C., and the specific rotation was  $[\alpha]_D + 5.066$ , or less than half that obtained for the whole oil. It is, perhaps, remarkable that the fractions should have been thus separated, as the mean of the two rotations of these fractions is nearly that of the whole oil.

Third fraction, between 245.6 and 253° C, had a specific gravity of 1.004 @ 17° C. The material was not sufficient to enable the rotation to be taken.

The original oil is yellowish, inclining to brownish, with a tinge of green. The first two fractions are yellowish to brownish, while the third fraction is distinctly green.

When the original oil was subjected to the action of cold, a stearoptene crystallised out in small quantity, the temperature being 12 degrees below zero. It was not possible to separate it, as it disappeared very quickly on removing from the freezing mixture, evidently melting below zero.

A portion of the oil was agitated with a solution of potash, the aqueous solution separated, and acidified with dilute sulphuric acid; no oil separated, but the solution was turbid; this was agitated with ether, the ether separated and evaporated, when a minute quantity of an oil was obtained, which became quickly brown, and which had a very strong odour of cloves. When dissolved in alcohol, ferric chloride gave the blue reaction. It is to be supposed, therefore, that the phenol is *Eugenol*, and that it is only present in traces.

A portion of the oil was mixed with a concentrated solution of acid sulphite of soda, and well agitated. A small quantity of a crystalline compound was obtained; this was separated entirely from adhering oil and acidified with dilute sulphuric acid in a graduated tube. The separated oil when measured equalled 1½ per cent. of the original oil. It was of a dark brown colour and had the odour of cinnamon most markedly. It constitutes the material that gives the slight brownish tinge to the original oil, because when it was removed the oil was yellowish to greenish. The oil contains, therefore, less than 2 per cent. of *cinnamic aldehyde*.

None of the terpenes of low boiling point are present, nor could phellandrene be detected. A distinct reaction for cineol was obtained with iodol.

This oil, therefore, cannot be classed with the cinnamon oil of commerce nor with cassia oil, as it is deficient in cinnamic aldehyde, although the principal constituents of those oils (cinnamic aldehyde and eugenol) were present.

Further researches are in progress to locate the principal constituent of this oil.

**Timber.**—Pale coloured, close in the grain, firm, easy to work, and suitable for joiners' work. (*Cat. Qld. Timbers, Col. and Ind. Exh.*, 1886.)

Pale brown, soft, smells much like Sassafras; a very common timber in thick scrubs (J. L. Boorman).

It is pale coloured, with little figure, fissile, and rather light in weight. It is a promising timber of the Bolly Gum class.

Mr. R. T. Baker, *op. cit.* p. 277, describes the timber in the following words:—

The timber, when freshly cut and dressed, very much resembles that of "She Beech" or "Bolly Gum" (*Tetranthera reticulata*) or "Sycamore" (*Panax elegans*); and I do not doubt but that much of the timber passing under these names is really obtained from *Cinnamomum*. It is greyish in colour, with frequently a black stain running through it, as though decaying. It has a straight grain, is light in weight, soft, and easy-working. It is very susceptible to the attacks of borers, even to the very heart, and is therefore of no economic value.

**Size.**—Tall trees of 60–80 feet; girth, 4–6 feet (W. Dunn and J. L. Boorman).

**Habitat.**—Brushes of North Coast Railway, Queensland. The type came from Maroochie, Q., "where it is known as the Sassafras tree."







M. Flockton del.

OLIVER'S SASSAFRAS.  
(*Cinnamomum Oliveri*, BAILEY.)

It, however, is by no means confined to Queensland, being probably more widely diffused in New South Wales. Mr. Baker gives the following localities from New South Wales:—Mullumbimby, Brunswick River (W. Baeuerlen), Port Macquarie (Forester G. R. Brown), and probably extending along the whole coast district to the Illawarra (Hedley). This is quite possible, but I would like to see specimens from intermediate localities.

It is a brush tree, and following are localities represented in the National Herbarium, Sydney, not referred to above:—Tweed River (R. A. Campbell); Acacia Creek, Macpherson Range (W. Dunn), locally called "Sycamore"; Lismore (W. Baeuerlen); Coff's Harbour to Grafton (J.H.M. and J. L. Boorman).

#### EXPLANATION OF PLATE 158.

- A. Flowering twig.
- B. Flower.
- C. Flower opened out, showing—
  - (a) Perianth segments.
  - (b) Stamens, outer row, introrse anthers.
  - (c) „ inner row, extrorse anthers.
  - (d) Staminodia,\* outer row.
  - (e) „ inner row.
  - (f) Pistil.
- D. Perianth segment, with stamen.
- E. Stamen, front view, with staminodia at base.
- F. „ back view, „ „
- G. Pistil, half immersed in the perianth tube.
- H. Vertical section of pistil, showing the pendulous ovule.
- K. and L. Young fruits.
- M. Mature fruit.

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\* See note at p. 56, Part XXXIV of this work.

## Notes on Australian (particularly New South Wales) Timbers for Carriage Building.

I reproduce a short paper I contributed to the *Agricultural Gazette* for August, 1894 :—

There is undoubtedly an unwise prejudice in the colonies against colonial timbers for carriage-building, and this feeling is assented to by people who should know better, and who ought to look into the merits of the timbers for themselves. Instead of a man who orders a vehicle refusing to listen to his coach-builder who suggests colonial timber, he should allow a conscientious and experienced coach-builder to exercise his discretion to some extent. The tradesman's reputation is at stake, and he will not trifle with it. It is not difficult to see how such a state of things exists. Certain timbers in older countries are approved for certain uses ; it is easy to continue their use in a new country without troubling to ascertain whether a cheap, efficient, or even superior substitute is to hand. Some of our timbers have passed the experimental stage for carriage-building, and a user may run no risk with them.

At the present time colonial timbers are less used in carriage-building than they formerly were, owing to the excellent supply of English and American timbers in this market. Notwithstanding this competition, some of our colonial timbers are worthy of a more prominent position in the coach-building trade than they receive. I am not so foolish as to advocate their use for sentimental reasons, but I do not see why a timber should suffer because it is colonial. Let it be used or not on its merits.

I suppose a timber could be put in no more trying situation than in one part or other of a carriage. In no trade is it more absolutely necessary that timber should be thoroughly seasoned than in that of carriage-building. Let us inculcate this lesson in regard to colonial timbers. Let our watchword in regard to them be, Season ! Shun unseasoned timber as you would damp clothing. Nature has been so prodigal to the people of New South Wales in regard to timbers that they sometimes lose sight of the fact that timber is timber after all, and that it is not ready for immediate use, like a crop of apples. Timber, each timber, has its season for cutting, just as wheat has. Don't cut it all the year round, and then grumble at it if it warps and splits. Don't use it almost as soon as it can be converted into sawn stuff, and then grumble at it if it twists or decays.

Season, season, season timber, or, in other words, give it fair play. I practise what I preach. I use large quantities of colonial timbers ; in fact, I use them wherever I can, but never until they are well seasoned.

I have jotted down a few notes in regard to colonial timbers for carriage-building, more as suggestions than anything else. I am collecting data as to the various colonial timbers used and deemed to be suitable to special trades ; and I trust these few notes will provoke discussion, and cause additional information *re* carriage-building timbers to be sent in. We are going to be more aggressive. We shall not be satisfied with the consumption of our native timbers by our own people, but we desire to foster a trade in them with other countries.

CEDAR (*Cedrela australis*, F.v.M. (*C. Toona*, Roxb.)—see Part III of this work).

This is the first and foremost amongst colonial timbers for carriage-building. Some grades of this, with clear, straight grain, dense and tough, make excellent framing for many of the parts of a carriage. In fact, I have been informed that Sydney cabs of excellent quality have been built of cedar alone, except the wheels and shafts. The features that recommend it for the special use of the carriage-builder are that it is light, and easily worked. It bends well for panels when seasoned. If a log be cut through the centre, then quartered, and flitches cut from each of these quarters, the result will be that panels even a quarter of an inch thick will not split at the ends more than an inch or so,—an important matter in an expensive and good timber. Mr. Samuel Lownds informs me that he examined some samples which had been exposed to the sun and rain, and also to the drip of water from a galvanized-iron roof for a period of three and a half years. The outer surface was almost unrecognisable, but the ends of the boards were neither split nor shaken. A board was planed up, and it had not deteriorated in the slightest, the colour and grain remaining perfect. Comparing cedar with the best English ash, the former timber remains sound under treatment which would cause the latter to be rotten. Our Sydney timber-merchants might be reminded that cedar which is left floating in the harbour deteriorates for the purpose of the carriage-builder. The salt penetrates the timber, and in best grade work the painting and varnishing suffers accordingly.

ROSEWOOD (*Dysoxylon Fraserianum*, Benth.—see Parts XXIII and XXV of this work), RED BEAN (*Dysoxylon Muelleri*, Benth.—see Part XXVII of this work), and ONION WOOD (*Owenia cepiodora*, F.v.M.—see Part XXXI of this work).

Are timbers of the cedar class, for which they can often be substituted. Rosewood can be supplied in the greatest abundance, and the other two in lesser quantities. All three are really valuable timbers.

BLACKWOOD (*Acacia melanoxylon*, R.Br.—see Part XV of this work).

This is a most useful timber for coachbuilders, in the bent-timber branch. It bends well, and with proper treatment from the felling and sawing of the lumber, it substitutes perfectly for the bent timber in, say, an Austrian chair, and would look as well, and feel as light. For narrow boards it is used in the coachbuilding trade in Sydney in place of American walnut, and it is taken for that timber when polished. It is, in Sydney, only one-third the price of American walnut, which is an inducement for people to use it. It would last indefinitely in dry situations. It is really valuable for panelling, and perhaps framing.

COACHWOOD (*Ceratopetalum apetalum*, Don.—see Part VI of this work).

This is a useful timber to the coachbuilder for placing in clean, dry situations. Under such circumstances, it is equal to English ash. Its weakness is its liability to rot when left in damp or dirty places near the bottoms of carriages, which are neglected and not kept clean. For very many years this timber has been in request for coachbuilding. An eminent coachbuilder informed me that "it is the grandest Australian timber for coachbuilding." It is undoubtedly excellent for bodies, and a good all-round timber.

WHITE CHERRY OR COACHWOOD (*Schizomeria ovata*, Don).

This is a closely allied and very similar timber to ordinary coachwood (*Ceratopetalum*), for which it is sometimes substituted. It is an inferior substitute, but a good timber, nevertheless.

PLUM WOOD OR ACACIA (*Eucryphia Moorei*, F.v.M.).

The name Acacia is misleading, as it is not an Acacia at all. It is a nice timber, with close, tough grain, and cuts well. It is capable of high finish in painting. It is a good all-round timber for body-making, if it gets fair treatment as regards being kept clean. I am assured that it stands the weather, wet and dry, very well.

In the Braidwood district this is rather extensively used, and much liked by coachbuilders for the framework and bodies of buggies, spring carts, &c. It is also used for shafts and poles, being considered elastic enough for that purpose. It has also been tried for felloes, but has been found not to answer for that purpose. It does not yet appear to have been tried for spokes and naves.

COLONIAL BEECH (*Gmelina Leichhardtii*, F.v.M.—see Part IX of this work).

This is a very useful timber for panels and thin boards. It is pretty durable, but rather soft; but its softness is, in some instances, an advantage. Where extreme heat or moisture has to be considered, as in bakers' carts, beech will be found to withstand such influences better than most timbers. It paints and polishes well, is very easily worked, and does not readily split.

BROWN OR BULLY BEECH (*Tetranthera (Litsaea) reticulata*).

Has a good deal in common with colonial beech, but has the advantage that when cut into short lengths it will stand nailing or screwing when many other timbers will go into splinters. It is not a strong timber.

COLONIAL PINE (*Araucaria Cunninghamii*, Ait.—see Part XXXV of this work).

Is not fit for first-class work. It is used in wheelwrights' work on account of its cheapness.

The quality, durability, and reliability of colonial hardwoods (chiefly species of *Eucalyptus*) is well known. For cart and wheelwright's work there is no timber to approach them, though exception is taken to their weight. Put in such places as mentioned, no foreign timbers can approach them, viz.:—Ironbark and box for the naves of wheels and very heavy dray-shafts; ironbark for spokes. Blue gum (*Eucalyptus saligna*, Sm., see Part IV of this work) is one of the best timbers for wheelwrights' body work; it is tough, not bad to work, and always gives two good edges for paint. For the felloes of wheels it is the best timber we have; the iron tyres seem to grip and adhere to them better than any other timber.

Grey gum (*Eucalyptus punctata*—see Part X of this work) can be efficiently used as a substitute for ironbark, both as regards strength and durability.

SPOTTED GUM (*Eucalyptus maculata*, Hook.—see Part VII of this work).

Is strong and tough, and a useful timber for the coachbuilder. It is chiefly used for naves, and cart and buggy shafts.

MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.—see Part XXXIV of this work).

The excellence of this timber for general wheelwrights' work is everywhere admitted, and its quality on the whole appears to be less variable than that of the timber of most Eucalypts. It is recommended for shafts, swingle-trees of buggies, &c., and for miscellaneous purposes in carriage-building.

MOUNTAIN GUM OF N.S.W. OR SPOTTED GUM OF VICTORIA (*Eucalyptus goniocalyx*, F.v.M.—see Part V of this work).

Selected timber of this species, grown on dry stony ranges, is valued by wheelwrights, particularly for spokes.

APPLE TREES (*Angophora*).

Selected pieces, free from gum-veins, used for naves, and occasionally spokes, of wheels.

BRUSH BOX (*Tristania conferta*, R.Br.—see Part V of this work).

A tough and durable timber, extensively used in the North Coast districts for wheelwrights' work. All the timbers above mentioned could be supplied in quantity, most of them in practically unlimited quantity. The list does not profess to be complete; it has been compiled at rather short notice.

WILGA (*Geijera parviflora*, Lindl.).

Is used to some extent for the naves of wheels in the interior. Of no commercial importance.

SPOTTED OR LEOPARD TREE (*Flindersia maculosa*, F.v.M.—see Part X of this work).

Unlike many other timbers in the arid western districts of New South Wales, this timber is very elastic, and is, therefore, locally used for the poles and shafts of drays, buggies, &c. Of no commercial importance.

I also reproduce (by permission) a paper on "Some Coach-building Timbers," by Mr. R. T. Baker, Curator and Government Economic Botanist, Technological Museum, Sydney, in the *Australasian Coachbuilder and Wheelwright* for 15th June and 15th July, 1908.

#### INTRODUCTION.

The subject matter of papers read in the past on New South Wales timbers has generally covered a rather wide range of utilitarian properties, but in this instance there is considerable restriction, for when dealing with a single branch of industry such as coachbuilding, only comparatively few timbers supply the desiderata. Therefore, this paper does not permit much amplification of data. . . . .

#### CARRIAGE TIMBERS USED IN AUSTRALIA.

The timbers used in coachbuilding in this State, more especially in Sydney and neighbourhood, may be divided into two classes, Australian and foreign :—

##### (a) Australian—

Cedar ( <i>Cedrela Toona</i> , Roxb.).	Ironbark ( <i>E. paniculata</i> , Sm.).
Blackwood ( <i>Acacia melanoxylon</i> , R.Br.).	Ironbark ( <i>E. siderophloia</i> , Benth.).
Myall ( <i>Acacia pendula</i> , A. Cunn.).	Mahogany ( <i>E. resinifera</i> , Sm.).
Hickory ( <i>Acacia spp.</i> ).	Red Gum ( <i>E. tereticornis</i> , Sm.).
Yarran ( <i>Acacia homalophylla</i> , A. Cunn.).	Murray Red Gum ( <i>E. rostrata</i> , Schl.).
Gidgea ( <i>Acacia Cambagei</i> , R.T.B.).	Spotted Gum ( <i>E. maculata</i> , Heck.).
Teak ( <i>Flindersia australis</i> , R.Br.).	Sydney Blue Gum ( <i>E. saligna</i> , Sm.).
Blackbutt ( <i>Eucalyptus pilularis</i> , Sm.).	Tallow-wood ( <i>E. microcorys</i> , F.v.M.).
Flooded Gum ( <i>E. saligna</i> , var. <i>pallidivalvis</i> , R.T.B.)	Silky Oak ( <i>Orites excelsa</i> , R.Br.).
Ironbark ( <i>E. crebra</i> , F.v.M.).	Silky Oak ( <i>Grevillea robusta</i> , A. Cunn.).

## (b) Foreign—

American Hickory (*Carya tomentosa*).  
 American Ash (*Fraxinus americana*).

Indian Teak (*Tectona grandis*).

The woods mentioned in Division (a) by no means exhaust the number of New South Wales timbers suitable for carriage work, and from recent experiments and tests made by this Museum and local firms, the following were found to be excellent for coachbuilding, and are now for the first time recommended to the trade:—

## Ashes (Mountain)—

*E. delegatensis*, R.T.B.  
*E. fraxinoides*, H.D. et J.H.M.  
*E. oreades*, R.T.B.  
*E. Sieberiana*, F.v.M.

Blue Fig (*Elæocarpus grandis*, F.v.M.).

Coachwood (*Ceratopetalum apetalum*, Don.).

Giant Gum (*Eucalyptus regnans*, F.v.M.).

Grey Gum (*E. propinqua*, H.D. et J.H.M.).

Myrtle (*Fagus Cunninghamiana*).

Negro Head Beech (*Fagus Moorei*, F.v.M.).

Slaty Gum (*Eucalyptus Dawsoni*, R.T.B.).

## Stringybarks—

*E. carnea*, R.T.B.  
*E. eugenioides*, Sieb.  
*E. lewopinea*, R.T.B.

## White Mahoganies—

*E. acmenoides*, Schau.  
*E. umbra*, R.T.B.

Before proceeding to describe these woods in detail, it is perhaps as well to take a general view of our timbers from a commercial standpoint.

When the first settlers arrived here the whole face, with the exception of the plains, was covered with an almost impenetrable forest.

Settlement naturally brought with it the clearing of the land in order to provide the necessary agricultural and pastoral land, and so, however much the destruction of our forests is to be deplored, still in a measure it was inevitable.

What one complains of is that at the beginning certain lands were not set apart for all time for forestry purposes in order to provide for a rainy day in our timber supply.

In view of the enormous amount exported, it may perhaps be not far wrong to say that the rainy day, if not arrived, is within almost measurable distance in many parts of the State, and supplies must be sought for in foreign lands.

It is not, however, a forlorn hope, for if the matter is taken up at once and handled in a scientific way, much might be done to meet the supply in the near, as well as the far future.

## LOCAL AND BOTANICAL NAMES.

Much botanical study has been devoted to the systematic arrangement of our forest trees, and little remains to be done in this direction. This knowledge may not appear of much importance to the average workman, but its value to the members of so ancient a guild as the coachbuilders cannot be questioned. For only to give one illustration: when the trade decides that a particular timber, say a special Mountain Ash like *Eucalyptus delegatensis*, R.T.B., is excellent for coachbuilding, and should be propagated; then it is the work of the botanist to see that none other than this particular species be cultivated, and not other species going under the same common name of Mountain Ash.

Again, it is the botanist who is able to untangle the knot of local nomenclature, for a wood is often variously designated in the same or in different districts; and again, several different kinds are frequently found under an identical name. For example, the term "Blue Gum" is applied to at least half a dozen distinct species of *Eucalyptus* in various parts of the State. The inverse also holds true, for one species of *Eucalyptus* will be known by several common names, according to the district where found.

This multiplicity of names for the same timber naturally results in confusion, and must lead to trouble and annoyance where a coachbuilder, say, by ordering a timber under a common name, receives quite a different wood to that wanted. It is very pleasing to note how quickly the bushmen pick up these names, and "use no other." The Convention will therefore make a distinct step forward if in future it will put an embargo on common names and ask the trade to use only species names.

This will, I am sure, appeal to all when I state that I am to-day going to strongly recommend to the trade some new species of Ash. Now, there are several timbers going under this name, but it is only by using the specific names that the right sorts can be procured.

This can be easily overcome by the trade using specific names for their timber, and such are not difficult to acquire, as has been proved by the Eucalyptus oil industry. For when this Museum took this matter up, the utmost confusion existed in the matter of naming, owing to using common names. To-day almost every distiller of eucalyptus oil uses species names for his oil, and so places it on the world's market. And now the English and German manufacturers place orders here for oil of *E. polybractea*, *E. Macarthuri*, *E. Smithii*, &c., &c., and will have nothing whatever to do with such terms as "Blue Mallee," "Paddy River Box," "Gully Ash"—terms previously used by settlers for these gum trees.

Again, by using common names it makes it very easy for the unscrupulous dealer to substitute a poor quality of timber for a better one.

## II.—IDENTIFICATION OF TIMBERS.

The imported timbers are so few that not much time is required to obtain a knowledge of them, but in the matter of Australian timbers the case is quite different, for often timbers of distinct species are so similar that the expert botanist is often at his wits' end to differentiate them.

After twenty years of experience with our timbers I doubt if a quick and sure method of identifying our timbers is possible.

Microscopical sections assist very little, if any, in this matter, and I have come to the conclusion that there is no royal road, and that a knowledge of our timbers can only be acquired by having a collection of correctly named samples for reference. Such a collection I shall be pleased to present to any member of the Congress upon application to this Museum.

In the list of timbers given below, and which are found in commercial quantities and are recommended for carriage-building, a brief guide and description is given that may be used in identifying these timbers when found on the market.

## III.—SEASONING.

The coachbuilder having acquired the correct timber for his purpose, the next most important matter is to season it. To buy it seasoned seems almost impossible so far as my knowledge goes, and concerning this important feature of the subject there yet remains much to be done in regard to a knowledge of the seasoning characteristics of our Australian timbers. There seems, however, to be a consensus of opinion that Australian timbers season badly, but, like most other *voces populorum*, this idea is erroneous. I make bold to say that it is not correct to assert that all the good seasoning timbers can only come from the other half of the world, and no better example can be given than that of English Oak. Instances are recorded where English Oak after being in a building for four hundred years, has been taken out, and although apparently as good as the day it was put in, has been found to shrink after being planed and dressed.

Australian timbers, if used in the green state—and that is the condition I suppose in which 90 per cent. of the local timber is used—will, like all others under similar circumstances, behave in a similar way.

I remember as a boy seeing extensive stacks of timber from all parts of the world, roofed over only, in the different dockyards in England, that were seasoning before being placed in the vessels of the British Navy. These baulks were stacked similar to bricks in a kiln, so that air could circulate all round, but yet were kept dry by the roof. The date of storing was placed on each log, which would remain in the shed for years and not used till thoroughly dry.

Can anyone wonder, then, that the wooden walls of Old England lasted so long, and could stand any amount of pounding from the guns of their foes?

Some of the first cargoes to leave Sydney after the landing of Governor Phillip consisted largely of our timbers. These, I am prepared to say, were not utilised before being thoroughly seasoned, and in this connection I exhibit a specimen of Red Gum (*Eucalyptus tereticornis*, Sm.), taken from the battleship "Nelson"—it is thoroughly seasoned. Comment is needless.



It may not be out of place to mention that there is a specimen in this Museum of Mahogany (*Eucalyptus resinifera*, Sm.) recovered from the wreck of the "Boyd," which ship foundered in 1809 at New Zealand, when carrying timber from Sydney to England.

No timber could possibly be in a better state of preservation after immersion for so long a period in water than this is, and no better example could be given of the durability of our hardwood.

But coming back to seasoning. Timber merchants say they cannot wait for the timber to season, and to store millions, or even thousands, of feet would represent a large percentage of money lying idle. Then I say it behoves the manufacturer—in our case the coachbuilders—to do our own seasoning, the methods for which a man must in a measure be a law unto himself, as in this extensive Continent there are so many varying climatic conditions, for what would hold good in one place may not in another.

I have heard some speak of seasoning in the log, another to cut up, but this method I entirely condemn. Very few timbers will season if the sapwood and bark are left in, and it is always as well to get rid of the heart wood if possible.

Perhaps the best method of cutting a log is to cut it in two fitches clear of the heart, cut the heart out of the middle fitch, leaving thus two pieces, and lastly afterwards cut off the remaining lateral pieces into fitches as desired. Next remove the sapwood from the sides, and then stack for seasoning in such a manner that the surfaces do not touch each other. In a dry climate such as obtains in many parts of New South Wales, old world methods are not entirely recommended, as a too free current of air would cause drying to take place too quickly, and serious shakes and cracks would occur, and therefore the open drying sheds referred to above would not, I think, answer in Australia.

A slow, steady drying seems to be the desideratum—a matter that must be left to individual experiment—and one that does not appear to present any great difficulties. One coachbuilder not a hundred miles from Sydney has his own seasoning process, and I have been informed that no timber is built into a coach or waggon unless it has been seasoned at least ten years. One sequel is that the hot suns of the interior or the moist atmosphere of the coast make no impression on the products of his coachbuilding works; another is, and this is the more important, "once a customer, always a customer," illustrating that good old maxim, "the business that stays is the business that pays."

#### IV.—TIMBER ALREADY IN USE IN THE TRADE.

##### CEDAR (*Cedrela Toona*, Roxb.).

One of the best known timbers of Australia and the Malay Archipelago and States, and Further India.

It is famous for its rich red colour and beautiful figure and incomparable polish it takes, and is a splendid all-round timber.

In railway carriage construction it is largely used for panelling, window framing, doors and also internal and external finishing generally, and let me here remark, can anything be more beautiful in carriage-building than an American car, with the outside sheathing in polished cedar? I think not.

It is also used in the lighter kinds of finishing work of vehicles.

##### BLACKWOOD (*Acacia melanoxylon*, R.Br.).

This is a large tree, having a dark coloured timber; very often with a beautiful figure. Close grained, hard and heavy, with little sapwood, and is used principally in this State for cabinet work. In coachbuilding it has been used for frame work, panelling, hood frames, cab seat rails, and no doubt could be utilised for other purposes in coachbuilding.

It enters largely into the construction of passenger carriages of both railway and tram cars.

##### MYALL (*Acacia pendula*, A. Cunn.).

It is a very hard, dark, cross-grained timber, but difficult to dress. I have been given to understand that it is used wherever the tree is found for parts of coachbuilding. It is similar in texture and qualities to Yarran and Gidgee.

It is much in request for stock whip handles.

HICKORY (*Acacia spp.*).

Under this name several local species of *Acacia* are used in various parts of the State.

The wood is evidently fancied for particular parts of coachbuilding, or it would not be used.

I should say that they are most probably those that have a hard, dark wood, and are preferred for their durability.

YARRAN (*Acacia homalophylla*, A. Cunn.).

Wherever this tree is found growing in the State, I have been informed that it is used by coachbuilders.

The timber is dark coloured, very hard, and heavy, yet not difficult to dress; and for certain parts of a vehicle should be most durable.

GIDGEE (*Acacia Cambagei*, R.T.B.).

This timber, I have been given to understand, is used, wherever the tree is found, for parts of coachbuilding. It is similar in texture and qualities to Myall and Yarran.

It is a very hard, dark, cross-grained timber, but difficult to dress. It is much in request for stockwhip handles.

TEAK (*Flindersia australis*, R.Br.).

One of the finest trees of the Northern Rivers scrubs, and is fast being cut out, as large quantities are exported to Europe.

The timber is yellowish, pale-coloured, hard, close-grained, and fairly easy to work.

It is very durable in railway rolling-stock, and a sample is exhibited in the Technological Museum, which has been in use for twenty years; a supporting column in a goods waggon on the New South Wales Railways is as sound as the day it was put in. No better proof can be given of a timber's qualities than this.

It is quite a different timber from the Burma Teak, which is brownish in colour, and more open in texture.

BLACKBUTT (*Eucalyptus pilularis*, Sm.).

A large forest tree, with a light-coloured timber; straight-grained, hard, strong, and very durable. Useful for wheelwrights and coachbuilding, and, in fact, a good all-round timber. It must be durable for goods waggons, as a specimen of a sole bar is exhibited in this Museum which was taken thirty years ago from a goods truck, and has still some life in it.

FLOODED GUM (*Eucalyptus saligna*, var. *pallidivalvis*, R.T.B. et H.G.S.).

A light, red-coloured, straight-grained, free-working timber, often substituted for Blue Gum (*E. saligna*), which it somewhat resembles. Its durability and uses are many, and it should be a good timber for felloes, spokes, naves, and in lighter work.

## IRONBARKS.

Under this name are used indiscriminately three kinds:—

Narrow-leaved Ironbark (*Eucalyptus crebra*, F.v.M.).

Grey or White Ironbark (*E. paniculata*, Sm.).

Broad-leaved Ironbark (*E. siderophloia*, Benth.).

These differ from each other, more particularly in colour; they are all very hard, close-grained, and most durable. Of the three, the Broad-leaved is least furrowed in some parts, as it is, perhaps, not so durable as the others.

Ironbark is the timber mostly used for naves, heavy spokes, shafts, poles, &c., and its qualities are too well known and familiar to my audience to need comment here.

MAHOGANY (*Eucalyptus resinifera*, Sm.).

This is a good-sized tree, yielding a fresh, red-coloured, open, free-working timber with very little sapwood. Very durable under water, and should be useful for certain classes of carriage work.

RED GUMS.

The principal timbers used under this heading are the Forest Red Gum (*Eucalyptus tereticornis*, Sm.); Murray Red Gum (*E. rostrata*, Schl.) They are both excellent red-coloured timbers for coach-building, being medium hard, close-grained, and I have not the slightest doubt that one or the other was used in the following (quoted from the *Daily Telegraph*, 28th March, 1908):—"Wheels forty years old—Durability of Red Gum—Wellington, Friday.—Mr. James Thompson, coachbuilder, has just had returned to him for retyring a pair of dray wheels he had made over forty years ago. They were cut out of Red Gum timber, then growing on Junction Park, and are fit for many years' service yet."

They are particularly suited for felloe-making, and Mr. Goodwin, of Sydney, states he prefers Red Gum (supplied as Blue Gum) to Sydney Blue Gum for this purpose, as he found it more durable than the latter, and, he claims, less likely to fracture.

SPOTTED GUM (*Eucalyptus maculata*, Hook.).

A fine forest tree, giving a greyish-yellow coloured timber, with a close grain, which is sometimes straight, but occasionally interlocked; hard, tough, and elastic. Fair quantity of sapwood. Difficult to dress. Used for spokes, shafts, poles, swing-trees, rims, and coach-building construction generally.

BLUE GUM (*Eucalyptus saligna*, Sm.).

A fine gully tree with a red-coloured timber, which is open, straight-grained, heavy, free-working, and one of our most useful timbers. Principally employed by carriage-builders and wheelwrights, who, in fact, almost use it exclusively for felloes. It is also much used for railway-waggon work, and a specimen taken from the under-frame of a waggon after thirty years' running is still in a good state of preservation.

TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).

A large forest tree, having a greyish-yellow, hard, close-grained, heavy, strong, and very durable timber; good for any purpose requiring great strength. Used for shafts, rails, poles, and especially for the heavy framing of railway rolling-stock. Portion of a sole bar of an open goods waggon is exhibited in this Museum, and, after thirty years' use, is still sound.

SILKY OAK (*Orites excelsa*, R.Br.).

Most of the Silky Oak sold on the Sydney market is generally thought to be botanically *Grevillea robusta*, A. Cunn., but such does not appear to be the case, for specimens recently chemically examined were found to be *O. excelsa*, R.Br. The timber of the two may be regarded commercially as one and the same, and practically are so, but *O. excelsa* is given more prominence here as it is the timber most frequently found in the trade. Its colour may be said to approach that of the English Oak, and perhaps even the figure, but it is not nearly so hard, although more elastic. It has a beautiful figure, and looks handsome polished, and would do well for panelling, decoration, sheathing, &c. It is often used in sulky work. Saddlers (saddlery being a trade closely allied to carriage-making) prefer it to any other for saddle trees, as it holds nails very much better than any other woods.

FOREIGN TIMBERS.

AMERICAN HICKORY (*Carya tomentosa*).

This appears to be a particularly fine timber. It is a close-grained, easy working, heavy, tough timber. As a substitute for this I should recommend Teak (*Flindersia australis*, R.Br.).

The Australian substitute for American Ash (*Fraxinus americana*), I should say, would be found in the Mountain Ash (*Eucalyptus delegatensis*, R.T.B.; *E. fraxinoides*, H.D. et J.H.M.; *E. oreades*, R.T.B.; and *E. regnans*, F.v.M.).

INDIAN TEAK (*Tectona grandis*).

This is the timber that figured so largely in the British Navy before the advent of iron ship building. It is a pale chocolate coloured, free working, comparatively light timber. It has a greasy feel to the touch, and is very durable in water. It is extensively used in railway carriage construction and gives every satisfaction.

Its rival here is the Queensland Maple, which runs it very closely in the several tests made.

## V.—NEW TIMBERS SUGGESTED FOR COACHBUILDING.

A MOUNTAIN ASH (*Eucalyptus delegatensis*, R.T.B.).

This is one of the tallest trees of the State, and is found on the western slopes of the Delegate and Snowy Mountains at an elevation from 4,000 to 5,000 feet. It has a stringy bark, which extends well up the trunk. The leaves are comparatively large and possess a very fragrant odour, which persists for years in the dried leaves.

As a timber tree it is one of the best, for the wood is light-coloured, fairly hard, not particularly heavy, fissile, seasons well, works easy, is elastic, and so forms a good substitute for imported Ashes.

It is used for house-building, show-cases, oars, golf-shafts, tool-handles, and its bending qualities are almost equal to American or English Ash, and is, in my opinion, a splendid timber for carriage work, and could be used in place of Ash and Hickory.

WHITE ASH (*Eucalyptus fraxinoides*, H.D. et J.H.M.).

A typical forest tree, having a smooth bark. It occurs on the south-eastern slopes of the Dividing Ranges. Specimens from the Clyde River, Sugar Loaf Mountain, Braidwood, Nimitybelle, are exhibited in this Museum.

The timber much resembles that of *E. delegatensis*, R.T.B., but is perhaps a little lighter in colour and of a closer texture, and should prove a good substitute for American Ash; it dresses well, is pale coloured, straight-grained, fissile.

It is used locally for general house-building, casks, but is eminently suited for utilisation in many other branches of the timber industry, especially coachbuilding. In this connection it might be used wherever American Ash is employed.

A MOUNTAIN ASH (*Eucalyptus oreades*, R.T.B.).

A splendid tree of the Blue Mountains, and one that attains its greatest size in the gullies, where it is found with splendid straight branchlets and stems.

It is a pale-coloured, fairly hard timber, and of medium weight, and in texture resembles such local Ashes as *E. delegatensis*, R.T.B., and *E. fraxinoides*, H.D. et J.H.M.

The trees found on the higher grounds are much more liable to gum veins than those growing on the lower levels.

It bends well, and transverse tests give good breaking results, and I recommend this timber to the favourable consideration of the trade. It might be used as a substitute for some imported Ash.

GIANT GUM (*Eucalyptus regnans*, F.v.M.).

A tree described by the late Baron von Mueller from Victorian specimens; Deane and Maiden place it with their species of *E. fastigata*, which occurs in New South Wales.

A large log received at the Museum from Warburton cut up well, making some fine planks. It is a pale-coloured, medium-weight timber, fissile, easy working.

It has been recently tested for golf shafts, the results being most satisfactory.

For coachbuilding its bending capabilities have been tested by Messrs. D. Hardy and Sons, who report that it is a most satisfactory timber in this respect, and the specimens are exhibited here this evening.

It should rank as a good substitute for American Ash.

MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).

One of the most prominent of our mountain trees. It is a straight-grained, free-working, pale-coloured timber for mill wheels, posts, and general coachbuilding purposes. Grows to a height of from 60 to 70 feet.

GREY GUM (*Eucalyptus propinqua*, H.D. et J.H.M.).

A fine forest tree, with a reddish-coloured, hard, close-grained, splendid working timber. Seasons well, and is altogether a first-class wood, and is strongly recommended to coachbuilders for a trial, being superior to the Red Gums *E. tereticornis*, Sm., and *E. rostrata*, Schl.

WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).

This is a typical forest tree, and one of the commonest of the Stringybarks, and is found on the Coast district. The wood is pale-coloured, medium weight, and works, dresses, and seasons well. It is very durable in the ground, and should be so in carriage construction, and the bending and transverse tests are very satisfactory.

It should be suitable for heavy dray work and railway carriages and waggons.

SILVER TOP STRINGYBARK (*Eucalyptus levopinea*, R.T.B.).

This tree almost invariably occurs in basaltic formation, more especially the hills, and is a fine upstanding tree.

The timber is hard, pale-coloured, straight-grained, and very durable, and is strongly recommended to the consideration of coachbuilders where the orthodox timbers are not procurable.

It has been confounded with the Red Stringybark (*E. macrorrhyncha*, F.v.M.) by some botanists, but the timbers of the two are quite different, the latter being much inferior.

It is at least equal, if not superior, to the White Stringybark (*E. eugenioides*, Sieb.), and is also recommended for heavy carriage work of all kinds.

SLATY GUM (*Eucalyptus Dawsoni*, R.T.B.).

One of the finest forest trees in the Rylstone and north of Mudgee district. It grows with a splendid branchless trunk, the foliage being entirely confined to the head. Its timber is highly valued in the locality where the tree grows, and regarded as quite equal in quality to Ironbark, and from which it is quite impossible to differentiate when sawn in planks and dressed, and this amplified knowledge is supported by scientific tests of samples of standard size. It is a close-grained, hard, heavy, red-coloured timber, and suitable for all kinds of carriage construction work in which Ironbark is utilised.

STRINGYBARK (*Eucalyptus carnea*, R.T.B.).

An average forest tree in height, having a light flesh-coloured timber, but rather inclined to develop gum veins. Suitable for heavy carriage work construction.

WHITE MAHOGANY (*Eucalyptus acmenioides*, Schau.).

A fine forest tree of the Coast district, having a pale-coloured, hard, close, straight-grained, heavy timber. Suitable for coachbuilding purposes of the heavy kinds, and should make good framing for carriages, as well as shafts, spokes, &c.

BLUE FIG (*Elvocarpus grandis*, F.v.M.).

A fine tree, growing in the Northern River scrubs. The timber is much in request in the furniture trade, and I see no reason why it should not be used by coachbuilders for panelling, wings, &c. It might almost be classified as a white wood having a satin sheen. It is light in weight, easy working, bends well, and in this respect supplies the desiderata of some requirements in coachbuilding.

NEGRO-HEADED BEECH (*Fagus Moorei* F.v.M.).

This is a true Beech; that is, it belongs to the same botanical family as the English Beech (*Fagus*), and occurs in the North Coast brush forests. There is a species of it *Fagus Cunninghamii* in Tasmania, known locally as Red Myrtle.

The New South Wales representative has, as far as I am aware, not previously been used in coach building; but that is no reason why it should not be tested, for, in my opinion, it could be used for panels, sheathing, and would be a most suitable timber where cedar is now employed and painted; for I hold that cedar should never be painted, as it is a crime to treat such a lovely timber so. It is a pinkish, or rather reddish, colour, as distinctive from the white of the English Beech, close-grained, and works freely. It lacks the small prominent medullary rays of the English Beech.

TASMANIAN RED MYRTLE OR BEECH (*Fagus Cunninghamii*).

This is a tree of similar character to the Negro-head Beech of this State, the difference being in the morphological characters of the foliage.

The timbers appear to be quite identical, and the remarks under *F. Moorei* apply here.

MARARIE (*Nephelium distyle*).

This is a fine scrub timber of the North Coast district. The timber is pale reddish colour, medium weight, close grained and tough; dresses well, is excellent for golf heads, and is undoubtedly suitable for many purposes in coachbuilding.

QUEENSLAND MAPLE.

This timber has only recently come on the market. It belongs to the same genus as Teak (*Flindersia australis*), and is probably *F. Brayleyana*, but it differs from it considerably in colour, being more like Indian Teak.

The microscopical resemblance of these timbers being so marked, they were tested at the same time, and, if anything, the advantage is with the Queenslander. It is light, free, and easy to work, and is highly recommended for railway and road carriages.

COACHWOOD (*Ceratopetalum apetalum*, Don).

This is a brush timber, and was at one time much more frequently met with in the Sydney market than at present, as it was common in the brushes near Sydney.

It has long been known under its common name, so that in the early days of the State it must have been used for the purpose from which its vernacular is derived.

It is not a hard timber, is easily worked, possesses a very pleasing fragrant odour, is tough, and could be used for panelling and seat rails.

VI.—TIMBERS WHICH WOULD HAVE BEEN EXCELLENT FOR COACHBUILDING,  
BUT HAVE ALMOST BEEN CLEARED FROM THE LAND.

NATURAL ORDER—*Rutaceae*.

Soapwood (*Evodia octandra*, F.v.M.).

Soapwood (*Evodia micrococca*, F.v.M.).

Soap Box (*Evodia sp.*).

*Erodia erythrococca*, Benth.

Logan Apple (*Acronychia acidula*, F.v.M.).

Thorny Yellow Wood, Satin Wood (*Zanthoxylum brachycanthum*, F.v.M.).

*Halfordia scleroxylon*, F.v.M.

*Halfordia drupifera*, F.v.M.

NATURAL ORDER—*Sapindaceae*.

*Ratonia tenax*, Benth.

*Ratonia anodonta*, F.v.M.

*Ratonia stipitata*, Benth.

Mararie (*Nephelium distyle*, F.v.M.).

Carrot Wood (*Cupania anacardioides*, A. Rich.).

*Nephelium leiocarpum*, F.v.M.



*Kerr's photo.*

STUNTED EUCALYPTUS GROWTH, COWAN BAY, HAWKESBURY RIVER, N.S.W.



STRINGYBARK ROOFING, NEW ENGLAND N.S.W.





*F. A. Kurton, photo.*

BUSH ROAD NEAR WYONG, N.S.W



*F. A. Kirtan, photo.*

TEAMS FROM BUSH SAW-MILLS NEAR WYONG

NATURAL ORDER—*Tiliaceæ*.

- White Wood (*Elæocarpus obovatus*, G. Don).  
 Maiden's Blush (*Echinocarpus australis*, Benth.).  
 Queensland Blue Fig (*Elæocarpus emundi*, Bail.).

NATURAL ORDER—*Laurineæ*.

- She Beech, or Bolly Gum (*Tetranthera (Litscea) reticulata*, Meissn.).  
*Cryptocarya triplinervis*, R.Br.  
*Cryptocarya microneura*, R.Br.  
 Black Sassafras (*Cryptocarya glaucescens*, R.Br.).  
 Nucarn (*Cryptocarya obovata*, R.Br.).

NATURAL ORDER—*Sapotaceæ*.

- Black Apple (*Achras australis*, R.Br.).  
 Apple (*Achras pohliniana*, F.v.M.).

NATURAL ORDER—*Monimiaceæ*.

- Yellow Wood, Bitter Wood (*Daphnandra micrantha*, Benth.).

NATURAL ORDER—*Olacineæ*.

- Maple (*Villaresia Moorei*, F.v.M.).

NATURAL ORDER—*Ebenaceæ*.

- Grey or Black Myrtle (*Cargillia pentamera*, F.v.M.).  
*Maba fasciculosa*, F.v.M.

I am indebted to the following gentlemen for much assistance in the preparation of this paper :—  
 Messrs. George Bennett, St. Mary's; James Bennett, St. Mary's; J. E. Bishop, Sydney; H. M. Brown, of Ritchie Bros., Auburn; Thow, of Railway Construction Branch, Eveleigh; H. Goodwin, Sydney; R. N. Bubb, of Grimley, Ltd.; D. Hardy, Redfern; W. Kopsen, Sydney; Martin, of Clyde Engineering Co.; Meadowbank Manufacturing Co., James Nangle, W. Rutherford, C. Still, and A. Worsfold, Camperdown.

## SUPPLEMENTARY PHOTOGRAPHIC ILLUSTRATIONS.

- (a) Eucalyptus Growths, Cowan Bay, N.S.W. Dwarf species growing on the poor Hawkesbury sandstone.  
 (b) Selectors' Buildings made of Stringybark. Probably from *Eucalyptus macrorrhyncha*. (Both Kerry, photo.)  
 (c) Bush Road near Wyong, chiefly Spotted Gum (*Eucalyptus maculata*).  
 (d) Teams from Bush Sawmills en route for Wyong, N.S.W. The smooth barked saplings are those of Spotted Gum. (Both F. A. Kirton, photo.)

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets) :—

<i>Eucalyptus acacioides</i> , A. Cunn. (XI). „ <i>acmenioides</i> , Schauer (IX). „ <i>amygdalina</i> , Labillardière (VI). „ <i>Andrewsi</i> , Maiden (VII). „ <i>apiculata</i> , Baker and Smith (IX). „ <i>Behriana</i> , F.v.M. (X). „ <i>bicolor</i> , A. Cunn. (XI). „ <i>Boormanii</i> , Deane and Maiden (X). „ <i>Bosistoana</i> , F.v.M. (XI). „ <i>Caleyii</i> , Maiden (XII). „ <i>calycogona</i> , Turczaninow (III). „ <i>capitellata</i> , Smith (VIII). „ <i>Consideniana</i> , Maiden (X). „ <i>coriacea</i> , A. Cunn. (V). „ <i>crebra</i> , F.v.M. (XII). „ <i>dives</i> , Schauer (VII). „ <i>eugenioides</i> , Sieber (VIII). „ <i>fruticetorum</i> , F.v.M. (XI). „ <i>hæmastoma</i> , Smith (X). „ <i>hemiphloia</i> , F.v.M. (XI). „ <i>incrassata</i> , Labillardière (IV). „ <i>leucoxyton</i> , F.v.M. (XII). „ <i>Luehmanniana</i> , F.v.M. (IX).	<i>Eucalyptus macrorrhyncha</i> , F.v.M. (VIII). „ <i>melanophloia</i> , F.v.M. (XII). „ <i>microcorys</i> , F.v.M. (IX). „ <i>microtheca</i> , F.v.M. (XI). „ <i>Muelleriana</i> , Howitt (VIII). „ <i>obliqua</i> , L'Héritier (II). „ <i>ochrophloia</i> , F.v.M. (XI). „ <i>odorata</i> , Behr and Schlecht. (XI). „ <i>pilularis</i> , Sm. (I). „ <i>piperita</i> , Sm. (X). „ <i>Planchoniana</i> , F.v.M. (IX). „ <i>populifolia</i> , Hooker (X). „ <i>regnans</i> , F.v.M. (VII). „ <i>siderophloia</i> , Bentham (X). „ <i>sideroxyton</i> , A. Cunn. (XII). „ <i>Sieberiana</i> , F.v.M. (X). „ <i>Smithii</i> , R. T. Baker (XII). „ <i>stellulata</i> , Sieber (V). „ <i>umbra</i> , R. T. Baker (IX). „ <i>virgata</i> , Sieber (IX). „ <i>vitellina</i> , Naudin (VII). „ <i>vitrea</i> , R. T. Baker (VII).
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, Six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.

## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (Two Plates.)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andreusi*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (Two Plates.)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (Two Plates.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (Two Plates.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muelleri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia uilacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya fetida*, R. T. Baker)

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations).  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muelleriana*, Howitt)  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus ptilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenioides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORE WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betche).

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hæmastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

Recapitulatory. (Fifty-seven Plates.)

**Volume V (Parts XLI-L).**

**PART XLI. (Issued November, 1910.)**

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).  
148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.).  
149.—A HICKORY (*Acacia implexa*, Benth.).  
150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 3.*

*Published by Authority of the*  
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*PART XLIII* OF THE  
COMPLETE WORK

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANGONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniocalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).
- THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muelleri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleafolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
  - 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
  - 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
  - 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).
- (N.B.—The numbers of Part XIV are given erroneously in the text.)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxylon*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.)
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)



THE FOREST FLORA  
OF  
NEW SOUTH WALES.

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PART XLIII.

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*Grevillea Hilliana*, F.v.M.

White Yiel Yiel.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Grevillea*. (See Part I, p. 1.)

**Botanical description.**—Species, *G. Hilliana*, F. Muell., in *Trans. Phil. Inst. Vict.*, ii, 72 (1858).

The original description is in the following words:—

Branchlets brown silky, leaves large, ovate oblong, blunt, entire or pinnatifid, cuneate at the base, flat, net-veined, above glabrous, beneath silvery-silky; their segments oblong lanceolate; racemes axillary and lateral, solitary, pedunculate, silky, densely many-flowered; bracts minute, lanceolate, deciduous; calyx small, inside and style glabrous, stigma orbicular, nearly lateral, umbonate at its centre.

In forests at the Pine River of Moreton Bay. Hill and Mueller. A magnificent forest tree which I wished to bear the name of its discoverer, Mr. Walter Hill, the Director of the Botanic Gardens, Brisbane.

Later on Bentham described it as follows:—

A large tree, young branches minutely tomentose.

*Leaves* petiolate, either entire obovate-oblong or elliptical, very obtuse, tapering at the base and 6 to 8 inches long, or still longer and deeply divided at the end into 2 or 3 diverging lobes, or deeply pinnatifid with 5 to 7 oblong or lanceolate lobes of several inches, the whole leaf then sometimes above 1 foot long, glabrous above, penniveined and reticulate with the primary veins confluent in an intramarginal nerve, more or less silvery-silky underneath.

*Flowers* small and very numerous in dense cylindrical racemes of 4 to 8 inches, on short axillary shoots, accompanied often by 1 or 2 smaller racemes.

*Pedicels* about 1 line long, minutely pubescent as well as the rhachis.

*Perianth* minutely silky outside, glabrous or scarcely pubescent inside, the tube slender, about 3 lines long, revolute under the globular limb.

*Torus* straight.

*Gland* semiannular, not very prominent.

*Ovary* glabrous, stipitate; style long and slender, the stigmatic disk lateral.

*Fruit* slightly compressed, nearly 1 inch long.

*Seed* rather narrowly winged all round. (B.Fl. v, 463.)

**Botanical Name.**—*Grevillea*, already explained (see Part I, p. 2); *Hilliana*, in honour of Walter Hill, sometime Director of the Botanic Gardens, Brisbane, as already explained. For biographical notes of this officer, see my "Records of Queensland Botanists," *Proc. A.A.A.S.*, Brisbane Meeting, 1909, p. 377.

**Vernacular Name.**—The name “Yiel Yiel” or “Yill-Gill” is applied to several proteaceous trees, e.g., *Stenocarpus sinuatus* and *Grevillea robusta*, as well as to *G. Hilliana*. I suggest the name “White Yiel Yiel” for *G. Hilliana* in allusion to the colour of the timber and silvery appearance of the underside of the leaves, though whether the name is original on my part I do not remember. “Silky Oak” is a name also applied to this tree in common with many others of the Proteaceæ.

**Aboriginal Name.**—“Yiel Yiel” (the name is variously spelt) is a name of aboriginal origin applied in northern New South Wales and in Queensland to proteaceous trees, as already indicated. What the meaning of it is, or to what extent it had definiteness with the aborigines, I do not know.

**Leaves.**—Below see a note on some leaves which are very pinnatifid. Those figured in the drawing are not so, and the plate represents the leaves as ordinarily observed in this species. Particularly as regards the Proteaceæ, we want plenty of field observations in regard to variation of organs yet.

**Timber.**—Hard, durable, and beautifully grained; used for coopers’ work, cabinet work, veneers, &c. It is, however, but very little known, being usually cut up and mixed with the timber of two other Silky Oaks—*Grevillea robusta* and *Orites excelsa*.

**Size.**—A tree of 50 or 60 feet, and with a diameter of 2 or 3 feet.

**Habitat.**—This tree is confined to Queensland and the Northern Rivers of New South Wales. Following are the localities given in the *Flora Australiensis* :—

*Queensland.*—Brisbane River, Moreton Bay (W. Hill, F. Mueller); Rockingham Bay (Dallachy).

*New South Wales.*—From the Clarence to the Tweed River (C. Moore).

Mr. F. M. Bailey, in his “Queensland Flora,” adds “Logan and Albert Rivers” (Hill).

A Queensland specimen in the National Herbarium, Sydney, bears the label in Leichhardt’s handwriting, “Dinnangurumbin B.B. Brush, 18th Sept., 1843.” The precise locality could doubtless be traced by perusal of Leichhardt’s journals. This specimen was labelled *G. Hilliana* by Mueller himself. Its leaves are very pinnatifid, are in leaf only; and I cannot say from the material alone whether it is different from *G. pinnatifida*, Bail.

New South Wales specimens in the National Herbarium, Sydney, are :—Mullumbimby, Brunswick River (W. Baeuerlen), and Casino, Upper Richmond River (Forester W. P. Pope).





WHITE YIEL YIEL.  
(*Grevillea Hilliana*, F.v.M.)

## EXPLANATION OF PLATE 159.

- A. Flowering twig.
- B. Flower bud.
- C. Expanded flower, showing—
  - (a) Four-lobed corolla with stamens.
  - (b) Pistil.
- D. Portion of corolla-lobe with stamen (sessile anther) in the concave lamina.
- E. Pedicel with pistil (corolla removed).
  - (a) Pedicel.
  - (b) Disc.
  - (c) Stipitate ovary.
  - (d) Lateral stigma.
- F. Stigma.
- G. Follicles.
- H. Seed, winged all round.

The plate was drawn from specimens obtained from the Tweed River, with name of collector not available.

No. 156.

## *Eucalyptus Bosistoana*, F.v.M.

### Bosisto's Box.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*, already described. (See Part II, p. 33.)

**Botanical description.**—Species, *E. Bosistoana*, F.v.M., in Australasian Journ. Pharm., 1895.

Finally tall; branchlets slender, at first angular.

*Leaves.*—On rather short petioles, almost chartaceous, mostly narrow or elongate-lanceolar, somewhat falcate, very copiously dotted with translucent oil glandules, generally dull-green on both sides, their lateral venules distant, much divergent, the peripheric venule distinctly distant from the edge of the leaf, all faint.

*Leaves of young Seedlings.*—Roundish or ovate, scattered, stalked; umbels few-flowered, either axillar-solitary or racemosely arranged.

*Peduncles.*—Nearly as long as the umbels or oftener variously shorter, slightly or sometimes broadly compressed.

*Pedicels.*—Usually much shorter, rather thick and angular.

*Tube of the Calyx.*—Turbinate-semiovate, slightly angular.

*Lid.*—Fully as long as the tube, semiovate-hemispheric, often distinctly pointed.

*Stamens.*—All fertile, the inner filaments abruptly inflected before expansion; anthers very small, cordate or ovate-roundish, opening by longitudinal slits.

*Style.*—Short; stigma somewhat dilated.

*Fruit.*—Comparatively small, nearly semiovate, its rim narrow, its valves 5-6 or rarely 4, deltoid, totally enclosed, but sometimes reaching to the rim; sterile seeds very numerous, narrow or short; fertile seeds few, ovate, compressed, slightly pointed.

In swampy localities at Cabramatta, and in some other places of the County of Cumberland, and also in the County of Camden (Rev. Dr. Woolls); near Mount Dromedary (Miss Bate); near Twofold Bay (L. Morton); near the Genoa (Barnard); on the summit of the Tantawanglo Mountains, and also near the Mitchell River (Howitt); between the Tambo and Nicholson Rivers (Schlipalius); near the Strezlecki Ranges (Olsen). The "Wul Wul" of the aborigines of the County of Dampier; the "Darjan" of the aborigines of Gippsland. Called locally by the colonists of New South Wales *Ironbark Box-tree*, and in some places also *Grey Box-tree*, which appellations indicate the nature of the wood and bark, though the latter may largely be shedding.

As richly oil-yielding, and also as exuding much kino, this tree is especially appropriate to connect therewith the name of Joseph Bosisto, Esq., C.M.G., who investigated many of the products of the Eucalypts, and gave them industrial and commercial dimensions.

This species, in its systematic affinities, is variously connected with *E. odorata*, *E. siderophloia*, *E. hemiphloia*, and *E. drepanophylla*. A fuller account of this valuable tree will early be given. (*Op. cit.*)



Shortly after the publication of *E. Bosistoana*, I wrote to Baron von Mueller, pointing out that he had confused two trees in his description, namely, a "Grey Box" and an "Ironbark Box." He thanked me for the information, and stated he intended to publish further notes on the tree (as, indeed, he promised at the conclusion of the description), but his intention was frustrated by pressure of work, and subsequent death.

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *Bosistoana*, in honour of the late Joseph Bosisto, M.L.A., of Richmond, Melbourne. See my "Records of Victorian Botanists," in *Vict. Nat.*, xxv, p. 103 (1908).

**Vernacular Names.**—"Red Box." It goes most commonly under this name in the South Coast and Monaro, in reference to its pinkish colour when fresh.

"Of late it has received the local name of 'Grey Box' from the splitters and saw-millers." (A. W. Howitt, speaking of Gippsland.) "Yellow Box" of the County of Cumberland, N.S.W. (see this page and also p. 60). "Bastard Box" of the County of Cumberland, N.S.W. (see this page and also p. 60). It is called "Bastard Box," from a belief amongst some timber men that it is a tree of which the true Yellow Box (*meliiodora*) is one of the parents.

**Aboriginal Name.**—I believe "Togoygora" to have been a name in use by aborigines in the County of Cumberland, N.S.W., according to observations by George Caley (1800-1810). See *Agric. Gazette N.S.W.*, p. 989 (1903).

**Synonyms.**—(1.) *E. bicolor*, Woolls (*Contrib. Flora of Australia*, 232), non A. Cunn.; see also p. 7 of Part xi of the "Critical Revision of the genus *Eucalyptus*."

In the Woollsonian Herbarium, which is my property, there is a specimen in Dr. Woolls' handwriting, bearing the following label:—

"Yellow or bastard Box, half-barked when young, nearly smooth when full-grown. Hard wood. Height, 120 feet. Cabramatta. *E. bicolor*."

On another occasion Dr. Woolls labelled a similar specimen from Cabramatta *E. largiflorens*.

There is no question as to the identity of this tree, even if his specimens did not make it quite clear. It is *E. Bosistoana*, F.v.M., is typical for the species, as determined by Mueller himself (Mueller first labelled this specimen *E. odorata*, Behr, and then *E. Bosistoana*), and the assumption that Woolls' determination of the tree as *E. bicolor* was correct has given rise to some curious mistakes. See my paper, *Proc. Linn. Soc. N.S.W.*, xxvii, 519 (1902), for a full account of the matter.

(2.) *E. odorata*, Howitt, non Behr. See p. 58.

#### **Timber.**—

*E. Bosistoana*.—This tree has in many respects a superficial resemblance to *E. meliiodora*, with which it was for a long time locally confounded in Gippsland, . . .

The difference between *E. Bosistoana* and *E. melliodora* was long apparent to me, from a careful comparison of the trees growing in the Mitchell River district, and especially from distinctions which have been apparent to the timber men there. The wood of this Eucalypt is much browner in colour than that of *E. melliodora*, and while the timber of the latter can very rarely be split into posts or rails, that of the former, although it is difficult to split "on the quarter," is, when once the log is opened, "backed off" with great ease. The principal differences upon which a rapid diagnosis may be made lie in the greatly superior height of *E. Bosistoana*, in its freer growth, the rhytiploious (fibrous) bark, the smooth upper portion of the stem and limbs, and the somewhat larger fruit, with a narrow, compressed rim, and more deeply sunk orifice. Finally the outer stamens are all provided with fertile anthers, while those of *E. melliodora* are anantherous.

The timber of this tree is most durable, and is one of the most serviceable of the Eucalypts of Victoria, especially for work which is exposed to damp. (A. W. Howitt in *Trans. Roy. Soc. Vict.*, ii, 95, 1890-1.)

In the above passage, where *E. Bosistoana* occurs, there is *E. odorata* in the original, as Mueller made that species very comprehensive, and afterwards carved *E. Bosistoana* out of it.

Mr. Howitt subsequently wrote to me: "The greatest care should be taken to preserve this timber, for the reason that where works of construction require great durability and strength combined with length of material, there is no Victorian Eucalypt to compare with this."

"Red Box abounds in this district, and I am assured by persons who are competent to judge, equal, if not superior, to Ironbark for strength and durability. Recommended to be tested for sleepers and bridge-building." (The late Forest Ranger Benson, Wagonga, N.S.W., writing in 1893.)

I have a specimen of the same timber, called "Grey Box," from the Muckindary Bridge, Bombala, N.S.W., part of a pile nineteen years in the ground. It is quite sound, but has split badly.

The following notes concerning the same timber I obtained verbally from Mr. A. R. Crawford, of Wingello, N.S.W. :—

"A splendid timber, no faults of any kind. Good for wheelwrighting, shafts, and all frame work."

Mr. Crawford further says that this is the best Box he has ever worked, and he has worked that of Hill Top, Orange, &c.

It will be observed that all these witnesses uniformly speak most highly of this timber.

It is a brown timber, drying paler. It is hard, and without gum veins. The tree has good clean stems and smooth branches.

**Size.**—This tree grows to 200 feet, or in exceptional cases to perhaps 250 feet in height. (A. W. Howitt, *loc. cit.*)

**Habitat.**—So far as we know at present, it is confined to eastern New South Wales, from the Illawarra and the southern tableland in the north as far as North Gippsland (Bairnsdale district), Victoria, in the south,

## VICTORIA.

It grows only in Gippsland, especially on limestone formations, commencing to the westward of Bairnsdale, and extending beyond Lake Tyers. Unfortunately, it grew principally upon lands which were required for settlement, and consequently, immense quantities of this tree have been ringbarked. It is still found growing on some private lands, on some unalienated Crown lands, in the neighbourhood of Lake King, and in Cunninghame State Forest. (A. W. Howitt, in an unpublished report, 1895.)

I have observed a small colony of *E. Bosistoana* (*E. odorata* in original) growing in South Gippsland, near Four-mile Creek. The occurrence of this tree in the Miocene limestones of North Gippsland falls in with the statement made by Baron von Mueller that it occurs upon limestone areas at St. Vincent's Gulf.\* (A. W. Howitt, *loc. cit.*, p. 95.)

It grows principally on the Miocene limestones in the littoral tracts of North Gippsland. (A. W. Howitt in a letter to me.)

## NEW SOUTH WALES.

Following is a copy of a label by Oldfield (dated 1866), in Herb. Barbey-Boissier:—"Box-tree.—Tree, 160 feet; bark dark grey, spongy on trunk; limbs very white, soft to the touch, like velvet. Stony Ranges, called Mountain Hut Range, near Eden, Twofold Bay." Later, the label bears the name *E. leucoxydon* in Oldfield's handwriting. The specimens are *E. Bosistoana*, F.v.M.

There are similar specimens in *Herb. Cant.* labelled "No. LX<sup>o</sup> *Eucalyptus leucoxydon*, F.M., 'Box-tree,' New South Wales, Hb. Oldfield," and, doubtless, in other herbaria.

This is the key, in my opinion, to the use of the name "Box" having been attached to *E. leucoxydon*. The name Box is never used in Australia for true *E. leucoxydon*, so far as my experience goes. If it is so used, it must be very rarely.

Bega district; also "Red, Grey, White Box," Cobargo (J. S. Allan); Mt. Dromedary (Miss Bate); "Grey Box," Noorooma (A. Langley); abounds in Wagonga district (F. R. Benson); "Grey Box" (J. V. de Coque); and "Red Box" (J. S. Allan), both in the Moruya district; Lower Araluen (J.H.M.); Milton; also "Yellow Box," West Dapto (R. H. Cambage); "Box" or "White Box" of Razorback, 4 miles from Wingello (J.H.M. and J. L. Boorman); Marulan (A. Murphy). (*E. Bosistoana*, from Marulan, was provisionally determined by F.v.M. as *E. bicolor* many years ago.) Bullio to Wombeyan (R. H. Cambage and J.H.M.).

Cabramatta district, County of Cumberland, occurring between Bankstown and the Cabramatta Railway Station, and also thence to Bringelly and Cabramatta (now Rossmore).

Woolls' Cabramatta specimens, already referred to, have large, plump flower-buds; there are no fruits.

"There used to be some large trees of it near Bringelly, growing in a swampy place. Wood reddish-yellow and very tough when dry." (W. Woolls.)

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\* This is true as regards *E. odorata*, but it remains to be proved that *E. Bosistoana* extends into South Australia.

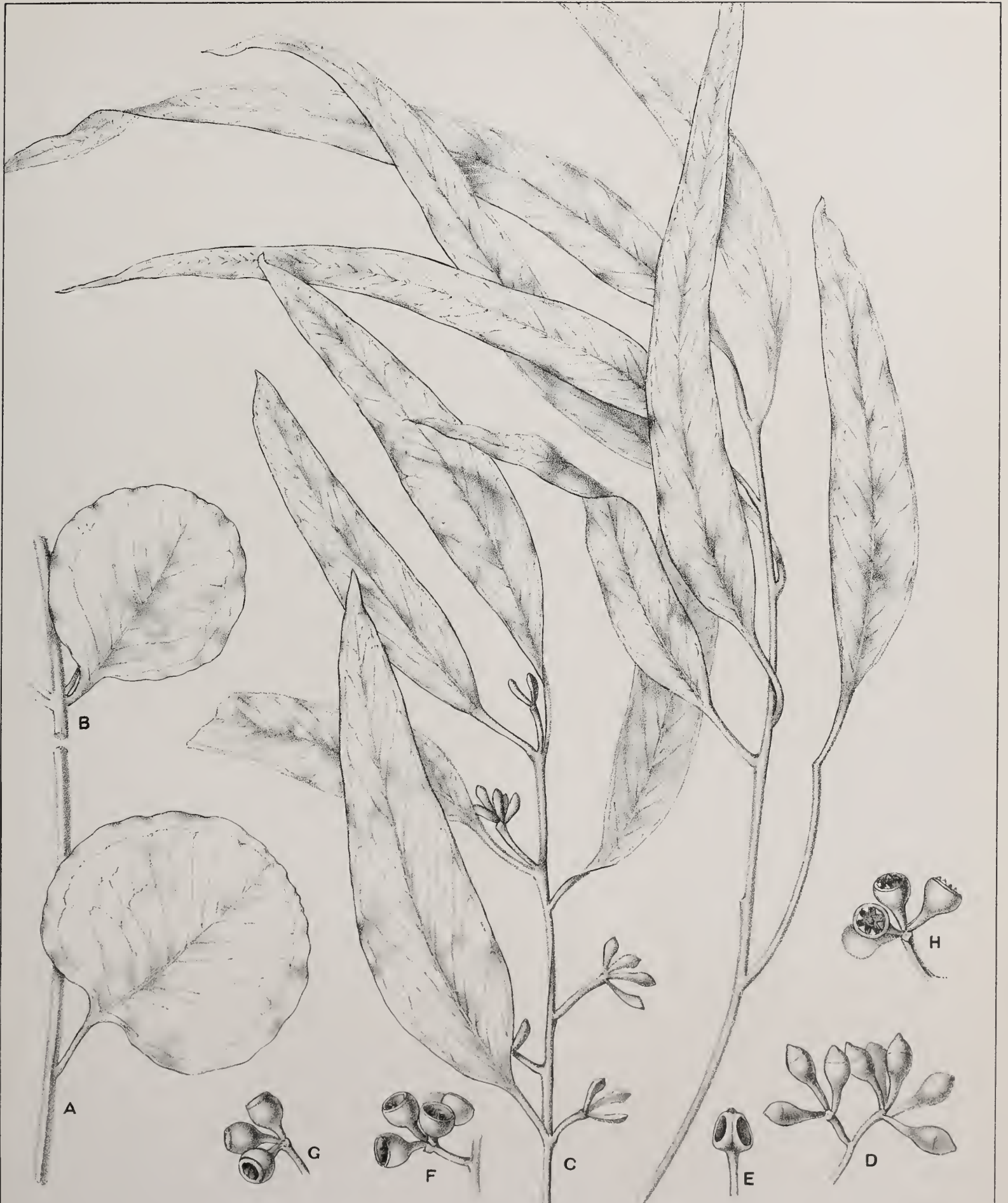
Then on specimens collected by J. L. Boorman at Bankstown, on 8th February, 1900, he and I made the following notes:—

“No. 13, ‘Yellow Box.’ Very tall trees, ribbony base. Clean grey tips from 12 to 14 feet from ground. Leaves elliptic ovate, acuminate, of a glaucous colour. Timber yellow. Usually known as Bastard Box.”

Subsequently, on 20th July, 1901, I went to Cabramatta with Mr. Boorman and interviewed Mr. Hoy, a local resident, in regard to the range of this tree in the district, and compared the local Grey Box (*E. hemiphloia*) with it.

#### EXPLANATION OF PLATE 160.

- A. Juvenile leaf, from a specimen collected by Oldfield in 1866 at Twofold Bay, N.S.W.
- B. Juvenile leaf, from Wingello, N.S.W.
- C. Flowering twig, Bankstown and Cabramatta, a few miles south of Sydney.
- D. Buds, from Cabramatta.
- E. Anther            ,,
- F. Fruit             ,,
- G. Unripe fruit, showing rim, from Wingello.
- H. Fruit with exerted valves, from Bega, N.S.W.



BOSISTO'S BOX.  
(*Eucalyptus Bosistoana*, F.v.M.)



No. 157.

## *Acacia prominens*, A. Cunn.

### The Prominent Glanded Wattle.

(Family LEGUMINOSÆ: MIMOSEÆ.)

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)

**Botanical description.**—Species, *A. prominens*, A. Cunn.

*A. prominens* (Cunningh. MSS. *Loud. Hort. Brit.* 407) Phyllodia divaricate, retrorsely falcate, linear-lanceolate, acute, 1-nerved, ending in a hooked mucrone, with a rather prominent gland on the upper margin at the base; heads of flowers in terminal and axillary racemes. Native of New South Wales. Phyllodia  $1\frac{1}{2}$  inch long, and  $1\frac{1}{2}$  line broad. (G. Don, *Gen. Hist. of Dichlamydeous Plants*, ii, 406, 1832.)

The reference in Loudon (1830) is

Evergreen greenhouse shrub 4 feet high. Flowers in February and June; colour of flowers yellow. A native of New Holland, introduced in 1824. Propagated from cuttings, likes sandy loamy and peat soils,

and is not adequate as a description of a species. Its date as a species is therefore 1832.

Under *Bot. Mag.* t. 3502 (1836) W. J. Hooker quotes Allan Cunningham's original description of *Acacia prominens* as follows:—

*Acacia prominens*; glabra, phyllodiis (sesquiuncialibus) lineari-lanceolatis acutis patentibus retrorso-falcatis rectisve uninerviis tenuissime ciliatis, mucrone subuncinato terminatis, margine antico versus basin uniglanduloso, glandulâ leviter elevatâ, racemis terminalibus axillaribusve 6-10-cephalis phyllodio paulò longioribus, capitulis (in racemo) solitariis geminisve pedicello brevioribus, floribus quinquepartitis, petalis ovato-oblongis subacuminatis, stylo staminibus parum longiore.

It is taken from Allan Cunningham's MSS. Journal dated 1817.

Hooker then describes it in the following words:—

A tall, slender shrub, often 10 feet high, of erect growth, numerously branched, the branches being smooth, greenish, and slightly angular.

*Phyllodia* copious alternate for the most part,  $1\frac{1}{2}$  inches in length and  $2\frac{1}{2}$  to 3 lines in breadth, spreading, linear-lanceolate, acute, mucronated, mucro rather hooked, towards the apex often retrorsely falcate, with several slightly-marked veins diverging from the midrib, on the upper edge near the base is a rather prominent gland.

*Flowers* golden-yellow, very fragrant, formed in axillary and terminal racemes, each raceme having from six to ten heads, generally longer than the phyllodia.

*Heads* many-flowered, distinct, solitary, or in pairs.

*Pedicels* patent, very smooth, longer than the heads, having at the bases short, brown bracts.

*Calyx* very short, five-parted.

*Petals* five, ovate-oblong, subacute, erect or slightly spreading.

*Stamens* numerous, shorter than the style.

*Stigma* simple.

He then goes on to give the following account of it :—

A charming conservatory shrub, native of New South Wales, where it inhabits barren forest-grounds, in the immediate vicinity of the Nepean River; and although it may, in its native regions, be truly said to be, like Goldsmith's village thorn, "unprofitably gray,"—no one caring to receive it into his garden, it nevertheless seldom fails, even there, in the month of September, when decked with blossoms, to commend itself to the notice and admiration of the passing, way-worn colonist, not less by the extreme richness and profusion of its golden flowers, than by the delicious fragrance they diffuse around. It has been several years at Kew, where it flowers annually in the months of spring; and our acknowledgments are due to Mr. Aiton for the opportunity now afforded us of publishing a figure of it.

At the end he gives a description of *A. fimbriata*, A. Cunn., a species which has been confused with *A. prominens*.

Then Bentham redescribes the species in the following words :—

A tall shrub, glabrous and usually glaucous, with angular branchlets.

*Phyllodia* from linear-lanceolate to oblong-falcate, when narrow nearly those of *A. linifolia*, but not so decidedly ciliate, more acute and the marginal gland further from the base, and passing from that to nearly those of *A. lunata*, but always much thinner than the latter, with the pinnate veins as well as the gland more conspicuous, mostly 1 to 1½ inch long, from 2 lines broad in the narrow form to 3, 4, or even 5 in the broad ones.

*Racemes* about as long as the phyllodia, with very small globular heads of about 8 to 10 or rarely 12 to 15 small flowers, mostly 5-merous.

*Calyx* very short, broadly lobed.

*Petals* smooth, or nearly so.

*Pod* very flat, 2 to 3 inches long when perfect, 3, 4, or rarely 5 lines broad.

*Seeds* longitudinal along the centre, the last fold of the funicle thickened into a fleshy clavate lateral aril, the other folds very small. (*B.Fl.* ii, 371.)

Mr. R. T. Baker gives a figure of this species in *Proc. Linn. Soc. N.S.W.*, xvi, 572.

He (*op. cit.*, p. 573) usefully supplements Bentham's description with the following remarks :—

It is described as "a tall shrub," but it is very often to be seen over 20 feet, and not uncommonly exceeding 30 feet in height, with a diameter in proportion.

The phyllodes often extend to 2 inches, particularly in plants found in the northern districts; about 1½ inch in those in the neighbourhood of Sydney, and 1 inch in southern examples.

The racemes are given by Bentham as "about as long as" the phyllodes, but I find them almost always longer in the living state. They shrink very much in drying.

The pod ("neglected by collectors in the majority of specimens gathered") can scarcely be said to be "very flat"; it is light warm brown in colour, glabrous and rugose, measuring 1 to 3 inches long and ¼ to 1 inch broad.

The seeds are at first transverse, but in some cases oblique and longitudinal along the centre; they appear to change their position prior to falling.

The coloured plate (*Bot. Mag.*, vol. lxiii, No. 3502) in no way assists to identify the species.

I will supplement Mr. Baker's observations by saying that it attains the height of over 70 feet (measured). While agreeing to the extent that *Bot. Mag.* t. 3508 is not a very good representation, the characteristic gland is present. The flowers are usually about twelve in the head.

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *prominens*, Latin, prominent, in allusion to the conspicuous marginal gland of the phyllodes.



**Vernacular Names.**—I propose the name “Prominent Glanded Wattle,” in spite of myself, for I have only heard it called “Sally,” because of its drooping habit, and “Silver Wattle” because of its glaucous foliage, names which have been applied to scores of Wattles with equal appropriateness or the reverse.

**Aboriginal Name.**—I know of none.

**Synonyms.**—This is a species which has given rise to a surprising amount of confusion. It has been more or less confused with at least three species.

(1.) *Acacia lunata*, F.v.M. non Sieb., “F. Mueller refers it (*A. prominens*) to *A. lunata*, describing the pod very accurately; but that is not the fruit of the true *A. lunata*, which has always the seed lying close to the upper suture, not in the centre of the pod.” (Bentham in *B.Fl.* ii, 371.) Mueller referred some indubitable specimens of *A. prominens* (A. Cunn.) to *A. lunata* (Sieb.), and Bentham followed him. These have caused great confusion in herbaria. In Part XLIV I shall figure *A. lunata*, Sieb., and, I trust, clear up all difficulty in this particular matter.

In Mueller’s “Key to the System of Victorian Plants,” i (1887–1888) and ii (1885), *A. prominens* will be found synonymised under *A. lunata*.

(2.) *Acacia fimbriata*, A. Cunn. (see *B.Fl.* ii, 371), has also been confused with *A. prominens* as a synonym. I trust that the figures and descriptions of *A. fimbriata* in Part XLII of this work will render confusion impossible in the future.

(3.) *A. linifolia*, Willd., var. *prominens*, F.v.M. Herb. In Mueller’s “Second Census” (1889) it does not appear, but it was included by Mueller under *A. linifolia*, Willd., as a variety (*e.g.*, *prominens*). Bentham also contributed to this view by saying (*B.Fl.* ii, 371): “This species (*prominens*) may prove to be a broad-leaved variety of *linifolia*.” And, again, under *A. linifolia*, he speaks of “The broad-leaved forms of this species, with the margins less ciliated (really *A. fimbriata*, A. Cunn., as I have shown in Part XLII of this work.—J.H.M.), or not perceptibly so, connect it with the following, *A. prominens*.”

I trust that the illustrations and notes concerning *A. linifolia*, Willd., given in Part XLII, will render confusion with *A. linifolia* impossible in the future.

**Leaves.**—Note the prominent glands on the phyllodia.

**Bark.**—This is called “Grey” and “Black Wattle” near Sydney, “Silver Wattle” and “Sally” near Gosford, but dealers will not have it, and it hardly pays to cut up and pass with better bark. A sample of a black bark, stained, leopard-like, with whity-green patches, and bearing lichens, yielded the writer 18.03 per cent. of tannic acid and 42.35 per cent. of extract. It was from Penrith, N.S.W.

A sample from Penshurst, Illawarra line, near Sydney, gave the author (*Proc. R.S. N.S.W.*, 1888, p. 269) 39.95 per cent. of extract and 14.42 of tannic acid. Height of tree, 10 to 15 feet; diameter, 1½ to 2 inches; collected September, 1887; analysed August, 1888. A light-coloured bark, very thin, of the thickness of stout brown paper, and reminding one strongly of that of *A. longifolia*.

A very promising-looking bark obtained from the same locality in February, and analysed the same month, gave 19·75 per cent. of tannic acid and 46·95 per cent. of extract. It is fairly thick, pale in colour, has little fibre, and its low percentage of tannic acid is certainly disappointing. I doubt whether a finer sample of this bark is obtainable; if this surmise is correct, the value of this bark is fixed at under 20 per cent. of tannic acid.

**Timber.**—Tough and pale-coloured, used for axe-handles in the Gosford district according to Mr. Andrew Murphy.

**Size.**—This Wattle is really one of the largest of Australian species, according to a measurement (76 feet) given to me by Mr. Andrew Murphy of a tree felled by him at Narara, near Gosford.

**Habitat.**—Bentham (*B.Fl.* ii, 371) refers this species to New South Wales (“Blue Mountains, *Caley*, *A. Cunningham*, and others”), and also doubtfully to South Australia.

Mueller (“Second Census”) refers *A. linifolia*, Willd. (which included, according to his view, *A. prominens* as a variety), to Victoria, New South Wales, and Queensland.

The properly authenticated range of *A. prominens* is County of Cumberland, north of the County of Camden, and nearly to Newcastle on the north, *i.e.*, to New South Wales only.

In my “Wattles and Wattle-barks,” 3rd edn., p. 80, I have the following note:—

A specimen from trees 15 to 20 feet high, and having a diameter of from 4 to 8 inches, was collected in February, 1890, at Krackenback Mountain, Jindabyne, N.S.W., and analysed January, 1891. It was found to contain 11 per cent. tannic acid and 29·75 per cent. extract. This bark is deceptive in appearance, being smooth, breaking short, with little fibre, and altogether a fair-looking bark.

On the Snowy Mountains it occurs at elevations from 4,000 to 5,000 feet. It is an eastern form found principally in the coast districts.

These Snowy Mountains localities are several hundreds of miles from all other authenticated localities, which may be briefly described as Sydney and Newcastle districts. The Snowy Mountain specimens that I have seen are in immature bud only and are, therefore, doubtful, but they become interesting because perhaps similar specimens have caused *A. prominens* to be recorded for Victoria.

Furthermore, *A. prominens* has been recorded from Queensland. Certainly *A. simbricata* occurs there, as I have shown in Part XLII, but I am not aware that the true *A. prominens* occurs in the northern State, and the record should be struck out until it is confirmed.

The record “South Australia?” in the *Flora Australiensis* should also be struck out. In a word, I do not think we have evidence at present to look upon *A. prominens* as occurring in any State other than New South Wales.





M. Flockton del.

PROMINENT GLANDED WATTLE.

(*Acacia prominens*, A. CUNN.)

New South Wales localities (authenticated by material in the National Herbarium, Sydney) are :—

Mulgoa, on the banks of the Nepean (R. H. Cambage and J.H.M.). The type came from the vicinity of the Nepean River, where it exists to this day, though it is rare in the vicinity of the old Emu crossing of the Nepean, owing to settlement.

Belmore, just south of Sydney. Taken from a tree 2 feet 6 inches in girth. A few years ago there were a number of trees in this locality much larger than the one noted (A. A. Hamilton).

Kogarah and Hurstville, just south of Sydney (J. H. Camfield and E. Betche); Gosford (J. J. Fletcher).

“Sally Wattle.”—From tree 76 feet high; timber used for axe-handles; Narara, near Gosford (A. Murphy).

**Propagation.**—This is a beautiful species, formerly the glory of the more southern Illawarra Sydney suburbs, but now comparatively rare owing to the progress of settlement. It is well worthy of cultivation.

#### EXPLANATION OF PLATE 161.

- A. Flowering twig.
- B. Flower-head.
- C. Individual bud and bract.
- D. Flower.
- E. Bract.
- F. Flower opened out, showing—
  - (a) Calyx.
  - (b) Corolla.
  - (c) Pistil (stamens removed).
- G. Pods.
- H. Seed.
- J. Portion of phyllode with marginal prominent gland, which protrudes outwardly from the margin.

No. 158.

*Cinnamomum virens*, R. T. Baker.

Native Camphor Laurel.

(Family LAURACEÆ.)

**Botanical description.**—Genus, *Cinnamomum*. (See Part XLIII, p. 35.)

**Botanical description.**—Species, *C. virens*, R. T. Baker, *Proc. Linn. Soc. N.S.W.*, xxii, 282 (1897), with a plate (t. 13).

A tree about 90 feet high, and up to 2 feet in diameter.

*Leaves* opposite or occasionally alternate, rigid, coriaceous, shining above, green and glabrous on both sides, the reticulations prominent on the underside, lanceolate-acuminate, either cuneate or rounded at the base, margins nerve-like, 4 to 6 inches long, triplinerved but not prominently so, petiole rarely exceeding  $\frac{1}{4}$  inch.

*Panicles* opposite in the axils of the upper leaves, bearing a few flowers in the raceme shorter than the leaves, slightly pubescent.

*Pedicels* the length of the calyx.

*Perianth-tube* about 1 line, segments or lobes 2 lines long, constricted for about half its length so as to give it a calyx-like appearance as soon as the ovules are fertilised.

*Stamens* shorter than the lobes.

*Stigma* very slightly expanded.

*Berry* 6 lines long, 4 broad, resting on an enlarged perianth-tube measuring across the top almost 5 lines; shining.

*Pedicels* enlarged under the fruit, the whole resembling some *Quercus* fruits and cups, such as *Q. pedunculata*, &c. (R. T. Baker, *loc. cit.*)

It differs from *C. Oliveri* in its foliage, the uniform colour of the upper and lower surfaces of its leaves giving it a distinctive character from those of that species, which are dark-green coloured on the upper surface and whitish below. The venation found in most other *Cinnamomum*s is slightly developed in this species, although wanting in *C. Oliveri*. Some specimens preserve a light green colour, others darken a little, but the colour is always distinct from *C. Oliveri*, Bail., *C. ovalifolium*, Wight, *C. Tamala*, Nees, and *C. Zeylanicum*, Nees; the leaves are also thicker, more rigid, and less fragrant than those of *C. Oliveri*.

It differs from *C. Tamala*, Nees, the only Australian representative of this genus recorded in *B Fl.* v, 303 (allowing for all variations), in the shape, colour, size and venation of the leaf, as well as in the characters of the stigma; from *C. ovalifolium*, Wight, in its lanceolate, unicoloured, glabrous leaves, which are also less coriaceous than those of that species.

The perianth is very much more enlarged and thickened than in *C. Oliveri*, Bail., which has an entire and thin-edged enlarged perianth-tube, whilst this one appears to show rudimentary lobes. The fruits also are larger than those of *C. Oliveri*, Bail., and very shining.

F. M. Bailey (in *Bot. Bull.* v, p. 25) refers to a probably new species of *Cinnamomum* under the name of *C. propinquum*, but I do not think that my specimens can belong to that species, as the branchlets are not 4-angled, neither are the leaves ovate-lanceolate; they are nearly all above 3 inches long, and the under surface is not whitish but green, the same as the upper surface, with the reticulations distinct. (R. T. Baker, *loc. cit.*)

**Botanical Name.**—*Cinnamomum*, already explained (see Part XLII, p. 35); *virens*, Latin, youthful and green: hence a bright clear green, referring to the leaves.

**Vernacular Name.**—Mr. Baker calls it “Native Camphor Laurel”; it is not specially appropriate; on the other hand, it is as good as most names for our brush trees. He also quotes the name “Copal tree,” on account of the high polish of the leaves and fruit. I do not like that name, as the Copals belong to a totally different group of plants found in non-Australian countries, and it is very objectionable.

**Leaves.**—Some of them quite triplinerved. They display a good deal of variation in the venation.

**Bark.**—“The bark is thin, non-aromatic, and a distillation of 60 lb. gave very little oil.” (R. T. Baker.)

**Timber.**—The remarks on the timber of *C. Oliveri* are also applicable to this species (*ibid.*).

Mr. G. Tingcombe says it is a very tough timber. It is one of a very large number of brush timbers, of whose properties we know nothing, or next to nothing, and I only hope we shall know more of them before they become so scarce as to be of no commercial importance.

**Size.**—“Not a tall tree, of small dimensions in the Comboyne.” (G. Tingcombe.) A large tree as originally described.

**Habitat.**—*New South Wales.*—Going north, we have it from Mullumbimby, on the Brunswick River, and Murwillumbah, Tweed River. (R. A. Campbell.)

Its most southern recorded locality, so far, is Comboyne Brush. (G. Tingcombe) This is just north of the Manning River.

It is a native of the Northern Rivers of New South Wales. It occurs from the Comboyne to the Tweed, and it would be nothing short of a miracle if it did not occur in Queensland.

Mr. Baker says it was found by Mr. Bauerlen on the Richmond River, at Tintenbar, Dunoon, and Goonellah. I have also seen it from him from Alstonville.

## EXPLANATION OF PLATE 162.

- A. Flowering twig.
- B. Flower.
- C. Flower, opened out, showing—
  - (a) Perianth segments.
  - (b) Stamens, outer row, introrse anthers.
  - (c) Stamens, inner row, extrorse anthers.
  - (d) Staminodia, outer row.
  - (e) Staminodia, inner row.
  - (f) Pistil.
- D. Perianth segment with stamen.
- E. Stamen, front view with staminodia at base.
- F. Stamen, back view           ,,           ,,
- G. Pistil, half immersed in the perianth-tube.
- H. Fruit.





CINNAMOMUM VIRENS, R.T.BAKER.

M. Fiebigler del.



## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets) :—

<i>Eucalyptus acacioides</i> , A. Cunn. (XI). „ <i>acmenioides</i> , Schauer (IX). „ <i>amygdalina</i> , Labillardière (VI). „ <i>Andrewsi</i> , Maiden (VII). „ <i>apiculata</i> , Baker and Smith (IX). „ <i>Behriana</i> , F.v.M. (X). „ <i>bicolor</i> , A. Cunn. (XI). „ <i>Boormani</i> , Deane and Maiden (X). „ <i>Bosistoana</i> , F.v.M. (XI). „ <i>Caleyi</i> , Maiden (XII). „ <i>calycogona</i> , Turczaninow (III). „ <i>capitellata</i> , Smith (VIII). „ <i>Consideiniana</i> , Maiden (X). „ <i>coriacea</i> , A. Cunn. (V). „ <i>crebra</i> , F.v.M. (XII). „ <i>dives</i> , Schauer (VII). „ <i>eugenioides</i> , Sieber (VIII). „ <i>fruticetorum</i> , F.v.M. (XI). „ <i>hamastoma</i> , Smith (X). „ <i>hemiphloia</i> , F.v.M. (XI). „ <i>incrassata</i> , Labillardière (IV). „ <i>leucoxyton</i> , F.v.M. (XII). „ <i>Luehmanniana</i> , F.v.M. (IX).	<i>Eucalyptus macrorrhyncha</i> , F.v.M. (VIII). „ <i>melanophloia</i> , F.v.M. (XII). „ <i>microcorys</i> , F.v.M. (IX). „ <i>microtheca</i> , F.v.M. (IX). „ <i>Muelleriana</i> , Howitt (VIII). „ <i>obliqua</i> , L'Héritier (II). „ <i>ochrophloia</i> , F.v.M. (XI). „ <i>odorata</i> , Behr. and Schlechtendal (XI). „ <i>pilularis</i> , Sm. (I). „ <i>pipерita</i> , Sm. (X). „ <i>Planchoniana</i> , F.v.M. (IX). „ <i>populifolia</i> , Hooker (X). „ <i>regnans</i> , F.v.M. (VII). „ <i>siderophloia</i> , Bentham (X). „ <i>sideroxyton</i> , A. Cunn. (XII). „ <i>Sieberiana</i> , F.v.M. (X). „ <i>Smithii</i> , R. T. Baker (XII). „ <i>stellulata</i> , Sieber (V). „ <i>umbra</i> , R. T. Baker (IX). „ <i>virgata</i> , Sieber (IX). „ <i>vitellina</i> , Naudin (VII). „ <i>vitrea</i> , R. T. Baker (VII).
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.



## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).
- 148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.).
- 149.—A HICKORY (*Acacia implexa*, Benth.).
- 150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.)
- 152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).
- 153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).
- 154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (*Two Plates.*)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andrewsii*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (*Two Plates.*)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (*Two Plates.*)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (*Two Plates.*)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muelleri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya fetida*, R. T. Baker).

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations.)*  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muelleriana*, Howitt).  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenioides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betche).

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hæmastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

*Recapitulatory. (Fifty-seven Plates.)*

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 4.*

*Published by Authority of the*  
*GOVERNMENT OF THE STATE OF NEW SOUTH WALES.*



*PART XLIV* OF THE  
COMPLETE WORK.

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANDONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniocalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).
- THE CYPRESS PINES OF NEW SOUTH WALES (Genus *Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muellieri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleæfolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
  - 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
  - 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
  - 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).
- (N.B.—The numbers of Part XIV are given erroneously in the text.)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxyylon*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.).
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)



THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLIV.

*Published by the Forest Department of New South Wales, under authority of  
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*Telopea oreades*, F.v.M.

Gippsland Waratah.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Telopea*, R.Br.

*Flowers* hermaphrodite.

*Perianth* irregular, the tube open early on the under-side, tapering and recurved under the limb, the laminae oblique, broad.

*Anthers* broad, sessile at the base of the laminae, the connective not produced beyond the cells.

*Hypogynous glands* united in a short very oblique nearly complete ring.

*Ovary* contracted into a long stipes and tapering into a long style, clavate at the end, with a lateral stigma; ovules several, imbricate upwards in two rows, laterally attached near the base.

*Fruit* a recurved coriaceous follicle.

*Seeds* flat, terminating in a nearly straight or oblique membranous wing. Tall shrubs.

*Leaves* alternate, entire or toothed.

*Flowers* pedicellate in pairs, in very dense globular or ovoid terminal racemes, surrounded by an involucre of imbricate coloured bracts, the bracts within the raceme small.

*Perianths* as well as the whole inflorescence red.

The genus is endemic in Australia. It is allied in many respects to *Hakea*, differing chiefly in the number of ovules and seeds, and in habit. (*B.Fl.* v, 533.)

**Botanical description.**—Species, *T. oreades*, F.v.M., in *Fragm.*, ii, 170 (1860).

A shrub with the habit of *T. speciosissima*, the branches slightly ferruginous-pubescent, the foliage glabrous.

*Leaves* obovate-oblong or almost lanceolate, acute or obtuse, 4 to 8 inches long, tapering into a long petiole, entire or rarely with a few teeth at the end, usually glaucous underneath, the veins scarcely conspicuous except the midrib.

*Racemes* short, broad, and dense, as in *T. speciosissima*, but the glabrous involucre in one specimen coloured and obtuse with the inner bracts, 1 inch long, in the other specimens all herbaceous rigid mucronate, and the inner ones scarcely  $\frac{1}{2}$  inch long.

*Flowers* of *T. speciosissima*.

*Fruit* 3 inches long, besides the stipes and persistent style. (*B.Fl.* v, 534.)

Mueller's brief description of it in *Key to the System of Victorian Plants*, i, 277 (1888), is—

Finally quite arborescent; branchlets also glabrous; leaves large, firm, mostly obovate-lanceolar entire, their ultimate venules subtle; corolla crimson, slit unilaterally; glandule at the upper end of the stalklets rather conspicuous.

**Botanical Name.**—*Telopea*, from the Greek *telopos*, “perceived from afar,” in allusion to the conspicuous crimson flowers of the species first described (*T. speciosissima*, the Sydney Waratah); *oreades*, the mythological name of mountain nymphs (Greek), from *oreas*, belonging to the mountains. As regards the present plant, it is always found in mountainous districts.

**Vernacular Name.**—“Gippsland Waratah” is a name which was given to this plant a long time ago, and I do not feel inclined to disturb it. At the same time it may be misleading, as the species occurs at least as far north as the Fitzroy Falls, near Moss Vale, N.S.W.

**Leaves.**—The drawing was made from New South Wales specimens, which are much narrower in leaf than those from Gippsland, Victoria.

Bentham’s description is evidently based on specimens from Gippsland, in which the leaves are often 4–8 inches long.

There is a figure of the species at Fig. 72, *Key to Syst. Vict. Plants* (Mueller), but I have never seen the leaves as short as depicted.

**Fruits.**—The seeds of this species are rich in Aleurone grains, according to Tassi in *Bull. Lab. Orto Botanico* (Univ. Siena), Ann. i. Fasc. 2–3 (1898), p. 118 and t. xii.

Bentham describes the fruits as 3 inches long including the stipes and persistent style. The fruits of the New South Wales specimens barely exceed 2 inches in length, so far as seen by me.

**Timber.**—It is one of the handsomest of the Proteaceous timbers, and would prove valuable for cabinet work. It is not used, except for tool-handles. It is a very good working timber, of medium depth of colour.

Mr. W. Baeuerlen informed me that the miners in the Delegate district preferred this wood to any other for their pick handles, on account of its elasticity. It requires most careful seasoning. The young shoots or suckers are sometimes used for basket making.

**Size.**—It has a diameter of  $1\frac{1}{2}$  up to 2 feet, and a height of 30 to 40 feet (Baeuerlen).

Attempts to cultivate it in the Sydney district have been a failure so far. The flower is not so conspicuous as that of *T. speciosissima*, partly because it is smaller and partly because the flower is crimson and not scarlet; but it is a desirable shrub or small tree nevertheless.

**Habitat.**—The type locality (*Fragm.*) is Nungatta Creek (now spelt Nangutta) and Weatherhead. The Nangutta flows into the Genoa River, and is entirely on the New South Wales side of the border, and not in Victoria as Mueller believed at the time (*6th Index of Plants of Victoria*), and as it is recorded by





M. Floc. K. m. lith.

GIPPSLAND WARATAH.

(*Telopea oreades*, F.v.M.)

Bentham (*B. Fl.* v, 535). The correction is not now of importance, as the species has been frequently found in Victorian (Gippsland) territory since, and at the time Mueller described the species the Victorian-New South Wales border at this spot was little known. It was indeed not marked until 1870-2 by Messrs. Black and Allan.

Where "Canus River, Gippsland," quoted by Bentham is, I do not know. Perhaps it is a misprint for the Cann, otherwise called Tamboon.

As regards New South Wales, it is not rare near the New South Wales-Gippsland border.

I have it from Bonang, near Delegate (W. Forsyth), Monga or Sugarloaf Mountain, near Braidwood (W. Baeuerlen and J. L. Boorman), Charlie's Forest, Currockbilly, near Braidwood (J. L. Boorman). Mr. E. Seccombe tells me he has collected it at Nerriga.

Mr. W. Forsyth told me that he had collected it near the Fitzroy Falls, Moss Vale; but I have no specimens. Additional localities should be recorded.

#### EXPLANATION OF PLATE 163.

- A. Flowering twig.
  - B. Bud.
  - C. Bud more advanced.
  - D. and E. Front and back views of opened flower.
  - F. Side view of same.
  - G. Pistil, showing—
    - (a) Stipitate ovary.
    - (b) Style.
    - (c) Stigma.
    - (d) Hypogynous gland.
    - (e) Pedicel.

The stipes is just above (d), and is not indicated by a letter.
  - H. Anthers (a) sessile at the base of the laminae.
  - K. Follicle (from a specimen in the Botanic Gardens, Melbourne, kindly sent by Mr. J. Cronin).
  - L. Winged seed.
  - M. Broader leaf.
  - N. Leaf from Gippsland, Victoria.
- All the rest are drawn from a specimen collected in the Braidwood district.

No. 160.

*Eucalyptus bicolor*, A. Cunn.

Black or Flooded Box.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. bicolor*, A. Cunn. Herb.; Hook. in Mitch. *Trop. Austr.* 390.

A large shrub or sometimes a tree of 30 to 40 feet, with a persistent ash-grey or blackish bark (F. Mueller, A. Cunningham), or a tall tree with a smooth white bark (Dallachy).

*Leaves* lanceolate, narrow or rarely passing into ovate-lanceolate, mostly 3 to 4 inches, but sometimes 5 or 6 inches long, not very thick, often glaucous or pale coloured, the veins fine, oblique, not close, the marginal one at a distance from the edge and sometimes very prominent towards the base of the leaf.

*Flowers* small, about 3 to 8 together on short peduncles, the umbels forming usually axillary or terminal panicles shorter than the leaves.

*Pedicels* shorter than the calyx.

*Calyx-tube* turbinate, nearly  $1\frac{1}{2}$  lines long.

*Operculum* rather thin, hemispherical, obtuse or umbonate, shorter than the calyx-tube.

*Stamens* 1 to 2 lines long, all perfect or occasionally a few of the outer ones without anthers; anthers small, with 2 small globular cells opening in round pores or short oblong slits.

*Ovary* flat-topped.

*Fruit* globular-truncate or pear-shaped, about 2 lines diameter or rarely nearly 3, contracted at the orifice, the rim rather broad, flat, or depressed; the capsule somewhat depressed. (*B. Fl.* iii, 214.)

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *bicolor*, a Latin word, signifying two-coloured, in allusion to the fact that pinkish or even crimson flowers are often found on this tree intermixed with the greatly preponderating white ones.

Allan Cunningham in his MS. Journal, under date 30th June, 1817, says—“I here gathered specimens of a species of *Eucalyptus* with flowers in terminal panicles of two colours (red and white).”

**Vernacular Names.**—“Black Box,” or “Flooded Box,” are common names, the former owing to the colour of the bark and the latter to the nature of the country the tree commonly frequents. For the same reason it is called “River Box.” It is also called “Drooping Box,” from its habit.



The late Forest Ranger Kidston, a most experienced man, called it "Coolabah" of the Lachlan (several other trees go by this name). The same name is in use on the Bogan. He also called it "Swamp White Box," because of the often greyish or whitish appearance of the bark. It is sometimes also called "White—or Grey Box."

In poorer or drier soil it forms a small tree, sometimes called "Scrub Box," or "Dwarf Box."

It is an abundant and well-known tree and can be recognised without difficulty after a little practice. The names I recommend for this tree are as good as any.

**Aboriginal Names.**—The "Goborro" of the aborigines of western New South Wales; "Marura" is another name.

The following extracts from Mitchell's *Three Expeditions* are interesting in this connection:—

The alluvial portion of the margin of the Darling is narrow, and in most places overgrown with the Dwarf Box (Mitchell's *Three Exped.* i, 302).

. . . the trees which grew along the banks of the Lachlan. All were of the Dwarf Box kind, named Goborro by the natives, a sort of Eucalyptus which usually grows by itself on the lower margins of the Darling and Lachlan, and other parts subject to inundation, and on which the occasional rise of the waters is marked by the dark colour remaining on the lower part of the trunk. (*Op. cit.* ii, 30.)

Clumps of trees of the Flooded Box or "Marura" of the natives appeared occasionally (near the Lachlan) in and about the many hollows in the surface (ii, 49).

The small kind (of Eucalyptus) covered with a rough bark, and never exceeding the size of fruit trees in an orchard, and called, I believe, by Mr. Oxley, the Dwarf Box, but by the natives Goborro, grows only on plains subject to inundation, and it usually bears on the lower part of the trunk the mark of the water by which it is at times surrounded. Between the Goborro and the Yarra (*E. rostrata*) there seems this difference: the Yarra grows only on the banks of rivers, lakes, and ponds, from the water of which the roots derive nourishment; but when the trunk itself has been too long immersed, the tree dies, as appeared on various lakes and in reedy swamps on the Lachlan. The Goborro, on the contrary, seldom grows on the banks of a running stream, but seems to thrive in inundations, however long their duration (ii, 55).

As has been already stated, the name Coolabah (which is of aboriginal origin) is applied to these trees in the Lachlan district. It is also in use about Murrumbidgee (Dubbo district). Dr. T. L. Bancroft tells me that the same name is in use for the same tree on the Diamantina in Western Queensland. It also bears the same name on the Mulligan River.

"Curra Curra" of the aborigines, Wilcannia district (P. Corbett).

The name "Booligal" is sometimes applied to it, and is possibly the origin of the name of the township.

**Synonyms.**—*Eucalyptus largiflorens*, F.v.M.; *Eucalyptus pendula*, A. Cunn. For an account of these synonyms, see my "Critical Revision of the genus Eucalyptus," Part XI, p. 7.

**Leaves.**—Mr. F. B. Guthrie, in *Agric. Gazette, N.S.W.*, October, 1899, has analysed these leaves under the name of "Booligal," with the following result :—

Water.	Ash.	Fibre.	Ether extract (oil, &c.).	Albumin- oids.	Carbo- hydrates.	Nutrient value.	Albumin- oid ratio.	Tannin (oak bark).
16.07	4.13	9.05	7.24	6.75	56.76	80	1 : 11	5.6

**Gum leaves sometimes edible, sometimes not.** I have for many years made inquiries in regard to the fodder-value of our native vegetation. It is very easy to say whether certain plants are edible or not, but in regard to some of our trees and shrubs it is simply impossible to reconcile the statements concerning them. From the same district one receives the same species of plant in two different parcels, with the label that stock eat the one and reject the other. The plants are not even in a different stage of growth; they simply are identical in every respect. If they were sent at different times by different people one might solemnly record them as edible or the reverse, and the information, without qualification, would be misleading.

The fact of the matter is, there are two factors, the plant and the animal. The plant may vary and be edible in one district or at a particular season of the year, or particular sheep, cattle, or horses may be fond of this particular plant, while others may reject it. In other words, all plants of the same species may not be edible, and all animals of the same kind may not show partiality to the same plants.

Animals have their idiosyncrasies just as men have, liking one kind of food and disliking another. If we could but persuade some Australian animals that certain plants are *so* nutritious and palatable if they would only take our advice, what a different place Australia would be! Much depends on the district in which an animal is bred; much depends on habits of feeding he has recently formed—in other words, as regards foods an animal may be bred from infancy in the midst of certain food, and use of it may be quite natural to him, or through necessity he may have become educated to it. In either case he will eat similar food in another district or reject dissimilar.

If the flock or herd be of mixed origin (in the above sense), when they come to a new locality some of the animals will eat a certain plant, while others will reject it.

I published a note on Edible and Non-edible Red Gum-leaves (*Eucalyptus rostrata*) in the *Agricultural Gazette* for June, 1899, p. 496. I got specimens from Moulamein, absolutely identical as far as I could see, with the labels from the same gentleman that sheep were fond of one and rejected the other.

Then from Marra Creek, *viá* Nyngan, I have received several specimens of twigs of "Box, Drooping Box, or Coolabah" (*Eucalyptus bicolor*, A. Cunn.), *i.e.*, the tree now figured and described, with the following notes :—(1) Sheep will not

eat; (2) sheep very fond of this; (5) sheep will eat; (6) sheep fond of this; (8) sheep will not eat. The twigs are all from the same species, though doubtless from different trees, and were collected by an esteemed correspondent of the Department (Mr. Grigg).

From Warena Run, Castlereagh River district, I have received specimens of "Bimble Box" (*Eucalyptus populifolia*, Hook. f.) from the same gentleman. They appear to be absolutely identical, yet (1) is labelled, "Stock will eat"; (2) "Stock will eat, but do not care too much for it"; (3) "Stock will not eat."

Discussing the matter with Mr. R. H. Cambage, that gentleman gave me the following example with regard to one of the She-oaks (*Casuarina*) of the interior:—

An old resident mentioned that a man had brought a team of bullocks a distance of over 100 miles, and when camping inquired from my informant what trees were good for feed. On being told that the Belah (*Casuarina Cambagei*) was one of the best in this locality, he thereupon cut down a number of branches, only to find his bullocks reject them. He therefore went further afield, and some time afterwards returned to say his bullocks had had a great blow-out on Bull-oak (*Casuarina Luehmanni*). When telling me of this, my informant appeared amused at the recollection, for it seemed to him that these travelling bullocks must have a queer palate to prefer Bull-oak to Belah, but the driver explained that they were used to the former in their native district.

I would cordially invite correspondence on the very interesting subject I have brought before my readers. In deciding what are fodder-plants, it should be remembered that during the recent drought stock ate almost anything, but plants that animals only eat as a last resource should not be accounted fodder-plants.

Messrs. Baker and Smith (under the name *Eucalyptus pendula*) give the following statement of the composition of this oil:—

Whence obtained for Oil.	Specific Gravity at 15° C.	Specific Rotation $[\alpha]_D$ .	Saponification Number.	Solubility in Alcohol.	Constituents found.
Nyngan, N.S.W. ...	0·9155 to 0·9161	+ 6·0°	8·4	1½ vols. 70 %	Eucalyptol, pinene.

#### Seed.—

In the wet season, when the Nardoo is not procurable, the blacks derive a good deal of their support from the seed of a myrtaceous tree, which I believe to be a species of *Eucalyptus*, and known there by the name of "Yellow Box." When the fruit is nearly ripe a small patch is cleared round the tree, and confined by branches to prevent the fruit from escaping when thrown on the ground; when a sufficient quantity has been cut down they are allowed to remain on the ground till the capsule bursts and discharges the small seed, which is then collected into the "cogie," and afterwards manufactured like Nardoo.—(O'Shanesy's *Contributions to the Flora of Queensland*, 1879, pp. 27 and 28.)

Mr. Herbert Clark, of Killaw, Mulligan River, brought me seeds of the Coolabah (*Eucalyptus bicolor*), and informed me that this seed is prepared for food by the natives of the Mulligan in the way described by Mr. O'Shanesy above.

Dr. Roth, Bulletin No. 3, *North Queensland Ethnography*, says :—

*Eucalyptus bicolor*, A. Cunn.—A staple article of diet in the Boulia district when grass seed is scarce. With a hooked stick some terminal branches of this tree are pulled down, and, just as they are, spread out to dry on a piece of ground cleared for the purpose. Here they lie, according to the heat of the sun, for half a day or a day, till sunset or the following morning. The ends of the branches are then all collected together, and the seed obtained by damping the distal extremities and brushing them off into the water, as in the case of the *Sporobolus actinocladus*. Before the ultimate drying, however, the seed is kept for a couple of hours or so in water, which during this time is repeatedly changed, so as to remove all traces of the taste of the gum. After being ground on the proper "grinding stone" it is eaten raw. Boulia, "Kárrapari."

**Timber.**—Mr. R. J. Dalton, of Wanaaring, says :—

*Box Trees.*—There are several varieties of Box ; some are good for all kinds of work, while others, especially a kind which we call Swamp or Black Box, is very indifferent, not even being good for firewood. This is *Eucalyptus bicolor*.

The aborigines used to make narrow shields of it.

It does not appear to be a favourite timber. While used for fencing, it is not a favourite, because of its hardness, interlocked and crooked character, making it difficult to obtain either posts or rails. It is, however, very durable.

**Size.**—A spreading tree of medium size, with a trunk diameter of 2 or 3 feet ; the trunk is, however, not long.

**Habitat.**—It seems to be confined to South Australia, Victoria, New South Wales, and Queensland.

From St. Vincent's Gulf and the Murray River and its lower tributaries, through eastern Australia, and particularly its eastern tracts to Carpentaria, at least as far as the Flinders and Gilbert Rivers, but reaching also, in some places, the coast tracts. (Mueller, in *Eucalyptographia*.)

This reference to "coast tracts" applies, as regards eastern Australia, to Queensland solely. *E. bicolor* is a dry country species, and in central and northern Queensland many western New South Wales species approach the coast. It prefers rich flats, which are liable to occasional submergence.

As regards South Australia, I have only seen it from Mannum ; but should expect to find it with a fairly wide range in that State.

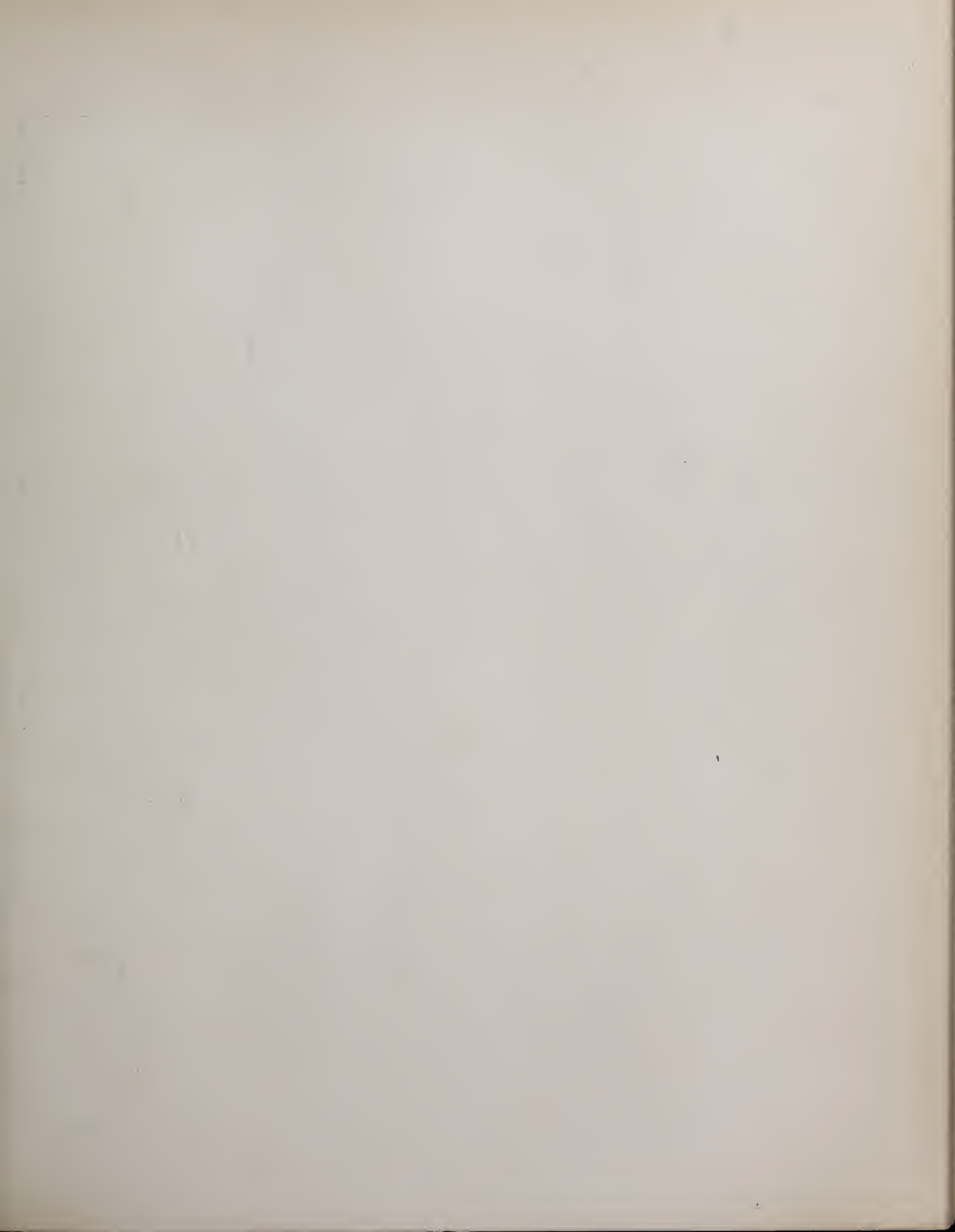
As regards Victoria, it is not rare in the north-west. Following are descriptions of it :—

"Box, growing from Swan Hill to Mildura, on the river flats. Habit spreading, bark greyish, close and even" (W. S. Brownscombe).

"A Box, low straggling tree, something like *E. melliodora* (Yellow Box) in habit. The leaves have, however, generally a bluish tint. Tree, 2 feet 6 inches in diameter, perfectly sound, with fine hard red timber, and very little sapwood. Kerang, also Bumbang, near Euston, N.S.W." (J. Blackburne).

8-10 miles N.W. of Nhill, on somewhat moist flats (St. Eloy D'Alton) ; N.W. of Lake Albacutya (C. French).

New South Wales is the State in which it is the most abundant.





M. Flockton. del.

BLACK OR FLOODED BOX.

(*Eucalyptus bicolor*, A. CUNN.)

In my "Critical Revision of the genus *Eucalyptus*," Part XI, I have given the localities in considerable detail, and my readers are referred to them.

It is common in the Riverina. It is abundant on the Lachlan, Darling, and Paroo, thence more northerly into an extensive area of Queensland.

Scone is the most eastern New South Wales locality so far recorded. It is what we call a "dry country" species.

Turning to Queensland, it is found in the Diamantina, Mulligan, and other districts, under conditions very similar to those in New South Wales. It probably extends the greater part of the distance to the Gulf of Carpentaria.

It is one of the most widely diffused of the *Eucalypts*, and I do not doubt that more careful search will very greatly extend its recorded range.

Specimens from Mount Elliott (Fitzalan and Dallachy) were placed by Bentham with this species, but the matter should be looked into when fruits and other evidence are available.

#### EXPLANATION OF PLATE 164.

- a. Sucker leaves.
- b. Flowering twig with immature fruits.
- c. Mature fruits.

No. 161.

*Acacia buxifolia*, A. Cunn.

(Including *A. lunata*, Sieb.)

The Box-leaved Wattle.

(Family LEGUMINOSÆ: MIMOSEÆ.)

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)

**Botanical description.**—Species, *A. buxifolia*, A. Cunn., (1825).

The following is the original description :—

50. *Acacia buxifolia*.—Glabra, foliis ovatis acutis: margine superiore uniglandulifero, capitulis racemosis axillaribus folio duplo longioribus. Pine Ranges, Macquarie River. (A. Cunn. in Field's *New South Wales*, 344), which is translated as follows :—

Glabrous; phyllodia ovate, acute, bearing a gland on the upper margin; heads of flowers axillary, twice the length of the phyllodia. Native of New Holland, in pine ranges at Macquarie River. *A. conferta*, Cunningham. MSS. (G. Don's "General History of Dichlamydeous Plants," ii, 406.) The synonym of *A. conferta* quoted is an error.

Then we have the figures and description in the *Icones*, which are valuable in that the figure is made from a co-type and the description amplifies that of the original :—

Tab. CLXIV. *Acacia buxifolia*.—Glabra, ramis virgatis, phyllodiis oblique lanceolatis obscure venosis marginatisque acutis, glandula infra medium marginis superioris sæpe obsoleta capitulis racemosis axillaribus phyllodia duplo longioribus.

*Acacia buxifolia*.—*All. Cunn. in Field's Austral.* v. 2, p. 344, n. 50. Hab. Pine (*Callitris*) ranges, Macquarie River. *Allan Cunningham, Esq.*

A shrub; with slender twiggy branches, and numerous, nearly erect, lanceolate, very smooth and glabrous phyllodia, on which the marginal gland is sometimes conspicuous, but more generally wholly wanting. Racemes of 4-6 globose capitula, longer than the leaves, deep yellow. (Hooker's "*Icones Plantarum*," ii, 164 (1837).

Bentham's description is :—

A glabrous shrub with angular branchlets.

*Phyllodia* obliquely oblong-lanceolate, somewhat falcate, narrowed at each end, usually under 1 inch, rarely 1½ inch long, rather thick, with a scarcely prominent nerve and obscure veins, the marginal gland small or none.

*Racemes* scarcely exceeding the phyllodia, with several small globular heads of 8 to 12 or rarely more flowers, mostly 5-merous.

*Calyx* short, broad.

*Petals* smooth.

*Pod* straight or curved, flat, 3 or 4 lines broad.

*Seeds* longitudinal, close to the upper suture; last fold of the funicle thickened into a lateral club-shaped aril, the lower ones very small. (*B.Fl.* ii, 372.)



Now let us turn to *A. lunata*, Sieb.

Following is the original description, dated 1825 :—

45. *A. lunata* (Sieb. l.c. n. 461) phyllodiis dimidiato-oblongis subfalcatis basi angustatis mucrone calloso obliquo terminatis infra medium ad latum convexius glandulâ minutâ instructis, ramisque glabris, capitulorum racemis phyllodio longioribus. Hab. in Nova-Hollandia. Phyllodia pollicem longa, 3 lin. lata subnervia, nervo laterali secus latus rectius. (v.s. sine fr.) (DC. *Prod.* ii, 452).

This is freely translated by G. Don in his "General History of Dichlamydeous Plants," ii, 406 (1832) in the following words:—

*A. lunata* (Sieb. pl. exsic. nov. holl. no. 461) phyllodia obliquely oblong, rather falcate, narrowed at the base, terminating in an oblique callous mucrone, convex beneath the middle on the margin, and furnished with a minute gland in the convex part, and are glabrous, as well as the branches; heads of flowers disposed in racemes, which are longer than the phyllodia. Native of New Holland. Phyllodia an inch long, and 3 lines broad, almost veinless, with a lateral nerve running along the straight side. Native of New Holland. Lindl. bot. reg. 1352. Lodd. bot. cab. 384, Sweet fl. austr. t. 42.

Lunate-leaved Acacia. Fl. April, May. Clt. 1810. Shrub, 2 to 4 feet.

Through the kindness of Kew I have a piece of the type (Sieber's Pl. Exs. Nov. Holl. No. 461), and also a drawing (by Miss M. Smith) of the large original specimen at Kew.

I have also a specimen of Sieber's *Fl. Mixt.* No. 600, quoted by Bentham as this species.

These specimens agree in every particular with a Wattle collected by Mr. R. H. Cambage and myself in flower in September, and by Mr. C. T. Musson in fruit in November. It was found in the Hawksbury Agricultural College Grounds near Richmond, and thence to near the Grose River.

The species was described by Bentham in the following words:—

A glabrous shrub of several feet, with angular branchlets, often glaucous.

*Phyllodia* oblong-falcate or almost ovate, but very oblique, obtuse or with a minute oblique or recurved point, rarely 1 inch long, 3 to 6 lines broad, coriaceous, 1-nerved, obscurely veined, the margins scarcely thickened, the gland minute or none.

*Racemes* longer than the phyllodia, with several small heads of 4 to 10 comparatively large flowers, mostly 5-merous.

*Calyx* short and broad.

*Petals* smooth.

*Pod* flat, glaucous, straight or curved, 3 to 4 lines broad.

*Seeds* longitudinal, close to the upper suture, the last fold of the funicle thickened into a lateral club-shaped aril, the lower folds very small. (*B.Fl.* ii, 373.)

Bentham, speaking of *A. lunata*, says:—

Without the fruit this species may readily be confounded with *A. prominens*; the phyllodia are, however, more coriaceous, with the veins less conspicuous and the flowers in the heads usually rather fewer and larger. (*B.Fl.* ii, 373.)

I have already referred to the confusion of these two species in Part XLIII.

The works quoted by Bentham are as follows:—

- (1) *Bot. Reg.* t. 1352 (1830). (Syn. quoted by Don.)

Lindley, in publishing his plate, says: "This is said to be a very variable species; and such it appears to be, if we are to judge from the figures that have been published of it, no two of which represent exactly the same state." . . .

"A native of Van Diemen's Land." . . . This is a mistake.

The frequency with which it was figured is testimony to the extent to which it was cultivated as an ornamental plant.

Lindley called it "Crescent-leaved Acacia," and the pointed character of the phyllode is brought out in his drawing.

- (2) Lodd. *Bot. Cab.* t. 384 (1819). (Syn. quoted by Don.)

"The leaves are about an inch long, in form resembling the moon at three or four days old." The figure is not very characteristic, but there is no doubt it was drawn from a cultivated specimen of *A. lunata*.

A specimen received from Kew, bearing the following label—

"Acacia buxifolia, A. C. (*nota bene*, J.H.M.)

"(named by Bentham)

"Blue Mountains, N. Holland."

"Coll. probably Fraser," is very similar to t. 384, just referred to.

It is from a *lunata* locality, and certainly nearer to typical *lunata* than to typical *buxifolia* in my view. This is an instance of the difficulty of endeavouring to keep the species apart.

- (3) Sweet, *Fl. Austral.* t. 42 (1827-8). (Syn. quoted by Don.)

"Lunate-leaved Acacia." Stated to be the *Acacia brevifolia* of *Bot. Cab.* 1235.

This beautiful species is one of the most variable plants in the genus, scarcely any two of them raised from seeds being alike. Mr. Loddiges has figured the short broad-leaved one as a different species, under the name of *A. brevifolia*; but this is the most common state of the species, and we have frequently raised that and his *A. lunata* out of the same pod of seed. . . .

(Sweet). His plate of *A. lunata* is excellent, but he repeats the error that it is a native of "Van Diemen's Island."

- (4) F. Muell. *Pl. Vict.* ii, 17 (partly).

I wrote to Kew asking what publication Bentham had in view, and I received the following reply:—

The publication referred to by Bentham in his *Fl. Austral.* ii, p. 373, as "F. Muell. Pl. Vict.," is Mueller's "Plants indigenous to the Colony of Victoria," the first volume of which was completed, but of the second volume, only a fragment containing part of the Leguminosæ and with no Title-page was issued. On page 17 will be found the description of *Acacia lunata*, referred to by Bentham, *l.c.*

Vol. i is a well known publication, but I have been unable to consult the Vol. ii as above defined, and therefore not Mueller's description of *Acacia lunata*. Probably only a few copies were issued.

Prof. Ewart, in 1910, published a "Plants indigenous to Victoria, Vol. ii," consisting of some of Mueller's drawings not previously published, and some of his own. In the preface he has given some bibliographical explanation, but the fact that there are now two Volumes ii of the work, the imperfect one quoted by Bentham in the Flora Australiensis, and the totally distinct one published by Prof. Ewart, will give bibliographers trouble in the future.

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *buxifolia*, from two Latin words signifying box (*buxus*) and leaf (*folium*), like the European Boxwood, which has a leaf resembling those of this Wattle a good deal in outline.

**Vernacular Name.**—I propose the name "Box-leaved Wattle" as good as any. Speaking of *A. lunata* (the Wattle with moon-shaped leaves), Lindley called it the "Crescent-leaved Acacia" and Sweet the "Lunate-leaved Acacia."

**Synonyms.**—Bentham quotes the following :—

- (1) *A. falcinella*, Tausch. in *Flora* 1836, 419. I have not seen this volume.
- (2) *A. brevifolia*, Lodd. *Bot. Cab.* t. 1235 (?) (1827).

Raised from seeds collected in 1823. Although Bentham marks it with a query, I have no doubt (with Sweet) that the plant is *A. lunata*, Sieb.

- (3) *A. oleaeifolia*, A. Cunn. in G. Don. *Gen. Syst.* ii, 405.

"*A. oleifolia* (Cunningh. MSS. Loud. *hort. brit.* 407) stipulas small, caducous, phyllodia ovate-oblong, oblique, marginate falcate at the apex, mucronate, and are, as well as the branches, pubescent; heads solitary, axillary, length of the phyllodia. Native of New South Wales."

*A. uncinata*, Lindl. *Bot. Reg.* 1332.

Olive-leaved Acacia. Clt. 1824. Shrub 4-6 feet.

It may be that *A. oleaeifolia* is a synonym of *A. lunata*, but the synonym quoted by Don (*A. uncinata*) refers to a very different plant.

I have not seen *A. oleaeifolia*.

- (4) *A. dealbata*, A. Cunn. in Field, *N.S.W.* 345, not of Lindl.

Cunningham's words are :—

Pallido-glaucescens, foliis ellipticis ovatisve glabris obliquis mucronatis : mucrone innocuo : margine superiore uniglanduloso, racemis erectis axillaribus, leguminibus albedo-pulverulentis furfuraceis. A slender shrub of recent discovery. Hills on the Cugee-gong River, 50 miles north of Bathurst.

I have seen a specimen through the kindness of Kew.

(5) *A. furfuracea*, G. Don, *Gen. Syst.* ii, 405.

Glaucous; leaves elliptic or ovate, glabrous, oblique, ending in an innocuous mucrone, bearing a gland on the upper margin; racemes erect, axillary; legumes covered with white furfuraceous powder. Native of New Holland, on hills on Cugee-gong River, 50 miles from Bathurst. *A. dealbata*, Cunningh. in Field's New South Wales, p. 345, but not of Link. A slender shrub.

I have seen a specimen through the kindness of Kew.

Other synonyms are:—

(6) *A. lunata*, Sieb.(7) *A. neglecta*, Maiden and Baker.

*A. buxifolia*, A. Cunn. is "nearly allied to *A. lunata*, and perhaps a variety with narrower, straighter phyllodia, and some specimens appear almost to pass into *A. decora*." (*B. Fl.* ii, 373.)

This was the sagacious Bentham's view, and experience gained since that was written justifies the mergence of one into the other as a synonym.

With a large series of specimens of the two forms such as I have, and my wide experience of the plants as they grow in the bush, I find it absolutely impossible to maintain the species apart. The work has not been inconsiderable, and I take the opportunity of recording the valuable help I have received in this connection from Mr. Edwin Cheel, Botanical Assistant, Botanic Gardens, in this and many other matters.

Both names were published in the year 1825, and inquiries made in Europe fail to elicit which is the earlier. I have, therefore, adopted the name *buxifolia*, since thereby less disturbance of nomenclature will result.

The shape, texture and colour of the phyllodia are the result of environment, and I am unable to propose varieties of the species, although odd forms, taken here and there, seem dissimilar enough.

In *Proc. Linn. Soc. N.S.W.*, xix, p. 163, t. xiii, (1894), Mr. Baker and I figured a plant which we named *Acacia neglecta*, and discussed its relations with *A. lunata*. I think the foundation of the species was fully justified under the then existing circumstances.

In the same publication, xxv, p. 661 (1900), Mr. Baker has the note—

Bentham (*B. Fl.* ii, 373), when describing this species (*A. lunata*) states that the seeds are close to the upper suture of the pod. Specimens having this feature have been obtained on Forest Reserve No. 1, Mulwala, N.S.W., by Mr. Wyburd. This is the first time I have ever found pods corresponding to Bentham's description.

The *Acacia* generally passing under the name of *A. lunata* is *A. neglecta*, Maiden and Baker.

In my "Wattle and Wattle Barks," 3rd Edition, 1906, p. 68, it is proposed to make it a variety of *A. buxifolia*.

It seems to be a form of *A. buxifolia* with more elliptical phyllodes, not rare in the Mudgee district, but the transition between this form and normal *buxifolia* and *lunata* is so complete that I do not suggest that it may be looked upon as a variety.

**Size.**—Quite a small shrub, never affording timber. It is usually 3 to 6 feet high, a shapely shrub, one of the most beautiful of the genus, and hence in cultivation for over three-quarters of a century. In its native habitats it forms balloons of gold every spring.

The form originally named *neglecta* would appear to be larger than the normal species, forming a spindly shrub of 10–12 feet, but it remains to be seen if there are important differences.

**Habitat.**—It is essentially a New South Wales species, with a very wide range, being found in the coast districts, mountain ranges and tablelands, and on the plains. It occurs in southern Queensland (Stanthorpe), and I expect to see it recorded from northern Victoria.

Bailey ("Queensland Plants") records it from Queensland on Mueller's authority, but I believe that the specific locality I give in this work is the first one recorded for that State.

Bailey also records *A. lunata* for Moreton Bay on the strength of a plant collected by Allan Cunningham. I suggest that *A. fimbriata* is referred to, and the confusion is cleared up at pp. 63 and 64, Part XLIII, of the present work.

#### NEW SOUTH WALES.

Following are southern localities:—

Berrima (J. L. Boorman and J.H.M.); Bowral (W. Greenwood, No. 140); Bowral to Bullio (R. H. Cambage and J.H.M.); Yass Junction (W. M. Carne, No. 12). A form with remarkably acuminate phyllodia.

"Dense bushes, 6–8 feet. In valley, head of Tuross River, Kybean."  
(R. H. Cambage, No. 2,000.)

Rhachis pubescent and with some slight differences in the individual flowers, which might be of importance if the pods (when available) should prove to be different.

There is no doubt that it is very close to typical *lunata*, and may be safely placed with it. The locality is so close to the Victorian border that it is most likely that search will reveal this form in the southern State.

Following are localities at the foot of the Blue Mountains: Grose River and banks of Nepean River near confluence with the Grose (R. H. Cambage and J.H.M.); Hawkesbury Agricultural College, Richmond (C. T. Musson).

Following are from the Blue Mountains and Bathurst district :—Wentworth Falls (W. Forsyth); Mount Victoria (J.H.M.); Clarence Siding (J.H.M. and J. L. Boorman); Clarence to Wolgan (H. Deane); Jenolan Caves (J.H.M.); Eskbank (R. H. Cambage); Mount Blaxland to Rydal (R. H. Cambage and J.H.M.); near Peel (Bathurst to Sofala), with very small phyllodia (R. H. Cambage and J.H.M.).

Apsley, Bathurst (R. H. Cambage). Hooker's *Icones*, t. 164, was drawn from a specimen remarkably similar to this.

I have also received a specimen from Kew, labelled *A. buxifolia* (so named by Bentham) "collected Blue Mountains, probably Fraser." It is the form figured at t. 384, Loddiges' *Bot. Cab.*, and I do not see in what way it can be separated from the rest of the Blue Mountains *lunata*.

Following are western and south-western localities:—Canoblas, Orange (H. I. Jensen); Bumberry, near Molong (J. L. Boorman); Cumnock, 5–6 feet, found in stony places (W. R. Glasson); Parkes Water Supply (J.H.M.); Mount McDonald (J. L. Boorman and J.H.M.); Warrumbungle Ranges (W. Forsyth); Coonabarabran (J. L. Boorman); Timor Rock, Coonabarabran (J. L. Boorman); Dubbo (R. H. Cambage, No. 1,056); 3–5 feet, common (J. L. Boorman); Peak Hill (J. L. Boorman); Wyalong (J. E. Carne), to be confirmed with pods.

Blue Bush, considered almost as great a pest as Black Wattle (*A. hakeoides*) in the Lachlan and Riverina districts (the late Forester Taylor, Wagga Wagga); Mudgee (N. Taylor); Kelgoola, source of the Cudgegong River, 25 miles east of Rylstone (R. T. Baker).

The following three plants were formerly named *neglecta*, and are all from the Mudgee district :—

- (a) Taloobie, near Bylong Creek, 25 miles north of Rylstone; also Camboon, 7 miles north of Rylstone (R. T. Baker).
- (b) Mudgee district, "Lanky Acacia," 8–10 feet high, with a thin stem (J. D. Cox).
- (c) Gulgong (J. L. Boorman and J.H.M.).

Following are New England localities :—

Howell (J. L. Boorman and J.H.M.); Warialda, apparently rare; narrow phyllodes (Rev. H. M. R. Rupp, J. L. Boorman); New England (C. Stuart).

#### QUEENSLAND.

Stanthorpe. "Not plentiful, and does not grow so high as in warmer districts." (J. L. Boorman.)





M. F. Lackham del.

BOX-LEAVED WATTLE.

(*Acacia buxifolia*, A. CUNN.)

A G are typical *A. lunata*, Sieb., and H-Q are typical *A. buxifolia*, A. CUNN. They are specifically identical.



## EXPLANATION OF PLATE 165.

*A. lunata.*

- A. Flowering twig.
- B. Flower-head.
- C. Individual bud and bract.
- D. Mature flower.
- E. Flower, opened out, showing—
  - (a) Calyx.
  - (b) Corolla.
  - (c) Pistil.
- F. Pods.
- G. Seed.

A.—E. drawn from Sieber's *Fl. Mixta*, No. 600, the type, and F. and G from specimens collected near Richmond, N.S.W.

*A. buxifolia.*

- H. Flowering twig.
- K. Flower-head.
- L. Individual bud with bract.
- M. Flower.
- N. Flower, opened out, showing—
  - (a) Calyx.
  - (b) Corolla.
  - (c) Pistil.
- O. Pods (natural size).
- P. Seed (magnified).
- Q. Phyllode (magnified).

H. and Q. are reproduced from Hooker's figure in the *Icones*.

The flower details are drawn from a specimen collected at Timor Rock, Coonabarabran.

The pod and seed were gathered at Bumberry.

No. 162.

## *Litsæa zeylanica*, Nees.

(Family LAURACEÆ.)

### Botanical description.—Genus, *Litsæa*, Juss.

*Flowers* diœcious.

*Perianth-segments* usually 4, equal or nearly so.

*Stamens* of the outer series usually 4, perfect, of the inner series 2 perfect, without staminodia; glands 4, one on each side of the 2 inner stamens; anthers all 4-celled introrse; stamens in the females reduced to staminodia.

*Ovary* imperfect or abortive in the males, free in the females stigma disc-shaped.

*Berry* resting on the flat somewhat or scarcely dilated perianth-tube, the segments persistent or deciduous. Trees.

*Leaves* alternate, frequently crowded and almost whorled at the ends of the shoots, usually penni-veined, but with few primary veins, and the lower pair more prominent so as often to appear triplinerved.

*Flowers* in sessile or nearly sessile clusters surrounded by several very deciduous imbricate bracts. (*B.Fl.* v, 306.)

### Botanical description.—Species, *L. zeylanica*, Nees, *frr. Cinnam. Disput. in Amœn. Bot. Bonn.* i, 58, t. 5.

A large tree, the branches and inflorescence quite glabrous or scarcely hoary, with a very minute tomentum.

*Leaves* ovate-elliptical or elliptical-oblong, acuminate, contracted at the base, 3 to 5 inches long, glabrous and green above, white or glaucous underneath, penniveined but with few primary veins, the lowest pair more prominent than the others.

*Flowers* in sessile clusters in the axils or at the old nodes, on pedicels of 1 to 2 lines usually glabrous as well as the perianths.

*Perianth-segments* ovate-oblong, obtuse.

*Filaments* exerted, with a few hairs about the base; glands of the two inner ones stipitate.

*Berry* globular or slightly ovoid, larger than in *L. dealbata*, resting on the persistent perianth-tube expanded into an entire or slightly angular flat disc of  $2\frac{1}{2}$  to 3 lines diameter, the segments entirely deciduous. (*B.Fl.* v, 307.)

We know so little of the Australian *Litsæas* (and indeed of other Lauraceæ), except as herbarium specimens often examined long after collection, that I feel it incumbent on me to particularly direct the attention of collectors to them. If we know so little about them as herbarium specimens even, we know less of them as timbers and from other economic aspects. The flowers are not conspicuous, and there is a strong family likeness running through these trees, hence they are passed over in the forest.

**Botanical Name.**—*Litsæa*, from the Chinese, Litsé, the name of *L. chinensis*, Lam.; *zeylanica*, a Latin adjective indicating Ceylon.

**Vernacular Name.**—I know of none in Australia. I believe it to form part of the timber sold as “Bolly Gum,” but of this I am not quite sure.

Commonly known as “Wild Cinnamon,” and like it in foliage, but the leaves have scarcely any scent or flavour. (Trimen, *Handbook Flora Ceylon.*)

**Synonyms.**—This tree has a complicated synonymy, which those interested can see on reference to Hooker’s *Flora of British India.*

**Fruits.**—An oil is obtained from the fruit, and used to burn. (Gamble, *Manual of Indian Timbers.*)

**Timber.**—A pale-coloured, fissile, moderately tough timber, with a faint aromatic odour. It is comparatively light in weight, and is of the class of timber known as “Bolly Gum.”

It is not confined to Australia, and since we know so little about it, the experience of other countries may be helpful.

A small evergreen tree. Bark thick, smooth, grey. Wood light brown to yellow, moderately hard, even-grained. Pores small, often subdivided, evenly distributed. Medullary rays fine, numerous. (Gamble’s *Manual of Indian Timbers*, ed. 2, p. 573.)

Wood rather light, moderately hard, even-grained, pale orange; used in house-building. (Trimen, *Handbook of the Flora of Ceylon.*)

Its wood is in use for house-building purposes, planks, rafters, &c.; it is yellowish in colour, straight-grained and tough, and when fresh emits an odour of Sweet Briar. (Beddome’s *Flora Sylvatica for Southern India.*)

It is undoubtedly a useful softwood, and when the softwoods of our brushes are properly recognised by the timber-getter, scores of them which are not at present utilised will become regular articles of commerce. In the time to come it will be found that the Controller of Forests will cut down many brush timbers not at present marketable because of the present small supply, and will stack the timber and classify it in proper depôts. At present the great difficulty is in satisfying repeat orders for so many of our lesser known timbers.

If great demand sets in for our brush timbers, which, in my view, is as certain as that night follows the day, steps must be taken to see that the brushes are not wiped out of existence, by judicious reservations and replantings. Some reservations will be made purely for scenic areas; these and others will be made for conservation of particular species.

In this connection I would like to emphasise a couple of passages contained in the 2nd edition (1904) of my “Notes on the Commercial Timbers of New South Wales.”

#### SUPPLY OF SEASONED COLONIAL TIMBERS, TRUE TO NAME.

As a consistent advocate for many years of the use of colonial timbers, I have become familiar with the oft-repeated objection, “What is the good of advocating the use of colonial timbers when we rarely can buy any already seasoned?” It is a fact that very few varieties of seasoned colonial timbers are kept in stock by our timber merchants. Timber merchants are like other tradesmen in endeavouring to keep a stock of any article that will sell, but we cannot expect them to run their business on sentiment; in other words,

to convert their timber-yards into sample museums. Consequently, in the first place, we require to educate our own people in regard to the merits of our timbers, and then they will endeavour to use more of them. I think that, as regards the general public, a certain amount of sentiment would not be out of place in endeavouring to encourage the use of colonial timbers. I mean that, having satisfied himself that a certain colonial timber is suitable for a certain purpose, the Australian citizen might well put himself to a little trouble to cause his want to be supplied. These new timbers of a new country have to work their way to public recognition, and it is often far easier to continue to use an old and well-tried timber than to use a colonial substitute, however meritorious.

\* \* \* \* \*

#### SEASONING DEPÔTS.

A large proportion of our timber consists of hardwood, which is cheap, and used for rough purposes. Such timber is cut at all seasons, sawn at all seasons, and it often finds its way to the consumer direct from the saw. It is not to be surprised at that such timber often warps and splits in a provoking degree. The wonder would be if it did not. The remedies for this state of things seem to be—

1. The observance of proper seasons for the felling of timber.
2. The establishment of seasoning depôts.

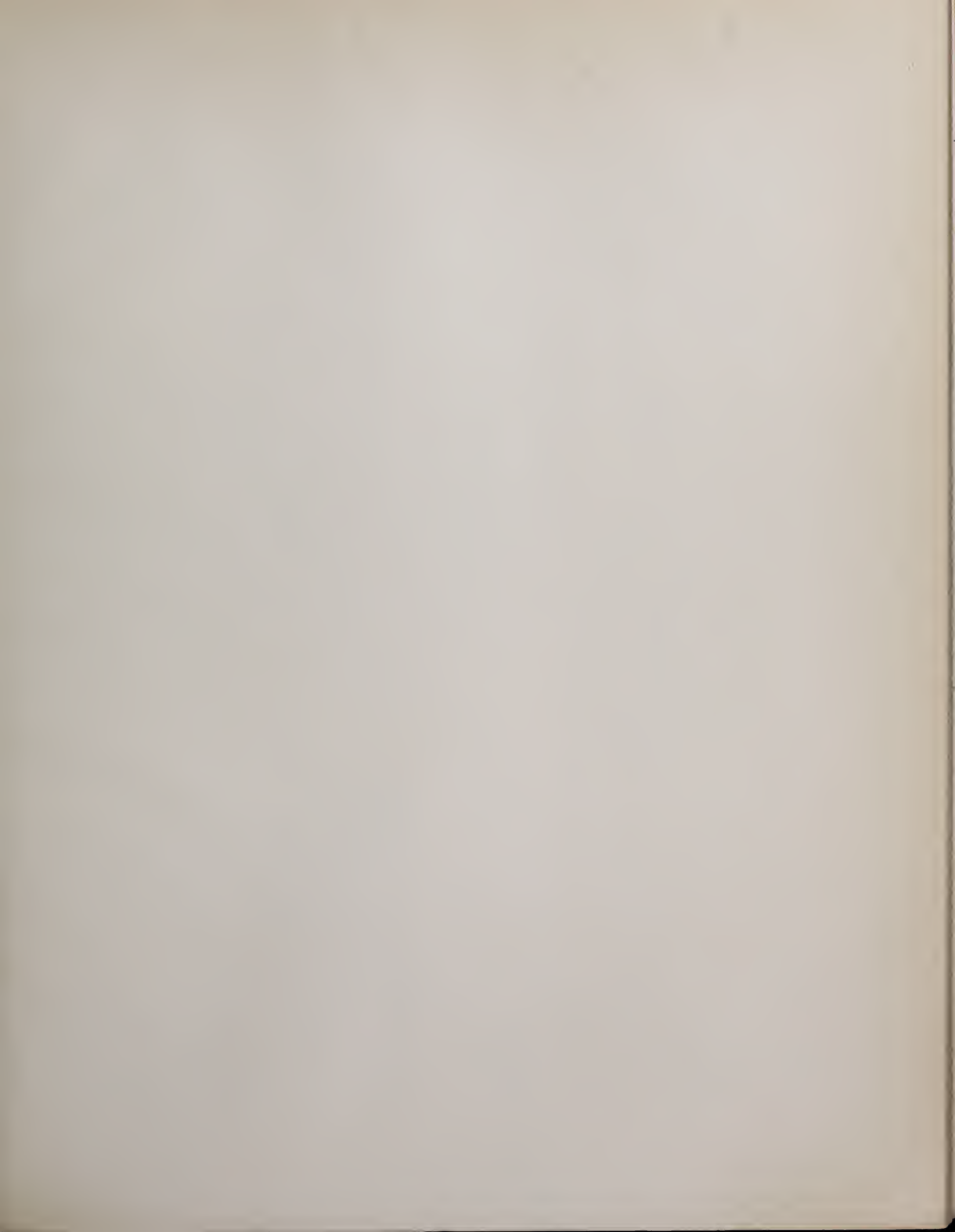
No. 1 has already been touched upon. As regards the second, various Government Departments, such as Railways, Roads and Bridges, Harbours and Rivers, Government Architect, &c., use such large quantities of timber that it would be desirable if they could adopt concerted action to establish seasoning depôts in various parts of the State, and draw supplies as required. Private persons could supply timber (cut at the proper season), in the log or sawn, and this could be stored in the Government seasoning sheds, and drawn upon for public works as required. In this way the use of green timber could be done away with, while the use of sheds would enable the timber to be classified as regards kinds and qualities to a far more accurate extent than it is at present. To initiate and establish these reforms could not be done without expense, but I feel sure it would be wise expenditure, which would be recouped over and over again in the improved and more uniform quality of the timber. The example would, I feel sure, soon be followed by private enterprise. Let us now turn to the case of the private supplier and user.

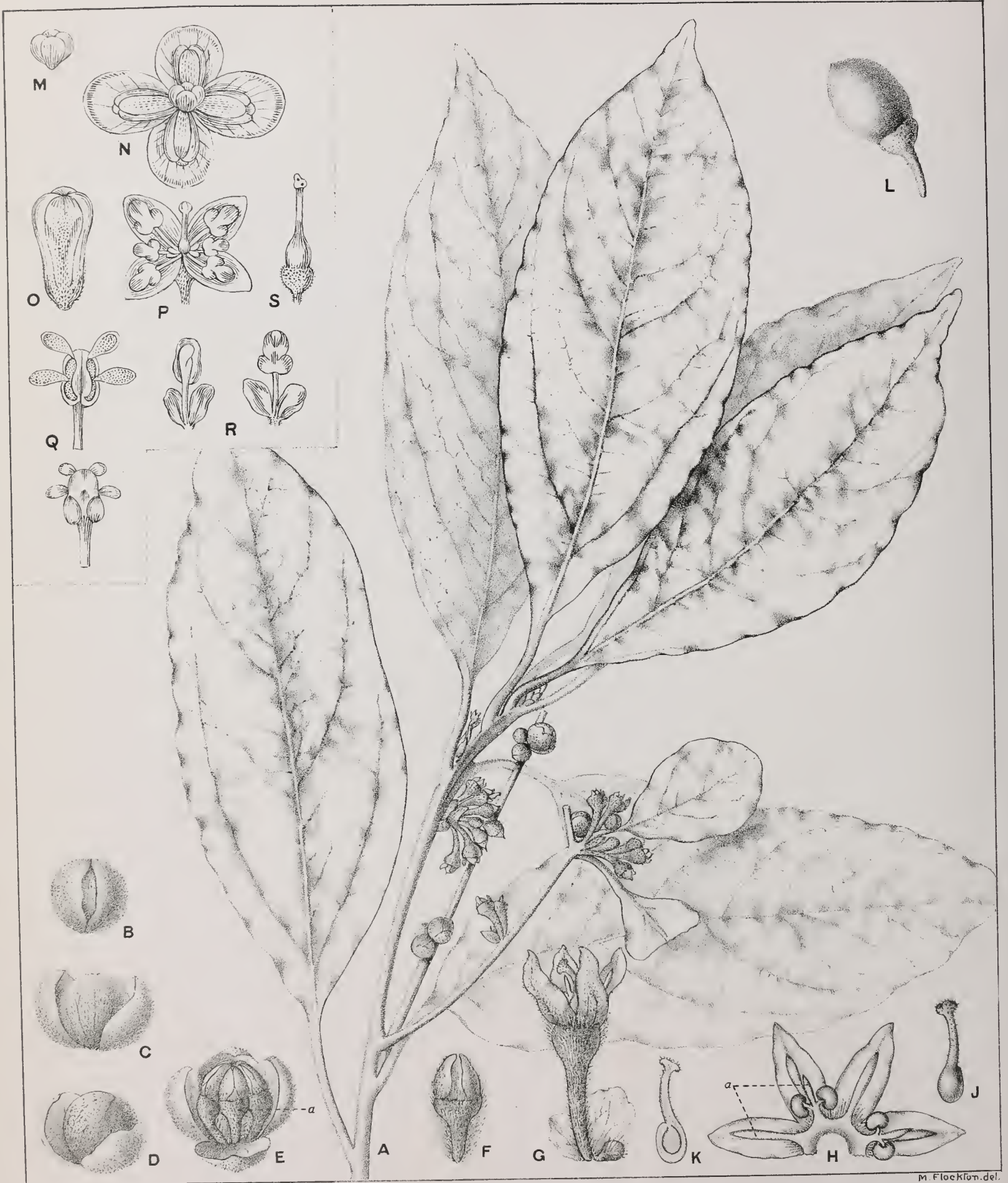
I know something of the practical difficulties which beset a timber merchant in Sydney—for instance, in obtaining a supply of a certain timber growing in a forest (say) hundreds of miles away—procuring it both true to name and in a seasoned condition. I have often pondered over the matter, and have wondered whether, seeing that the State is the principal proprietor of forests, and that it has already a staff of forest officers, whether State depôts (under lease or otherwise) might not be established, where stocks of timber might be held, such timber having been felled at the proper time, seasoned for a suitable period, and branded with a mark which would guarantee its true name. To carry out this plan would necessarily require a State subsidy for a time, but I think that, under all the circumstances, a reasonable subsidy would be justifiably spent. In a few years I feel convinced that the advantages of seasonably felling, of seasoning, and of properly naming our timbers, would become so apparent that private enterprise would take the matter up, and the State could withdraw from what might, at first sight, appear interference with private enterprise. We are at the present time giving our producers object lessons in many ways, and I do not think that a little State guidance in regard to the utilisation of our forest wealth would be either illogical or undesirable. It is, of course, understood that in making the above crude suggestions I am only expressing my individual opinion.

**Size.**—I have no data as to the size of this tree in New South Wales. As I have seen it, it has been a small or medium-sized tree. Bentham describes it as a large tree (referring to Queensland, of course). Most works on Indian plants that refer to it describe it as a small tree.

**Habitat.**—It is a native of India and Ceylon, Sumatra and Java.

As regards Australia, it is a common Queensland plant, occurring in the coastal brushes.





M. Flockton del.

LITSEA ZEYLANICA, NEES.  
(M-R reproduced from an Indian drawing.)

In New South Wales it has been found at Gloucester by Mr. E. Betche, and this is its farthest known locality south. In recording it as new to New South Wales, Maiden and Betche in *Proc. Linn. Soc. N.S.W.*, xxxi, 737 (1906), gave the following specific localities:—

Cape Byron; Mt. Lindsay, Macpherson Range; Acacia Creek, Macpherson Range.

In shape and venation of leaves and pale underside it resembles the common *L. dealbata* a good deal, and there is little doubt that further search will reveal it to occur in brushes a good deal further south than Gloucester.

#### EXPLANATION OF PLATE 166.

- A. Flowering twig. Pistillate flowers.
- B. Imbricate bracts enclosing the flower-head.
- C. The same, bracts opening.
- D. The same, another view, showing the four bracts.
- E. The five flowers (*a*) composing the flower-head, with bracts surrounding them.
- F. An individual flower, in bud.
- G. A mature flower.
- H. Flower opened out, showing calyx (four perianth segments), six staminodia (*a*), of which two or more of the inner series have glands near the base. Pistil removed.
- J. Pistil.
- K. Vertical section of pistil, showing the ovary with one pendulous ovule.
- L. Fruit (natural size).
- M. A flower-bud unopened. Staminate flowers.
- N. The same, the involucre opened and spread out to show the enclosed flowers *in situ*.
- O. A flower unopened.
- P. The same opened.
- Q. Anthers, front and back views.
- R. Two stamens with glands at the base.
- S. Pistil.

[The drawings of the male flower (m-s) were taken from Wight's *Icones t.* 132, as I was unable to obtain staminate flowers of Australian origin.]

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets):—

<p><i>Eucalyptus acacioides</i>, A. Cunn. (XI).</p> <p>„ <i>acenioides</i>, Schauer (IX).</p> <p>„ <i>amygdalina</i>, Labillardière (VI).</p> <p>„ <i>Andrewsi</i>, Maiden (VII).</p> <p>„ <i>apiculata</i>, Baker and Smith (IX).</p> <p>„ <i>Behriana</i>, F.v.M. (X).</p> <p>„ <i>bicolor</i>, A. Cunn. (XI).</p> <p>„ <i>Boormani</i>, Deane and Maiden (X).</p> <p>„ <i>Bosistoana</i>, F.v.M. (XI).</p> <p>„ <i>Caley</i>, Maiden (XII).</p> <p>„ <i>calycogona</i>, Turczaninow (III).</p> <p>„ <i>capitellata</i>, Smith (VIII).</p> <p>„ <i>Consideiana</i>, Maiden (X).</p> <p>„ <i>coriacea</i>, A. Cunn. (V).</p> <p>„ <i>crebra</i>, F.v.M. (XII).</p> <p>„ <i>dives</i>, Schauer (VII).</p> <p>„ <i>eugenioides</i>, Sieber (VIII).</p> <p>„ <i>fruticetorum</i>, F.v.M. (XI).</p> <p>„ <i>hæmastoma</i>, Smith (X).</p> <p>„ <i>hemiphloia</i>, F.v.M. (XI).</p> <p>„ <i>incrassata</i>, Labillardière (IV).</p> <p>„ <i>leucoxydon</i>, F.v.M. (XII).</p> <p>„ <i>Luehmanniana</i>, F.v.M. (IX).</p>	<p><i>Eucalyptus macrorrhyncha</i>, F.v.M. (VIII).</p> <p>„ <i>melanophloia</i>, F.v.M. (XII).</p> <p>„ <i>microcorys</i>, F.v.M. (IX).</p> <p>„ <i>microtheca</i>, F.v.M. (XI).</p> <p>„ <i>Muelleriana</i>, Howitt (VIII).</p> <p>„ <i>obliqua</i>, L'Héritier (II).</p> <p>„ <i>ochrophloia</i>, F.v.M. (XI).</p> <p>„ <i>odorata</i>, Behr. and Schlecht. (XI).</p> <p>„ <i>pilularis</i>, Sm. (I).</p> <p>„ <i>piperita</i>, Sm. (X).</p> <p>„ <i>Planchoniana</i>, F.v.M. (IX).</p> <p>„ <i>populifolia</i>, Hooker (X).</p> <p>„ <i>regnans</i>, F.v.M. (VII).</p> <p>„ <i>siderophloia</i>, Bentham (X).</p> <p>„ <i>sideroxydon</i>, A. Cunn. (XII).</p> <p>„ <i>Sieberiana</i>, F.v.M. (X).</p> <p>„ <i>Smithii</i>, R. T. Baker (XII).</p> <p>„ <i>stellulata</i>, Sieber (V).</p> <p>„ <i>umbra</i>, R. T. Baker (IX).</p> <p>„ <i>virgata</i>, Sieber (IX).</p> <p>„ <i>vitellina</i>, Naudin (VII).</p> <p>„ <i>vitrea</i>, R. T. Baker (VII).</p>
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.



## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (*Two Plates.*)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andrewsii*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (*Two Plates.*)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (*Two Plates.*)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (*Two Plates.*)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muellieri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya foetida*, R. T. Baker).

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations.)*  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muellieriana*, Howitt)  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenioides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betche).

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hæmastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

*Recapitulatory. (Fifty-seven Plates.)*

## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).
- 148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.).
- 149.—A HICKORY (*Acacia implexa*, Benth.).
- 150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.).
- 152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).
- 153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).
- 154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

### PART XLIII. (Issued May, 1911.)

- 155.—WHITE YIEL YIEL (*Grevillea Hilliana*, F.v.M.).
- 156.—BOSISTO'S BOX (*Eucalyptus Bosistoana*, F.v.M.).
- 157.—THE PROMINENT GLANDED WATTLE (*Acacia prominens*, A. Cunn.).
- 158.—NATIVE CAMPHOR LAUREL (*Cinnamomum virens*, R. T. Baker).

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 5.*

*Published by Authority of the*  
*GOVERNMENT OF THE STATE OF NEW SOUTH WALES.*



*PART XLV* OF THE  
COMPLETE WORK.

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANDONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniocalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).  
THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muelleri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleæfolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
  - 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
  - 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
  - 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).
- (N.B.—The numbers of Part XIV are given erroneously in the text.)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxydon*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.).
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)

THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLV.

*Published by the Forest Department of New South Wales, under authority of  
The Honourable the Secretary for Agriculture.*



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*Embothrium Wickhami*, Hill and F.v.M.  
Var. *pinnata*, Maiden and Betche.

A Red Silky Oak.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Embothrium*, Forst.

*Flowers* hermaphrodite, slightly irregular.

*Perianth-tube*, cylindrical at first, then splitting, limb ovoid or globose, oblique or recurved, segments loose in the expanded flower.

*Anthers* sessile in the concave laminae, ovate, connective not produced over the cells.

*Hypogynous disc* unilateral, semi-annular, fleshy, entire or obscurely 2 or 3 lobed.

*Ovary* long stipitate, narrow.

*Style-point* oblong-fusiform or oblique-subdisciform; *stigma* small terminal or in the centre of the disk.

*Ovules* numerous, ascending, imbricate in 2-series.

*Follicles* stipitate, oblong, coriaceous, subwoody.

*Seeds* 2 seriate, imbricate, planocompressed, samaroid wing terminal oblong. (Bailey's *Queensland Flora*, iv, 1357.)

The genus *Embothrium* is divided by Engler into two sections.

Sect. 1. *Euembothrium*. Point of the style elongated, fusiform.

Sect. 2. *Oreocallis*. Point of the style oblique, elongated ovoid, lateral. Axis of the flower very oblique.

The only Australian species belongs to Sect. 2.

It may be well to remind my readers who possess old botany books containing illustrations of Australian plants that the genus *Embothrium* formerly had a much wider scope than botanists have restricted it to at the present day. For example, it included the Waratah and many Grevilleas.

**Botanical description.**—Species, *E. Wickhami*, Hill and Mueller, in *Fragm.* viii, 164, and ix, 194.

A tall tree.

*Leaves* ovate, oblong, thick coriaceous 2 to 6 inches long,  $\frac{3}{4}$  to  $1\frac{1}{2}$  inches broad, entire, veins immersed, brown on the underside.

*Petioles* about 1 inch long.

*Flowers* in corymbs at the end of the branchlets or in the upper axils; *peduncle* short.

*Pedicels* germinate, 1 to  $1\frac{3}{4}$  inches long; *bracts* linear-subulate 1 to  $1\frac{1}{2}$  lines long, deciduous.

*Perianth* about 1 inch long, deep red, tube split on one side, slightly curved, limb before expanding oblique-globose, about  $1\frac{1}{2}$  lines long, lobes, more or less coherent.

*Anthers* sessile, round-ovate, blunt opening widely, two-thirds line long.

*Hypogynous disk* long, horseshoe-shaped.

*Stipes* of ovary about 3 lines long.

*Style* about 9 lines long.

*Ovules* 8 to 10 biseriate.

*Fruit* cylindrical, 3 to 4 inches long, the terminal wing of seed broad and truncate at the end.  
(Bailey in "The Queensland Flora," p. 1358.)

(This is a free translation of Mueller's original description.)

Engler characterises *E. Wickhami* in the following words: "distinguished by the long-stalked flowers and the horseshoe-shaped disc." I cannot see a true disc in all the flowers I have examined in this variety. The pedicel shows a slight very oblique scar (see Da in plate), outlined by a few weak hairs where the perianth has fallen off.

### Variety *pinnata*.

This interesting Proteaceous tree is common in North Queensland, on the Bellenden-Ker Range and on the Barron River, but has not been found in Southern Queensland, as far as we know; and now it turns up again in Northern New South Wales, in a very restricted area, in a different form. Mr. Boorman informs us that he did not see more than about a dozen trees in a radius of 12 miles of the Dorrigo township, and that it seems not to grow anywhere else in the district. It is a true brush tree, growing in company with *Araucaria*, *Dysoxylon*, *Harpullia*, &c., attaining a height of 60 to 80 feet, by about 5 feet diameter. The flowers and fruits are quite identical with the Bellenden-Ker specimens, but the leaves are pinnate in the New South Wales specimens, and simple in the Queensland ones. Such a sharp distinction would justify us in giving it a new name, if it belonged to any other family, but the variability of the leaves is so marvellous in Proteaceæ, that we can only regard it as a pinnate-leaved form. The leaves are from 9 to 18 inches long, including the slender petiole, pinnate with 7 to 9 leaflets; leaflets lanceolate, generally 4 to 5 inches long, and  $\frac{3}{4}$  to 1 inch broad in the middle, tapering at both ends, pinnately obliquely veined, only the principal veins conspicuous. The rhachis between the leaflets is in most leaves slightly winged towards the top, frequently uniting the three uppermost leaflets at the base, and thus showing a tendency to relapse into a pinnatifid leaf. This tendency is distinctly shown in the floral leaves; the first leaves below the inflorescence are frequently simple, next to the simple leaf follows occasionally a leaf cleft to or nearly to the rhachis into two lobes, and then follow, generally abruptly, the pinnate leaves.

Mr. Boorman distinguishes two forms growing together in the same restricted area: one is the tall tree described above; the other is a small shrubby form 10 to 15 feet high, with considerably smaller leaves, and a greater tendency to simple or lobed leaves. The specimens look very distinct, but this is again merely an instance of the protean character of Proteaceæ; the small form will eventually grow out into the tall form, and only tall old trees seem to have the large pinnate leaves. The tree is of special interest because it is one of the few links which connect the flora of Australia with that of South America. (Maiden and Bêche in *Proc. Linn. Soc. N.S.W.*, xxxv, 795 [1910].)

Following is an account of the allied *Embothrium coccineum*, R. and G. Foster.

From Chili to the Straits of Magellan. The Notra or Ciruelillo. A tree of exquisite beauty, but seldom reaching above 30 feet in height. The wood is utilised for furniture. *E. lanceolatum* is merely a variety (Dr. Philippi). The equally gorgeous *E. emarginatum* of the Peruvian Andes and *E. Wickhami*, (F.v.M.) from Mount Bellenden-Ker of North Queensland, deserve, with the East Australian allied *Stenocarpus sinuatus* (Endlicher), a place in any sheltered gardens or parks of the warm temperate zone. (Mueller's *Select Extra-tropical Plants*.)

**Botanical Name.**—*Embothrium*, latinised form of two Greek words, *en*, in, *bothrion*, a little pit, in reference to the pollen-cases or anthers; *Wickhami*, in honour of Captain John Clement Wickham, Royal Navy, explorer and navigator. He discovered the Victoria River in Northern Australia.

**Vernacular Names.**—Mr. Bailey calls it "Red Silky Oak," and I know no other name. But the pity is that the name is likely to cause confusion, in New South Wales, with another Red Silky Oak (*Stenocarpus salignus*), which has deeper red timber. See Part VI of this work.







M. Fieckton del. et lith.

RED SILKY OAK.

(*Embothrium Wickhami*, F.V.M., VAR. *pinnata*, MAIDEN AND BETCHE.)

**Timber.**—As regards the typical species, J. F. Bailey says: “The wood is of a pinkish colour, soft, tough and beautifully marked, and would be very serviceable and showy for cabinet work. . . . On account of its free-splitting and lasting qualities, it is used extensively for close-paling farms in the district” (Barron River, Q.).

The colour of the timber of the variety (*pinnata*) from the Dorrigo, N.S.W., is described as of a rather deep bright red when freshly cut, but it changes during drying and exposure to a paler colour not much deeper in tint than that of the ordinary Silky Oak of the Sydney market (*Grevillea robusta* and *Orites excelsa*).

**Size.**—A large tree as seen in the Dorrigo, viz., from 60 to 80 feet in height by about 5 feet in diameter.

**Habitat.**—The type of the species was originally found by Mr. Walter Hill at Mount Bellenden-Ker, Northern Queensland, at an elevation of 2,500 feet. J. F. Bailey later found it on the Barron River, in the same State.

The variety now figured was obtained from the Dorrigo, New South Wales, and there is no doubt that connecting trees will be found in brush land between the Dorrigo and the Barron River. The fact that such a large and important tree has only just been found in New South Wales, and in no part of Queensland south of the two localities mentioned, is eloquent testimony to the fact that our Australian forests are very imperfectly explored.

#### EXPLANATION OF PLATE 167.

- A. Flowers and leaf.
- B. Unopened flower.
- C. Opened flower with (*a*) bract at the base of the pedicel.
- D. Flower with corolla falling off, showing the pistil—
  - (*a*) Oblique attachment of corolla.
  - (*b*) Stipitate ovary.
  - (*c*) Stigma.
- E. Tips of corolla lobes showing four stamens in the concave laminae.
- F. Follicle with seeds.
- G. Winged seed.
- H. Leaf showing variation in shape.

(All from the Dorrigo.)

No. 164.

## *Eucalyptus Boormani*, Deane and Maiden. A Black Box.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. Boormani*, Deane and Maiden, *Proc. Linn. Soc. N.S.W.*, xxvi, 339 (1901).

*Bark.*—Dark in colour, often very dark grey and even black. In texture scaly, sometimes hard scaly, and even in parts nearly as rugged as an Ironbark, but never as soft as a Box. The rough bark extends to the small branches.

*Timber.*—Pale reddish-brown in colour, hard and durable, and, according to the testimony of many observers, while of an Ironbark character, even superior to the Ironbarks of the district in which it grows.

*Sucker leaves.*—Broad and coarse, nearly orbicular, but early becoming lanceolate.

*Mature leaves.*—Ovate-lanceolate to lanceolate, usually 3 to 6 inches long, and over 1 inch in breadth; veins fine and rather spreading, the intramarginal vein usually quite close to the edge. Texture of the leaf coriaceous and tough, like that of *E. siderophloia*.

*Buds.*—The buds and stamens appear to us not to differ from those of *E. siderophloia*.

*Operculum.*—Conical, like that of *E. siderophloia*, but we have not observed the operculum much to exceed the calyx, which is very commonly the case in *E. siderophloia*, especially in var. *rostrata*.

*Fruits.*—Nearly semiovate, often slightly angular, usually presenting a good deal of resemblance to those of *E. siderophloia*, but the valves (which usually number four, and sometimes five) scarcely exerted. About 3 to 4 lines in diameter, and not contracting at the orifice. Sometimes so subcylindrical in shape as to exhibit considerable resemblance to those of typical *E. hemiphloia*, F.v.M. (*op. cit.*)

*A Natural Hybrid.*—This seems to me to be a natural hybrid between *E. siderophloia*, Benth., and *E. hemiphloia*, F.v.M. The evidence available was published by Mr. Henry Deane and myself in *Proc. Linn. Soc. N.S.W.*, xxv, p. 111 (1900), and xxvi, p. 339 (1901). Later on, xxx, p. 494 (1905) I drew attention to the remarkable discovery by George Caley (botanical collector in New South Wales, 1800–1810), of hybridisation between *E. siderophloia* and *E. hemiphloia*.

I used the following words:—

I desire to say that I have no doubt in my own mind as to *E. Boormani* being a hybrid between the species named.

Here I would draw attention to my paper “George Caley, Botanical Collector in New South Wales, 1800–1810,” in the *Agric. Gazette*, N. S. Wales (Oct. 1903, p. 990). Caley gave the aboriginal name for *E. hemiphloia* as “Barilgora” or “Berigora,” and “Derrobarry” and also “Burryagro” for *E. siderophloia*. Attached to a specimen of *E. Boormani* Caley makes the following statement—“Burryagro.” A hybrid between “Barilgora” and “Derrobarry”!

I made the following comment:—"The blacks had but one name for this, the Ironbark Box, and the Ironbark (*siderophloia*), but Caley saw that they were different. Caley's surmise at hybridisation in this case is marvellously shrewd." (See *Proc. Linn. Soc. N. S. Wales*, 1901, p. 339.)

It is only proper to emphasise Caley's discovery. He is undoubtedly the first man who wrote down a statement that hybridisation takes place in Eucalypts, which discovery is therefore a century old! Little is known in regard to Caley's scientific work, as he published little; and botanists do not clearly know what became of most of his specimens. Careful examination of his labels might show other important observations. At present I would submit that the discovery to which I have already alluded is a very valuable one, and he should be credited with it.

The matter of natural hybrids amongst our native plants is often difficult to prove, particularly amongst our Eucalypts, but that natural hybridisation does occur in the genus has now passed the stage of conjecture. I am accumulating evidence on the subject, and intend to figure a number of forms in another work.

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *Boormani*, in honour of John Luke Boorman, Collector, Botanic Gardens, Sydney, who in regard to this and other species, has prosecuted inquiries in an intelligent and painstaking manner.

**Vernacular Names.**—The name "Black Box" seems to be most generally in use for this species; the even better name of "Ironbark Box" (which certainly indicates its affinities) is nearly as frequently in use. At Lue it is also called "She Ironbark," its difference from the ordinary Ironbarks being thus recognised.

**Aboriginal Name.**—"Burryagro," was the name for this tree amongst the aborigines of the Counties of Cumberland and Camden, in common with the Broad-leaved Ironbark (*E. siderophloia*). I have already shown that Caley discriminated between the two trees which the aborigines designated by the same name.

**Timber.**—Already referred to in the botanical description.

The late Mr. Vallins, who lived near Cabramatta, had the highest opinion of it, and ornamental rustic structures which he erected of branches of this tree of quite small diameter lasted as posts (a severe test for timber) in the Botanic Gardens and elsewhere for very many years.

Unfortunately, it is not abundant, and it has usually been used or sold as Ironbark, for which it is an honest substitute.

**Size.**—A large tree.

**Habitat.**—Bankstown and Cabramatta districts, thence across country to Penrith. It has also been found at Lue, on the Mudgee line.

So far, it is not known out of New South Wales, and over not very great stretches of country in that State. But the similarity it presents to *Eucalyptus siderophloia* on the one hand and to *E. hemiphloia* on the other leads me to believe that its range is very much more extensive than we at present know it to be.

## EXPLANATION OF PLATE 168.

- a. Sucker leaf.
- b. Flowering twig from Bankstown to Cabramatta.
- c. Anther.
- d. Fruits with exerted valves, and rather angular.
- e. Fruits with the valves not so exerted, not angular.

All from the type.



BLACK BOX.

(*Eucalyptus Boormani*, DEANE AND MAIDEN.)

M. Fiedler del. et. lith.





No. 165.

## *Acacia decora*, Reichb.

### The Western Silver Wattle.

(Family LEGUMINOSÆ : MIMOSEÆ.)

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)

**Botanical description.**—Species, *A. decora*, Reichb., *Icon. Exot.* t. 199 (Reichenbach's *Iconographia botanica exotica*, 1827–1830).

Reichenbach's figure, not entirely satisfactory, is reproduced on plate 169. This description is very brief, and is as follows:—

199. *Acacia decora*, Rchb. capitato-racemosa, phyllodiis lineari-lanceolatis basi attenuatis, rectis, acutis, glaucis.

Species nova vix ulli nisi *A. obtusata*, Sieb. phyllodiis viridibus obtusis praeter alias notas diversae similis, e semine anglico educata. Phyllodia maxime glauca, fere pruinosa, capitulis laete luteis elegantissime respondent. Legumina non maturuit. Floruit primo vere cum aliis.

Explic. Ad vivum.

Bentham describes the species more amply in the following words:—

A shrub of several feet, glabrous or slightly glaucous-tomentose; branchlets angular.

*Phyllodia* lanceolate or linear, narrowed at the base, straight or slightly falcate, 1 to 2 inches long, thicker than in *A. linifolia*, 1-nerved, slightly penniveined, with nerve-like margins, and usually with a gland below the middle.

*Racemes* usually numerous, longer than the phyllodia, with several globular heads of about twenty flowers, mostly 5-merous.

*Calyx* shortly lobed, not half so long as the corolla.

*Pod* straight or curved, flat, about 3 lines broad.

*Seeds* longitudinal, close to the upper suture; last fold of the funicle thickened into a lateral club-shaped aril, the lower folds very small. (B.Fl. ii, 372.)

He adds:

Perhaps a variety of *A. buxifolia*, differing only in the longer phyllodia and more numerous flowers in the heads. Some specimens from the Melbourne Botanic Garden, apparently of this species, have the phyllodia still longer and narrower.

Mueller goes further and omits *A. decora* from his "Census," including it under *A. buxifolia*, which I think is clearly a mistake.

*A. buxifolia* is a shrub, and never a tree; *A. decora* is usually a spreading tree. The phyllodes of the two species are so different in shape that it should not be easy to confuse them. The individual flowers are more hairy in *A. decora*; the pods of *A. decora* are longer, and the arillus sufficiently different.

The confusion has doubtless arisen through not keeping the types sufficiently in mind.

B

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *decora*, from the Latin *decor*, handsome, sightly, graceful.

**Vernacular Names.**—Over a large area of country this is called “Silver Wattle,” because of the silvery appearance of the foliage. I have also heard it called “Golden Wattle,” because of the profusion of its bright yellow flowers, and certainly no Wattle deserves the name better.

**Aboriginal Name.**—Mr. Robert Kidston, when Forest Ranger, gave me “Baringa” as the aboriginal name for this plant in the Lachlan district.

**Leaves** (*Phyllodes*).—*Acacia decora* has a wide geographical range, and includes a certain amount of variety, particularly in the phyllodes. I accordingly endeavoured to see if there are forms sufficiently accentuated to be called varieties, but failed. Some are less spatulate in shape than the type. Many of the phyllodes have one gland, and others have two glands; but these have no diagnostic value, for the same tree often has uniglandular and biglandular phyllodes. Nor can I find that the differences of length and width of the phyllodes have any classificatory value. The plate may be referred to.

This Wattle is occasionally used for fodder, but certainly not to any great extent.

**Timber.**—Reddish-brown in colour, not very hard; splits fairly well, and displays a small and neat silver grain. It is excellent for fuel, but the shortness of its trunk precludes its extensive use in the arts.

**Ornamental Tree.**—This tree is well named *decora*, for it is most beautiful. To see it on the western plains in August or September, forming veritable balloons of gold, is to witness a truly Australian spectacle which no lover of nature can see unmoved. Australia is a country of interesting plants; but I know nothing more gorgeous, more sweet, more pure, than the countryside ablaze with plants of this species at their best. The clear country air, and the more sombre appearance of the rest of most of the vegetation in winter, or in early spring, combine to enhance the brilliance of this Wattle.

It is quite true that we have some pretty Wattles in the Coast districts, but the Wattle is only developed in its fullest beauty in the interior, the tablelands or the western plains. Its profusion, also, is inexhaustible; and abundant evidence is available as to the appropriateness of the Wattle as a national floral emblem for Australia.

**Habitat.**—Reichenbach described his species from a cultivated plant, and does not say where he got his seeds from.

Bentham (Hooker's *London Journal of Botany*, i, 358, 1842) gives the locality of this species as “Liverpool Plains, New South Wales, *Cunningham, Fraser.*” The seeds which produced the type, therefore, probably came from the Liverpool Plains.

Bentham, in *B.Fl.* ii, 372, gives the following localities for the species :—

Queensland.—Keppel Bay, *R. Brown* ; Dawson River, *F. Mueller* ; near Mount Pluto, *Mitchell*.  
New South Wales.—Liverpool Plains, *A. Cunningham* ; New England, *C. Stuart*.

So far as I know, its recorded localities are confined to the drier parts of New South Wales and Queensland, but I should be very much surprised to learn that search will not find it in South Australia.

It is represented from the following localities in the National Herbarium, Sydney.

*Queensland*.—Rockhampton (*R. Simmonds*) ; Texas, Inglewood (*J. L. Boorman*) ; Killarney (*F. M. Bailey*).

*New South Wales*.—*Northern Localities*.—The northern specimens have mostly narrow phyllodes.

Bulga Road, Singleton (*R. H. Cambage*, No. 1,510), narrow phyllodes like fig. M.

Denman (*W. Heron*), and Mount Dangar, Gungah (*J. L. Boorman*), long narrow phyllodes like figure L, though not so long.

Tamworth (*Rev. H. M. H. Rupp*).

Scone (*R. H. Cambage*, No. 1,675) and Page River (*J.H.M.*), practically the same locality, but varying a good deal in width of phyllodes.

Warrah, red, sandy soil, growing Cypress Pine plentifully (*Jesse Gregson*). Phyllodes narrow.

Boggabri (*J.H.M.*) ; Barber's Pinnacle, Boggabri (*R. H. Cambage*, No. 2,493) ; Gunnedah (*J. L. Boorman*).

The common "Golden Wattle" of this and other inland districts. Small trees from 4 to 16 feet high, usually on stony ridges, often of rich soil, and in company with *Eucalyptus hemiphloia*, var. *albens*, Narrabri West (*J. L. Boorman*). (Boggabri to Narrabri, phyllodes of normal width).

Inverell (*J.H.M.* and *J. L. Boorman*). Narrow phyllodes.

*Western Localities*.—Shrub of 3–6 feet, Cullenbone, Mudgee (*J. D. Cox*) ; "near Bathurst" (*Allan Cunningham*). Named by Bentham, and received from Kew. Figured at D, plate 169.

Peel, near Bathurst, on the road, Bathurst to Sofala, *viâ* Wattle Flat. On the track taken by *Allan Cunningham*, in April, 1823. See his "Journal of a route from Bathurst to Liverpool Plains," as described by him in *Barron Field's* "Geog. Memoirs on N.S.W.," pp. 133, &c. (*R. H. Cambage* and *J.H.M.*). Phyllodes narrower than preceding specimen.

Bowan Park, near Cudal (*W. F. Blakeley*) ; Mount McDonald near Cowra (*R. H. Cambage*) ; Lachlan and Murrumbidgee districts (*J. Duff*) ; Condobolin and district (*R. Kidston*, *J.H.M.*) ; Lake Cudgellico, with large phyllodes (*Miss Clements*, *J. L. Boorman*) ; Dubbo (*C. J. McMaster*, *J. L. Boorman*) ; Minore (*J. L. Boorman*).

Dubbo to Tomingley. Phyllodes quite narrow (J.H.M.); Harvey Range and Peak Hill (R. H. Cambage, J. L. Boorman, J.H.M.).

Bidden Road, near Gilgandra (R. H. Cambage, Nos. 1,095 and 1,111).

Plains near Baradine (W. Forsyth). "8-10 feet high. Usually found in low, marshy places in alluvial drift; not much branched as in other localities." Forked Mountain, Coonabarabran (J. L. Boorman).

Edible by stock, East Nyngan (E. F. Rogers); Coolabah (R. N. Peacock).

The common "Silver Wattle" of the district, shrubs, or small, bushy trees, abundant. Commonly occurring with such plants as *Eremophila Mitchelli* and *Dodonaea viscosa*.

Coolabah to Girilambone (J. L. Boorman, J.H.M.); Cobar district (R. H. Cambage, J. L. Boorman); Nymagee (J. Wharton Cox); Near Mount Hope (J. L. Boorman).

*Southern Localities*.—Small trees of 8-12 feet on rocky land. Phyllodes short. Wyalong (J. L. Boorman); Grenfell (P. Corbet, W. S. Campbell); Wagga Wagga (R. Helms, J.H.M.).

#### EXPLANATION OF PLATE 169.

- A. Reichenbach's original drawing of his *Acacia decora* reproduced (A-C).
- B. Phyllode.
- C. Flower.
- D. Flowering twig from type named by Bentham, from a specimen collected near Bathurst by Allan Cunningham. (D-H) Broad phyllode, 2 glands.
- E. Flower-head.
- F. Individual bud with bract (a).
- G. Flower with bract.
- H. Flower opened out, showing—
  - (a) Calyx.
  - (b) Corolla.
  - (c) Pistil.
 Stamens removed.
- I. Pods—Boggabri.
- K. Seed „
- L. Long, narrow phyllodia, having one gland—from Boggabri.
- M. Showing smaller phyllode, narrow form, and having one gland—from Dubbo to Tomingley.



A. Fluekion del. et. lith.

WESTERN SILVER WATTLE.  
(*Acacia decora*, REICHB.)



No. 166.

*Litsæa reticulata*, Benth.

She Beech or Bolly Gum.

(Family LAURACEÆ.)

**Botanical description.**—Genus, *Litsæa*, already described. (See Part XLIV, p. 86.)

**Botanical description.**—*L. reticulata*, Benth., in Benth. and Hook. *Gen. Pl.* iii, 161 (1880).

A tree of considerable size, glabrous except the flowers, or the young shoots minutely silky-pubescent.

*Leaves* obovate-oblong or oblong-elliptical, obtuse or scarcely acuminate, narrowed into a petiole, mostly 3 to 4 inches long, not thick, green on both sides, the primary veins not very prominent, the reticulations much more conspicuous on the upper than on the lower surface.

*Peduncles* 3 to 5 lines long in the males, much shorter in the females, usually in short irregular racemes or clusters, on a common rhachis at first very short but sometimes lengthening to  $\frac{1}{2}$  inch, glabrous as well as the bracts.

*Perianth-segments* 6, narrow, acute, silky-villous.

*Stamens* in the males—6 outer ones rather longer than the perianth, and without glands; 3 inner rather shorter, each with a pair of glands.

*Staminodia* in the females shorter than the perianth.

*Ovary* glabrous; stigma broad and lobed.

*Fruit* ovoid, resting in the enlarged truncate cup-shaped perianth-tube. (B.Fl. v, 306, as *Tetranthera reticulata*, with the figure 6 added to "Perianth segments.")

**Botanical Name.**—*Litsæa*, already explained (see Part XLIV, p. 86); *reticulata*, Latin, reticulated, in reference to the netted appearance of the venation of the leaves, as brought out in the figure.

**Vernacular Names.**—This tree is one of those which produces the timber known as Bolly Gum in commerce. The original specimen, the type, was called "White Sycamore" by Sir William Macarthur, and it also goes under the name of "She Beech," while I have received it under the name of "Flindosa." Mr. Forester G. R. Brown, an excellent observer, called it "Scaly or Yellow Beech."

The following note by Mr. R. T. Baker in regard to timber passing under the name of "She Beech" will be found useful:—

There has long been a doubt as to the exact botanical determination of the marketable timber passing under the name of "She Beech." Many authors have referred it to *Cryptocarya glaucescens*, R.Br., and specimens of timber exhibited in International Exhibitions, and now in the Technological Museum, were labelled with the latter name queried; but I think now the matter can be definitely settled, as I have acquired botanical (timber and flowering) specimens from Gosford, Port Macquarie, and Lismore, and without doubt "She Beech" is *Tetranthera reticulata*, Meissn.

The timber of *Cryptocarya glaucescens* is quite distinct, being much lighter in colour, more durable, and with little or no figure, as against the rich brown colour and large figure of *T. reticulata*.

"She Beech" timber is, I find, also being sold in the Sydney market under the name of "Bully or Bolly Gum," so that we have the timber merchants selling to an unsuspecting public apparently two distinct timbers, but which are in reality from one and the same species, *i.e.*, *T. reticulata*. (*Proc. Linn. Soc. N.S.W.*, Vol. xxii, 1897, p. 235.)

**Aboriginal Name.**—"Myndee" of the aborigines around Brisbane Water, according to the late Sir William Macarthur.

**Synonyms.**—*Cylicodaphne Fawcettiana*, or *Tetranthera Fawcettiana*, F.v.M. *Fragm.* v, 168.

It is described as *Tetranthera reticulata*, Meissn., in B.Fl. v, 306.

The difference between *Tetranthera* and *Litsæa* is as follows:—

*Litsæa*.—Perianth 4-merous. Stamens 6 or less.

*Tetranthera*.—Perianth usually 6-merous. Stamens 9 or more.

They are now generally united, *e.g.*, in Bentham and Hooker's *Genera Plantarum*, *Tetranthera* is not even kept as a section in the genus *Litsæa*.

Mueller writes in the Census: *Litsæa reticulata*, Benth., in B. and H. *Genera Plantarum*. In the Index Kewensis *Litsæa reticulata* is omitted, probably through inadvertence, though *Tetranthera reticulata* refers to *Litsæa*.

Transferring *Tetranthera* to *Litsæa*, there is no other alteration needed in the specific description except to add the number (6) of perianth-segments.

It should be borne in mind that the "perianth" of Bentham is the "calyx" of Mueller, Engler, and most modern botanists; the petals are wanting in Lauraceæ.

**Leaves.**—Attention is drawn to the somewhat rigid, leathery leaves.

**Bark.**—Slightly rough and cracked, otherwise a smooth-barked tree as are most of the Lauraceæ.

**Timber.**—Pale coloured, very fissile, tough, with almost a fibrous fracture; rather hard when fresh; exhibits a neat grain.

Sir William Macarthur's original description of the tree (from Brisbane Water) was:—"A magnificent tree, producing a soft, white, but useful wood."

The original specimen (the type) is a small slab, is in the Technological Museum, and has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862). It has a weight which corresponds to 34 lb. 15 oz. per cubic foot.

The Queensland Forestry Museum catalogue gives its chief uses as: Joinery, cabinet-work, packing-cases, staves (for which it is extensively used), and for inside work of buildings as a substitute for Pine.

Mr. G. R. Brown says that, in the Port Macquarie district, it is used for lining boards, like *Sassafras* (*Doryphora*).

See also under "Vernacular Names."







BOLLY GUM.  
(*Litsea reticulata*, BENTH.)

**Size.**—A rather large tree. Trees 60 to 80 feet in height, with a diameter of 2 to nearly 3 feet, are not uncommon.

Sir William Macarthur gave the height of trees at Brisbane Water as 70 to 80 feet, and a diameter of 2 feet.

**Propagation.**—Like most of the *Litsæas*, a beautiful shade tree for the warmer, moister parts of this State; it requires shelter and good soil.

**Habitat.**—This is a coastal brush tree, occurring from Rockingham Bay, Queensland, to the Hawkesbury River, New South Wales. Further search will doubtless extend the recorded range.

In the Flora Australiensis (B.Fl. v, 306), we have the following:—

*Queensland.*—Rockingham Bay (Dallachy); Sydney woods (probably from Brisbane River), Paris Exhibition, 1855 (Macarthur, n. 24, 192).

The reference to the Sydney woods shows that Macarthur's specimens were incorrectly referred by Bentham to the Brisbane *River*, which is, of course, in Queensland, instead of to Brisbane *Water*, an arm of the Hawkesbury River, not much north of Sydney.

I have explained the matter at some length in the *N.S.W. Agric. Gazette* for November, 1894, p. 826, but only obtained specimens from the vicinity of Brisbane Water in 1900 (from Wyong), when Mr. Betcher and I recorded it in the *Proc. Linn. Soc. N.S.W.*, xxvii, p. 63 (1902).

I have it also in the Herbarium from the following intermediate localities going north.

Tuggerah Lakes (F. Gordon); near Tinonee, height 60 feet, diameter 20 inches (Augustus Rudder); Port Macquarie, "Scaly or Yellow Beech" (G. R. Brown); Woolgoolga Creek (E. H. F. Swain).

#### EXPLANATION OF PLATE 170.

- a. Flowering twig.
- b. The flower-head with 4 bracts—the 2 outer ones (*aa*) are glabrous or nearly so, the 2 inner ones (*bb*) are villous.
- c. Male flower.
- d. Male flower opened out showing—
  - (a) Calyx (6 perianth-segments).
  - (b) 6 stamens of the outer series.
  - (c) 3 stamens of the inner series, each with a gland on each side near the base.
- e. Rudimentary pistil.
- f. Female flower opened out, showing—
  - (a) Calyx (6 perianth-segments).
  - (b) 6 staminodia of the outer series.
  - (c) 3 staminodia of the inner series, with glands.
- g. Pistil.
- h. Portion of fruiting twig showing the persistent calyx.

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets) :—

<p><i>Eucalyptus acacioides</i>, A. Cunn. (XI).</p> <p>„ <i>acmenioides</i>, Schauer (IX).</p> <p>„ <i>affinis</i>, Deane and Maiden (XIII).</p> <p>„ <i>amygdalina</i>, Labillardière (VI).</p> <p>„ <i>Andrewsi</i>, Maiden (VII).</p> <p>„ <i>apiculata</i>, Baker and Smith (IX).</p> <p>„ <i>Baueriana</i>, Schauer (XIII).</p> <p>„ <i>Behriana</i>, F.v.M. (X).</p> <p>„ <i>bicolor</i>, A. Cunn. (XI).</p> <p>„ <i>Boormani</i>, Deane and Maiden (X).</p> <p>„ <i>Bosistoana</i>, F.v.M. (XI).</p> <p>„ <i>Caleyi</i>, Maiden (XII).</p> <p>„ <i>calycogona</i>, Turczaninow (III).</p> <p>„ <i>capitellata</i>, Smith (VIII).</p> <p>„ <i>Consideniana</i>, Maiden (X).</p> <p>„ <i>coriacea</i>, A. Cunn. (V).</p> <p>„ <i>crebra</i>, F.v.M. (XII).</p> <p>„ <i>dives</i>, Schauer (VII).</p> <p>„ <i>eugenioides</i>, Sieber (VIII).</p> <p>„ <i>fruticetorum</i>, F.v.M. (XI).</p> <p>„ <i>hæmastoma</i>, Smith (X).</p> <p>„ <i>hemiphloia</i>, F.v.M. (XI).</p> <p>„ <i>incrassata</i>, Labillardière (IV).</p> <p>„ <i>leucoxyton</i>, F.v.M. (XII).</p> <p>„ <i>Luehmanniana</i>, F.v.M. (IX).</p>	<p><i>Eucalyptus macrorrhyncha</i>, F.v.M. (VIII).</p> <p>„ <i>melanophloia</i>, F.v.M. (XII).</p> <p>„ <i>microcorys</i>, F.v.M. (IX).</p> <p>„ <i>microtheca</i>, F.v.M. (XI).</p> <p>„ <i>Muelleriana</i>, Howitt (VIII).</p> <p>„ <i>obliqua</i>, L'Héritier (II).</p> <p>„ <i>ochrophloia</i>, F.v.M. (XI).</p> <p>„ <i>odorata</i>, Behr and Schlecht. (XI).</p> <p>„ <i>paniculata</i>, Sm. (XIII).</p> <p>„ <i>pilularis</i>, Sm. (I).</p> <p>„ <i>piperita</i>, Sm. (X).</p> <p>„ <i>Planchoniana</i>, F.v.M. (IX).</p> <p>„ <i>polyanthemos</i>, Schauer (XIII).</p> <p>„ <i>populifolia</i>, Hooker (X).</p> <p>„ <i>regnans</i>, F.v.M. (VII).</p> <p>„ <i>Rudderi</i>, Maiden (XIII).</p> <p>„ <i>siderophloia</i>, Bentham (X).</p> <p>„ <i>sideroxyton</i>, A. Cunn. (XII).</p> <p>„ <i>Sieberiana</i>, F.v.M. (X).</p> <p>„ <i>Smithii</i>, R. T. Baker (XII).</p> <p>„ <i>stellulata</i>, Sieber (V).</p> <p>„ <i>umbra</i>, R. T. Baker (IX).</p> <p>„ <i>virgata</i>, Sieber (IX).</p> <p>„ <i>vitellina</i>, Naudin (VII).</p> <p>„ <i>vitrea</i>, R. T. Baker (VII).</p>
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, Six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.

## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (Two Plates.)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andrewsii*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (Two Plates.)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (Two Plates.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (Two Plates.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxyton*, Maiden and Betcher).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muellieri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu)  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya foetida*, R. T. Baker)

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations).  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muellieriana*, Howitt)  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenioides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia amula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideriana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betcher).

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hamastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, MEISSN.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

Recapitulatory. (Fifty-seven Plates.)

## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).
- 148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.)
- 149.—A HICKORY (*Acacia implexa*, Benth.).
- 150.—A WHITE APPLE (*Eudiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.)
- 152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).
- 153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).
- 154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

### PART XLIII. (Issued May, 1911.)

- 155.—WHITE YIEL YIEL (*Grevillea Hilliana*, F.v.M.).
- 156.—BOSISTO'S BOX (*Eucalyptus Bosistoana*, F.v.M.).
- 157.—THE PROMINENT GLANDED WATTLE (*Acacia prominens*, A. Cunn.).
- 158.—NATIVE CAMPHOR LAUREL (*Cinnamomum virens*, R. T. Baker).

### PART XLIV. (Issued August, 1911.)

- 159.—GIPPSLAND WARATAH (*Telopea oreades*, F.v.M.).
- 160.—BLACK OR FLOODED BOX (*Eucalyptus bicolor*, A. Cunn.).
- 161.—THE BOX-LEAVED WATTLE (*Acacia burifolia*, A. Cunn., including *A. lunata*, Sieb.).
- 162.—*Litsea zeylanica*, Nees.

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 6.*

*Published by Authority of the*

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*PART XLVI* OF THE  
COMPLETE WORK

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANDONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniocalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).  
THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muellieri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleaefolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
  - 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
  - 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
  - 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).
- (N.B.—The numbers of Part XIV are given erroneously in the text.)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxylon*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.).
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglaucæ*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)



THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLVI.

*Published by the Forest Department of New South Wales, under authority of  
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*Hakea saligna*, R.Br.

The Willow-leaved Hakea.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Hakea*, Schrader, *Sertum Hannov.*, i, Fasc. iii, 27, t. 17 (1797).

*Flowers.*—Hermaphrodite.

*Perianth.*—Irregular, or rarely regular, the tube revolute or curved under the limb, or rarely straight, the limb globular or rarely ovoid, often oblique, the laminae often cohering long after the tube has opened.

*Anthers.*—All perfect, sessile in the base of the concave laminae, the connective not produced beyond the cells.

*Hypogynous glands.*—United in a single semiannular, or semicircular, rarely disk-shaped gland occupying the upper side of the torus, in some species very small.

*Ovary.*—Stipitate, but usually very shortly so, with two amphitropous ovules laterally attached about the middle, style either long, and protruding from the slit of the perianth before the summit is set free from the limb, as in *Grevillea*, or not exceeding the perianth, more or less dilated at the end into a straight, or oblique, or lateral cone or disk, bearing the small stigma in the centre of the disk or at the summit of the cone.

*Fruit.*—A hard, usually woody capsule opening in two valves.

*Seeds.*—Two, compressed and collateral, the testa produced at the upper end into a broad, membranous wing usually longer than the nucleus, and more or less decurrent down the upper or both margins, and sometimes completely surrounding the nucleus, the nucleus itself flat and smooth on the inner face (next the other seed), convex on the outer face, and usually rugose or muricate, the protuberances fitting into corresponding cavities in the valve; each seed with its wing sometimes covering the whole inner surface of the valve, more frequently placed near the upper margin, and covering about half only, or rather more, the remainder of the valve a hard, woody mass. Shrubs or rarely small trees.

*Leaves.*—Alternate, very diversified in shape, flat or terete, the margins rarely recurved, and the two surfaces usually similar, and equally veined.

*Flowers.*—In pairs along the rhachis of a short and dense raceme or cluster, or rarely in a longer raceme; the clusters or racemes sessile in the axils or rarely also terminal, or in a very few species all terminal.

*Indumentum.*—As in *Grevillea*, consisting of closely appressed hairs attached by the centre, rarely of erect or spreading hairs. (B.Fl. v, 489.)

*Hakea and Grevillea.*—The following interesting account of the genus *Hakea*, with special reference to the closely related genus *Grevillea*, will also be found in the *Flora Australiensis* (v, 490.)

The genus is limited to Australia. As will be perceived on comparing the above character with that of *Grevillea*, there is no one organ in which the two genera are absolutely distinct excepting the seed

wing, and even that, although essentially terminal in *Hakea* and annular when present in *Grevillea*, is exceptional in *Hakea platysperma*, for instance, where the wing is almost of equal breadth all round the nucleus; but even there the texture and venation of the wing is that of *Hakea*, not of *Grevillea*, and the two genera are, with few exceptions, so natural that there are very few species that would not at once be referred to their right genus even without the fruit, especially as the wing of the seed can generally be traced into the ovule immediately after fecundation. The racemes are generally axillary and reduced to sessile clusters in *Hakea*, terminal and loose in *Grevillea*, but they are loose and elongated in the section of *Grevilleoides* of *Hakea*, and terminal in *H. ruscifolia* and a few others; whilst the section *Manglesia* of *Grevillea*, as well as *G. hakeoides* and a few others, have the inflorescence of *Hakea*. The so-called involucre or imbricate bud scales enveloping the nascent inflorescences of *Hakea*, appear to be wanting in *Grevillea*, but they are also deficient in the section of *Grevilleoides* of *Hakea*, and are always so deciduous as to be generally absent from flowering specimens. The same variations of form in the perianth occur in the two genera, but in *Hakea*, the hairs or beard inside the tube of the many *Grevilleas* are always wanting and the ovary is always glabrous. *Hakea* has also the various modifications of the pistil of *Grevillea*, except the turgid style of the section *Manglesia*. The fruit is, in general, totally different in the two genera, and yet that of *Grevillea gibbosa* is certainly a near approach to that of *Hakea platysperma*.

The determination of the species of *Hakea* generally requires the presence both of the flowers and fruit. Species, especially amongst the terete-leaved ones, with scarcely distinguishable flowers and leaves, have sometimes very different fruits, whilst closely similar fruits have, occasionally, very different flowers and leaves. I have found the flowers chiefly available for sectional, the fruits for specific, distinction. The dorsal protuberances on the fruit valves of some species, usually called spurs, appear to me to be more appropriately termed horns, as they occur always close to the apex, not to the base, of the valve.

**Botanical description.**—Species, *H. saligna*, Knight and Salisbury, *Proteæ*, 10<sup>2</sup>, (1809).

A tall, bushy shrub, quite glabrous or the young shoots slightly silky.

*Leaves* usually lanceolate, obtuse, or with a short callous point, tapering into a short petiole, 3 to 6 inches long, but sometimes oblong-elliptical and 2 to 4 inches long, of a pale colour, veinless or obscurely and obliquely penniveined.

*Flowers* small, in dense axillary clusters, the very short rachis hirsute.

*Pedicels* glabrous, filiform, about 3 lines long.

*Perianth* glabrous, the tube scarcely 2 lines long, much revolute under the globular limb.

*Torus* small.

*Gland* small.

*Ovary* nearly sessile; style long, with a large lateral convex stigmatic disk.

*Fruit* about 1 inch long,  $\frac{1}{2}$  to  $\frac{3}{4}$  inch broad, with a short incurved beak, more or less rugose, and sometimes covered with large very prominent tubercles.

*Seed-wing* shortly decurrent along the upper margin of the nucleus.

The Queensland specimens, to which the name of *H. mimosoides* specially applies, have longer leaves than most of the New South Wales ones, and F. Mueller's have the fruits narrower and less tuberculate, but several New South Wales ones have the same long leaves, with the fruits unknown. Some of C. Stuart's New England specimens have the leaves shorter and broader than usual. It will require, however, much more complete specimens to establish any definite varieties. (B.Fl. v, 512.)

This broad-leaved form is the common one in northern New South Wales (on the rivers as well as New England) and southern Queensland. This form is certainly *H. florulenta*, Meissner.

**Botanical Name.**—*Hakea*, in honour of Baron Christian Lewis Hake. An interesting letter from Robert Brown to Sir J. E. Smith will be found at page 112 of my "Sir Joseph Banks; the Father of Australia." It would appear that Sir J. E. Smith's feathers had been ruffled at the carving of *Hakea* out of *Conchium*,

and the result was one of the dignified and strictly botanically accurate "statements of the case" for which Brown was famous. *Saligna*, Latin, of or belonging to a "Willow," hence willow-like, usually taken as referring to the leaves of those species which have narrow pendulous leaves.

**Vernacular Names.**—The name "Willow-leaved *Hakea*" was proposed by Sweet in his work nearly ninety years ago. It is not specially appropriate, but I cannot suggest a better.

Near Bombala, N.S.W., it is locally called "Foley Wood." Following is the origin of this apparently absurd name, as given to me by Mr. W. Baeuerlen, then Collector, Technological Museum, Sydney, about 1890.

A man of the name of Foley, working on the road between Tantawango Mountain and Bombala, used to make the handles of his picks, hammers, &c., of the wood of this species (and sometimes also of *Lomatia longifolia*), and finding them very good, he made some in his spare time, which were readily purchased by passing teamsters, &c. On account of their excellence, these handles soon came into local repute under the name of "Foley handles," and now the name is consistently applied to the wood and the tree itself.

**Synonyms.**—*Embothrium salignum*, Andr. *Bot. Rep.*, t. 215 (very good figure); *Conchium salignum*, Sm., in *Trans. Linn. Soc.*, ix, 124; *Embothrium salicifolium*, Vent., *Jard. Cels.*, t. 8 (with more narrow willow-like leaves than I remember to have seen); *Conchium salicifolium*, Gært. f., *Fr.* iii, 217. *Hakea mimosoides*, A. Cunn; Meissn. in DC. *Prod.* xiv, 416; *H. florulenta*, Meissn. in *Hook, Kew Journ.*, vii, 116, and in DC. *Prod.* xiv, 416.

**Leaves.**—I would invite attention to the fact that, especially as northern localities are reached, there is considerable variation in the leaves of this species, specimens from northern New South Wales and southern Queensland being shorter, broader, and blunter than the typical form figured.

**Flowers.**—Sweet-scented, yet not strongly so, like many others of the Proteaceæ.

**Fruit.**—Mr. W. Baeuerlen once informed me that the winged seed of *Hakeas* afford a convenient means of determining species; they can readily be mounted on slides. All systematic botanists more or less carefully describe them, but it requires further observations, with large series, before we are justified in saying that they can be used for "determining" species.

**Timber.**—A free working, flesh-coloured timber; has not much figure. It requires careful seasoning, and is sometimes disfigured with borers.

I have already referred to it under "Vernacular Names." It is usually so small a plant that it is not in strictness a timber tree, but it is useful for the manufacture of small articles where toughness is required.

**Exudations.**—Reference should be made to a valuable paper entitled, “The possible relationship between Bacteria and the Gum of *Hakea saligna* (*Bac. pseudarabinus*, ii, n.sp.),” by R. Greig Smith, D.Sc., in *Proc. Linn. Soc. N.S.W.*, xxx, 136 (1905).

The conclusions arrived at in this paper are as follow :—

1. The gum of *Hakea saligna* is neither arabin, metarabin, nor pararabin. The hydrolytic products consist of reducing bodies that yield indefinite osazones and are probably akin to the furfuröids of Cross, Bevan, and Smith. It is not pectin, although it approaches this substance in some respects.

2. Of the bacteria occurring in the tissues of the plant, the most probable producer of the gum is one intermediate between *Bact. acacie* and its variety *Bact. metarabinum*, but as we do not yet know that the host-plant can alter a gum once formed by a bacterium, it cannot be said that the gum is produced by this micro-organism.

3. Bacteria that produce galactan gums which behave to reagents like arabin are not uncommon. A second is described under the name of *Bacillus pseudarabinus*, ii, n.sp. (*Loc. cit.* p. 148.)

**Size.**—A thin, spindly shrub or a small tree of 15 to 20 feet, with stem of quite a small diameter.

**Habitat.**—This is a purely eastern species, being confined to eastern New South Wales and Queensland.

Robert Brown, however, in *Trans. Linn. Soc.*, x, 185, gives “In Novæ Hollandiæ, orâ Australi; Lewin’s Land; in ericetis elevatioribus.” Presumably the vicinity of Cape Leeuwin is intended, as Brown gives “Lewin’s Land” for a number of indubitable West Australian plants.

Smith, in *Trans. Linn. Soc.*, ix, 124, in his “Sketch of the genus *Conchium*,” says of this plant :—“*C. salignum*, Donn, *Cant.* 21” (this is a mere list of plants.—J.H.M.), “A native of the country near Port Jackson. It flowered at Messrs. Lee and Kennedy’s (Hammersmith, near London) in 1791, and in the Conservatory of Thomas Johnes, Esq., of Haford, in June, 1798.”

Following on the localities quoted in the *Flora Australiensis*—

*Queensland.*—Araucaria Ranges (*Leichhardt*); Brisbane River, Moreton Bay (*A. Cunningham*, *F. Mueller*).

*New South Wales.*—Port Jackson, to the Blue Mountains (*R. Brown* and many others); Argyle County (*Fraser*); New England (*C. Stuart*).

Bailey gives, in addition, Wallangarra (N.S.W.—Queensland border) and Stauthorpe (Queensland), a few miles further on.

I have it in the National Herbarium, Sydney, from Cambewarra Mountain (J. L. Boorman); Jenolan Caves (W. F. Blakey); near Port Macquarie (J.H.M.); near Torrington, Einmaville District (J. L. Boorman); Woodburn, also Myrtle Creek, both Richmond River, very broad leaves (W. Baeuerlen); Drake, very broad leaves (J. L. Boorman); Acacia Creek, Macpherson Range, very broad leaves (W. Dunn).





THE WILLOW-LEAVED HAKEA.

(*Hakea saligna*, R. BR.)



I have already referred, under "Timber," to the occurrence of this species at Tantawanglo Mountain, near Cathcart, not far from the Victorian border. This would bring its range some hundreds of miles more to the south than any previously recorded locality; but I have not preserved specimens, if, indeed, I ever had them. But Mr. Bacuerlen is a most careful observer.

## EXPLANATION OF PLATE 171.

- A. Flowering twig.
- B. Bud.
- C. Unopened flower.
- D. Opened flower, showing—
  - (a) Four-lobed corolla, with sessile anthers in the concave laminae (b).
  - (c) Style.
  - (d) Stigma.
- E. Portion of flower (corolla removed) showing—
  - (a) Hypogynous gland.
  - (b) Ovary.
  - (c) Style.
  - (d) Stigma.
- F. Anther.
- G. Stigmatic disc.
- H. Fruits.
- J. Seed.

No. 168.

## *Eucalyptus Behriana*, F.v.M.

### The Broad-Leaf Mallee.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. Behriana*, F.v.M., in *Trans. Vict. Inst.* i, 34 (1855).

Following is the original description :—

*Fruticose*; leaves alternate, coriaceous, somewhat shining, lanceolate or ovate, acute, slightly oblique, thinly veined, dotted; umbels pedunculate, paniced, few-flowered; flowers small, nearly sessile; lid hemispherical, blunt or minutely apiculate; tube of the calyx obconical, bell-shaped, nearly twice as long as the lid; fruit half-ovate, sessile, not contracted at the top, valves of the capsule enclosed; seeds brown, streaked.

In arid plains and on stony bare hills near the Avoca, Murray, and Gawler Rivers, and in Bacchus Marsh.

Bentham more fully described the species in the following words :—

*E. Behriana*, F. Muell.; Miq. in *Ned. Kruidk. Arch.*, iv., 139. A tall shrub or small tree (F. Mueller).

*Leaves* from ovate to ovate-lanceolate, rarely lanceolate, mostly acute or acuminate, rarely above 3 inches long, thick and smooth, the fine very oblique veins scarcely conspicuous, the intramarginal one at some distance from the edge.

*Peduncles* short, terete or slightly angular, with few rather small sessile flowers, the umbels generally several together forming short oblong or thyrsoid panicles terminal or in the upper axils or several of these together in a compound terminal panicle.

*Buds* obovoid.

*Calyx* not 2 lines long, more or less attenuate at the base.

*Operculum* short, hemispherical, obtuse or scarcely umbonate, the outer membranous one often still persistent in the advanced bud.

*Stamens* all perfect, not 2 lines long, anther-cells small, globular, opening in circular pores, rarely at length confluent.

*Ovary* flat-topped.

*Fruit* obovoid-globular, truncate, about 2 lines diameter, the rim flat, the capsule slightly sunk.

Victoria. Bacchus Marsh, Avoca River, and Pine Forest, F. Mueller. (B.Fl. iii, 214.)

Bentham then gives a variety *purpurascens*, F.v.M., from Lake Wangaroo (Wangary), *viâ* Port Lincoln, S.A., but in my *Critical Revision*, Part x, p. 337, I have shown that this is a form of *E. odorata* and not of *E. Behriana*, and in the same place have dealt with the affinities of this interesting and not very well-known species.

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *Behriana*, in honour of Dr. Hans Hermann Behr, a medical man, born at Coethen, Duchy of Anhalt, Germany, 18th August, 1818. He was long resident in South Australia, where he collected extensively. He co-operated with Mueller in botanical matters in Adelaide in 1847 and 1848. He returned to Germany in 1848, and shortly afterwards left for San Francisco, where he spent the remainder of his life, dying there on the 6th March, 1904. He published a flora of San Francisco, and was also interested in entomology and ethnology. For a fuller account of Dr. Behr, see (a) my Presidential Address to Section D in *Proc. Aust. Assoc. Adv. Science*, Adelaide, 1907; (b) my "Records of Australian Botanists" (1st Supplement) in *Proc. Aust. Assoc. Adv. Science* (Sydney, 1911).

**Vernacular Name.**—The "Broad-leaf Mallee" is as good as any. *E. incrassata*, and especially its variety *angulosa*, are also broad-leaf Mallees, but our present species usually has broader leaves, and certainly contrasts well with the other Mallees found associated with it.

**Bark.**—The bark is always smooth, and commonly of a whitish or dirty white colour, or, according to one observer, of a "dark oily-looking green"—the latter referring to vigorous young stems.

**Leaves.**—Large, thick, shining. At page 285 of "Research on the Eucalypts," Messrs. Baker and Smith thus summarise the constituents of the oil:—

Species.	Whence collected for Oil.	Specific Gravity at 15° C.	Specific Rotation <sup>[α]</sup> D.	Saponification Number.	Solubility in Alcohol.	Constituents found.
Behriana.	Wyalong, N.S.W.	0.9237	+ 4.0°	11.1	1½ vols. 70 per cent.	Eucalyptol, pinene, sesquiterpene.

A Victorian correspondent familiar with the plants used for oil distillation in that State, writes "Leaves not used for oil."

**Timber.**—The timber is red, but small. It is not used in the arts, but forms an excellent fuel.

**Range.**—It has hitherto been recorded from a few localities in South Australia, and certain of the drier parts of Victoria and New South Wales.

Besides those localities mentioned in the original description, Mueller quotes ("Eucalyptographia") "in the hilly forest region of Wirrabara, near Crystal Brook, and Mount Remarkable, on deep marly clay-soil" (J. E. Brown), and quotes Dr. Behr, "in the scrubs of Sandarae-Cypresses (*Callitris*), near the Gawler River."

Prof. Ralph Tate, in his "Flora of South Australia," states that it is found in the northern agricultural areas, the Port Lincoln District, Kangaroo Island, and south of the Murray Desert. I have it from Truro, 70 miles north of Adelaide (Dr. J. B. Cleland). A few more specific South Australian localities are desirable.

## VICTORIA.

Bacchus Marsh (Mueller), a type locality ; Swan Hill, Murray River (J. G. Luchmann), 1890 ; Mallee District (C. Walter), 1889 ; Inglewood and Wedderburn (J. Blackburne) ; Yarram Black (C. Walter), 1886 ; Wimmera (J. Reader) ; Nhill (St. Eloy D'Alton).

## NEW SOUTH WALES.

"Mallee," Wyalong (H. Deane), about 1890.

Wyalong (Forester J. G. Postlethwaite), April, 1892. Height, 20 feet ; diameter, 6 inches.

Wyalong (W. S. Campbell), October, 1901.

20-30 feet, with one or two dozen stems of 3 to 4 inches in diameter springing from one root. Barmedman and other stations in the Lachlan District (J. Duff).

Leaves smooth, green and shining ; flowers small. Grows in scrubs 5 to 10 feet high, sometimes small trees, rarely up to 9 inches in diameter. Bark, dirty white, smooth. Broad green-leaf Mallee. (R. H. Cambage, Wyalong and Barmedman, September, 1900.)

"Broad-leaf Mallee," Wyalong (J. L. Boorman).

It will be thus observed that I only know this Mallee, as far as New South Wales is concerned, from Wyalong and Barmedman, and I appeal to my correspondents (which I rarely do in vain) to inform me of any other specific localities which may be known to them.

It is an interesting fact, the full meaning of which geologists and plant æcologists have not yet explained to us, that Wyalong is a locality from which a few other plants have been obtained, hitherto only recorded from the Victorian Mallee country and South Australia. I do not wish to push the matter too far, as Australia is imperfectly explored botanically yet, and year by year a number of our "facts" of distribution are proved to have been provisional observations.

## EXPLANATION OF PLATE 172.

- a. Sucker leaf, Wyalong, N.S.W.
- b. Flowering twig with fruit, Wyalong.
- c. Small fruits from Swan Hill, Victoria (Murray River).
- d. Conoid fruits, Wyalong.



BROAD-LEAF MALLEE,  
(*Eucalyptus Behriana*, F.v.M.)

M. Floeckon del. et lith.



No. 169.

*Acacia adunca*, A. Cunn.

## A Wattle.

(Family LEGUMINOSÆ : MIMOSEÆ.)

I MUST make some preliminary remarks (before dealing with *A. adunca* itself) concerning *A. crassiuscula*, Wendl., which has been confused with *A. adunca*, and indeed with other Acacias.

In Wendland's *Commentatio de Acaciis aphyllis*,\* Hanover, 1820, *Acacia crassiuscula* is figured, and described in the following words:—

*A. incrimis*: capitulis subracemosis paucissimis: petiolis linearispathulatis, apice rotundatis, mucronatis crassiusculis, calyce quinquefido: germine glabro. Habitat in Novâ Hollandiâ.

*Frutex* glaber, tripedalis, cortice fusco: ramis erectis vel patentibus, angulatis, angulis obtusis marginatis.

*Petioles* alterni vel suboppositi, remotiusculi, coriaco-crassiusculi, erecto-patentes, exacte linearispathulati subfalcati apice rotundati, breviter mucronati: uninerviî, venosi, marginati margine antico ad basin fere, uniglanduloso bi-tripollicares et longiores, 1-2 lineas lati. Stipulæ nullæ.

*Floræ* capitati, lutei, bracteolis spathulatis, concavis apice acutis, subpubescentibus interstincti. Capitula multiflora, pauca 3-5 in racemos axillares solitarios breves collecta, mediæ magnitudinis, insidentia pedicellis paulo longioribus, subclavatis, sicut pedunculus communis, basi bractea ovata, acuta, minima suffultis:

*Calyx* membranaceus diaphanus, monophyllus, turbinatus, quinquefidus: laciniis linearibus, superne valde dilatatis, acutiusculis, apicæ fusas.

*Corolla* monopetala quinquefida: laciniis erectis, oblongis, obtusis, calyce duplo longioribus.

*Stamina* numerosa, corolla longiora.

*Germen* oblongum, glabrum. Stylus staminibus paulo longior geminis apici insertus.

*Legumen*.....(v.v.)”

The species has since been shown, and I think correctly, to be a Western Australian species, and to be synonymous with *A. pycnophylla*, Benth., which must fall.

Then we have:—

“*A. crassiuscula* (Wendl. *Diss.*, n. 20, t. 8) phyllodiis linearibus 1-nerviis crassiusculis integerrimis basi attenuatis apice rotundatis inflexo-mucronatis, capitulis subternis racemosis, floribus 5-fidis. Hab. in Nov. Holl. ora orientali. Sieb. *l.c.*, n. 464 (v.s.)” (DC. *Prod.* 2 (1825) 453.)

*Acacia crassiuscula* (Wendl. *Diss.*, no. 20, t. 8) phyllodia linear, 1-nerved, thickish, quite entire, attenuated at the base, rounded at the apex, and ending in an inflexed mucrone; heads of flowers usually 3 in a raceme; flowers 5-cleft. Native of New Holland, on the east coast. Sieb. *pl. exsic. nov. holl.* No. 464.

Thickish-leaved Acacia. Fl. April, June. Clt. 1824. Shrub 4 to 6 feet.

(Don's *General History of the Dichlamydeous Plants*, vol. ii, p. 406 (1832).)

\* In Don's *Gen. Hist. Dichlamyd. Plants*, the reference is given as Wendl. *Diss.* No. 20, t. 8, and he is followed in Bentham *Lond. Journ. Bot.*, i, 356. I cannot trace Wendland's *Dissertationes*, and suggest that the work is really the same as the Hanoverian one. Bentham (*B.Fl.* ii, 372) quotes *Commentatio*.

Further we have:—

*A. crassiuscula* (Wendl. *Diss.* 31, t. 8), glaberrima, junior subglauescens, ramulis angulatis, phyllodiis linearibus brevissime mucronatis basi longe angustatis crassiusculis submarginatis uninerviis venis obscuris, glandula a basi parum distante, racemis phyllodio brevioribus, capitulis sub-20-floris, calyce truncato-dentato crassiusculo ciliato. Phyllodia  $1\frac{1}{2}$ –2-pollicaria,  $1\frac{1}{2}$ –2 lin. lata, multo crassiora et rigidiora quam in *A. linifolia*, angustiora quam in *A. rostellifera*. Racemi 3–8-cephali. Ovarium glabrum v. tomentosum. Legumen lineare, 2– $2\frac{1}{2}$  lin. latum, planum, crassiusculum, glabrum, inter semina contractum, valvulis coriaceis.—Blue Mountains, New South Wales, Sieber, n. 464, Cunningham, Fraser, Mitchell. (Hooker's *London Journal of Botany*, vol. i, (1842), p. 356.)

In the above three extracts, *A. crassiuscula* is assumed to be an exact Australian species, and to be identical with Sieber's No. 464, and specimens collected by others.

Also we have "*A. crassiuscula*, Wendl.," described in B.Fl. ii, 372 (1864):—

*A. crassiuscula*, Wendl. *Comm. Acac.*, 31, t. 8. A shrub of several feet, glabrous and often rather glaucous when young; branches usually acutely angled.

*Phyllodia* numerous, linear, often falcate, with a small oblique point or the lower ones obtuse and almost lanceolate, rather thick, 1-nerved and veinless, the nerve-like margins often but not always ciliate,  $1\frac{1}{2}$  to 2 inches long in some specimens, above 3 inches in others,  $1\frac{1}{2}$  to 2 or in larger ones 3 lines broad, the marginal gland below the middle.

*Racemes* shorter than the phyllodia, with several small dense globular heads of 20 or more flowers.

*Calyx* turbinate, fully half as long as the corolla, ciliate and readily separating into spatulate sepals.

*Petals* often separating, with prominent midribs.

*Pod* linear, rather thick, about  $2\frac{1}{2}$  lines broad, contracted between the seeds.

*Seeds* in the centre of the pods, but not seen perfect.

He repeats this in *Trans. Linn. Soc.*, xxx, 473.

This is in part Sieber's No. 464, as stated by him, but it includes Queensland and Tasmanian plants of whose identity I am in doubt at present, as I have been unable to obtain satisfactory specimens.

I will show, later, that Sieber's No. 464 is *A. obtusata*, Sieber, var. *Hamiltoni*, var., nov., which I will figure and describe in Part XLVIII of this work.

Then Bentham (B.Fl. ii, 368, 1864) gives *A. crassiuscula*, Meissn., in *Pl. Preiss*, i, 16 (not of Sieber), as a synonym of *A. pycnophylla*, Benth. He repeats this in *Trans. Linn. Soc.*, xxx, 471 (1875). Meissner's specimen was collected near Albany, W.A. (Princess Royal Harbour).

So that we have:—

- (1) *A. crassiuscula*, Wendl. This is *A. pycnophylla*, Benth.
- (2) *A. crassiuscula*, Meissner. This is *A. pycnophylla*, Benth., also (as indeed stated by Bentham).
- (3) *A. crassiuscula*, Sieber. This is No. 464, and is, I repeat, *A. obtusata*, Sieber, var. *Hamiltoni*, Maiden.



Now we come to *A. adunca*, A. Cunn.

*A. adunca* (Cunningh. mss.) phyllodia straight, elongated, linear, attenuated at the base, but rounded at the apex, ending in a callous mucrone, which forms a right angle with the phyllodia, 1-nerved, and bearing a gland on the upper margin between the middle and the base; heads of flowers crowded, disposed in terminal and axillary racemes. Native of New South Wales. "Hooked Acacia" shrub, 3 to 6 feet. (Don's *General History of the Dichlamydeous Plants*, vol. ii, 1832, p. 406.)

In the following passage Bentham makes it a variety of *A. crassiuscula* :—

"*Acacia crassiuscula* var. *adunca*. Phyllodii longioribus, (usque ad 4 poll.) glandula a basi remotiore. *A. adunca*, Cunn. in G. Don *Gard. Dict.* ii, 406, Hunter's River, Cunningham" (Bentham in Hooker's *London Journal of Botany*, vol. i, 1842, page 356).

Bentham (B.Fl. ii, 372) still looks upon *A. adunca* as a synonym of *A. crassiuscula*, Wendl., but I will show that it is a distinct species, and that Cunningham's name should stand.

Through the kindness of Colonel Prain, Director of Kew, I have received two specimens of *A. adunca*, A. Cunn., as follows :—

(1) Following is a copy of the Kew label :—

115. *Acacia crassiuscula* Wendl. (*A. linearifolia*, Cunn.)  
Blue Mountain Dec.  $\frac{84}{1825}$  New South Wales, A. Cunningham.

The last three months of 1825 were spent by Cunningham in the vicinity of Wellington Valley, N.S.W., and he botanised about 150 miles on each side of the Macquarie River.

Coming back to Sydney, he would, of course, have to cross the Blue Mountain (s), and the following is the only reference I can find in his MS. journal to the Blue Mountains, which indicates little more than a rapid journey over them at the very close of the trip.

This is what he records (p. 187, Journ. labelled 1822-30) :—

"In my route over the Blue Mountains I again visited the vicinity of the *Cascade*,\* providing myself with a large supply of the roots of *Blandfordia nobilis*. On the morning of the 29th I again crossed the Nepean River, and at the close of the day, myself and establishment arrived safe at Parramatta, after an absence of twelve weeks."

There is no day of the month (December) given in the label from Kew.

I do not know such an *Acacia* as occurring in the Blue Mountains, and would suggest that Cunningham got it somewhere in the vicinity of the Macquarie River; the precise locality is, however, unknown at present.

(2) Following is a copy of the second Kew label :—

115. *Acacia adunca*, A. Cunn.  
*A. crassiuscula*, Wendl.,  $\beta$ . *adunca*.  
Benth. in *London Journal Bot.* i,  
356. Hunter's River, New South  
Wales, A. Cunningham, July  $\frac{79}{1827}$ .

(N.B.—115 is Bentham's number for *A. crassiuscula*, Benth., in Hooker's *Lond. Journ. Bot.*, i, 356 (1842)—J.H.M.)

\* Presumably near Wentworth Falls.

Then there is a second label on this sheet, evidently by Allan Cunningham himself.

"Closely allied to the species marked *A. adunca*, from which it appears to differ in having a more prominent gland on the upper or inner margin of the petiole, and a hoary furfur covering the branches. "A large shrub, frequently noticed in the broken country investing Mount Dangar on the west branch of Hunter's River, Aug. 1827."

Through the kindness of Colonel Prain, Miss M. Smith drew for me the Kew specimen of which the above is a label. (See plate 173, fig. A.) I have also a specimen, as I have stated.

I have searched such of Allan Cunningham's MS. Journals as are available to me, and I find no further reference to this species.

I sent Mr. J. L. Boorman, Collector, Botanic Gardens, to Mount Dangar, and he obtained specimens which precisely match Cunningham's type, and I have received it from other localities, which will be referred to under "Habitat."

It may be redescribed in the following words:—

A tall shrub, loose in habit, with long pendulous stems rising from the ground, stems rarely more than 1 inch in diameter, glabrous, and often rather glaucous when young; branches usually acutely angled. Leaflets and phyllodia often on the adult plant at the same time.

The pinnae usually 3 pairs, the leaflets 5 to 8 pairs, elliptical in shape, and 8 to 11 mm. in length.

*Phyllodia* numerous, linear, sometimes slightly falcate, attenuated at the base, but rounded at the apex, and often ending in a small curved or hooked point, moderately thick, 1-nerved and veinless, the nerve-like margins often translucent; commonly 3 inches long, but often 4 or 5 inches long, and sometimes as short as 2 inches;  $1\frac{1}{2}$  to 3 inches broad, the marginal gland below the middle. Sometimes there is a second gland.

*Racemes* shorter than the phyllodia, dense globular heads of 20 or more flowers.

*Calyx* turbinate, nearly half as long as the corolla, readily separating into somewhat spatulate sepals, which are ciliate on the upper part.

*Ovarium* smooth.

*Petals* separating, spatulate, the tips thickened and mealy.

*Pods* 2 to 3 inches long and longer, and  $2\frac{1}{2}$ –3 lines broad, contracted between the seeds and the valves, with distinctly thickened margins.

*Seeds* in the centre of the pods, longitudinally arranged, narrowish-ovate; the funicle, which only passes round a fourth of the seed, thickened into a lateral club-shaped aril, said aril pointing towards the tip of the pod.

It is certainly related to *A. accola*, Maiden and Betehe.

*A. alunca* is loose in habit, and has long pendulous stems springing from the ground. A stem larger than 1 inch in diameter has not been observed. *A. accola* is pyramidal in shape, and more compact than *A. adunca*. It has stems 6 inches in diameter, but it is a smaller plant than *A. adunca*. The pods of *A. accola* are longer and broader.

The inset of Plate 173 is of *A. accola*, and shows that there is considerable affinity between the two species in phyllodes (those of *A. accola* have, however, more commonly two glands) and arillus, but I am satisfied that they are distinct species.

The locality, "Mount Dangar, Gungah," for *A. accola* in the original description in *Proc. Linn. Soc. N.S.W.*, xxxi, 734 (1906), should be *A. adunca*.

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *adunca*, Latin, hooked, in allusion to the tips of the phyllodes. Sometimes the tips or mucrones are markedly bent at an angle with the phyllodes, but not always so, and so the character must be used with caution.

**Vernacular Name.**—I know of none.

**Synonyms.**—*A. crassiuscula*, Benth. non Wendl. (*B. Fl.* ii, 372).

**Size.**—A tall shrub, never attaining timber size.

**Habitat.**—This species is commonest in the northern half of New South Wales, and extends to Queensland, only just over the border from Wallangarra, so far as we know at present. Its southernmost locality is Yerranderie, near Burragorang.

The Mount Dangar, Denman, Upper Hunter, and Goulburn River localities are in the same district. Going west, we have it in the Warrumbungles, and going north we find it in New England at Torrington and Wallangarra.

Following are specific localities:—

A large shrub frequently noticed in the broken country investing Mount Dangar. (Allan Cunningham, August, 1827.)

A much smaller tree than *A. nerifolia* and less floriferous in habit, growing amongst rocks at high altitudes in one locality only (seen more widely distributed later.—J.H.M.), Mount Dangar, Gungal. Type locality! (J. L. Boorman, October, 1904.)

A tall shrub of 8–20 feet, pendulous in general habit, variable in respect to foliage, having at times in certain localities leaves fully a quarter of an inch broad and 6 inches to a foot long. Mount Dangar, Gungal. (J. L. Boorman, December, 1908.)

Denman (R. H. Cambage, No. 1,650, July, 1907); Upper Hunter River (L. Stephenson, December, 1886); Murrumbo, Goulburn River (R. T. Baker, September, 1895); Warrumbungle Ranges (W. Forsyth, October, 1901).

10–12 feet high, on acid granite, Torrington (R. H. Cambage, July, 1907; No. 1,622, in flower). Reddish-brown stems; stems of *A. nerifolia* are grey (R. H. Cambage, September, 1907; No. 1,622a, in early fruit); Torrington (J. L. Boorman, January, 1911, in flower and ripe fruit); Wallangarra (E. Betehe, December, 1891, in flower); Wallangarra (J. L. Boorman, November, 1904, in fruit; January, 1906, in flower).

Following is the only locality south of Sydney known to me:—Byrne's Gap, Yerranderie; a shrub of 6–8 feet, on Permo-Carboniferous formation (R. H. Cambage). In this plant the calyx has a distinct line running down the middle, and while not typical, I think it cannot be separated from this species.

## EXPLANATION OF PLATE 173.

- A. Flowering twig.
- B and C. Phyllode and pinnate leaf from Mount Dangar, Gungahlin, N.S.W.
- D. Flower-head.
- E. Individual bud.
- F. Flower, with (*a*) bract found at the base of each flower.
- G. Flower opened out, showing—
  - (*a*) Calyx.
  - (*b*) Corolla.
  - (*c*) Pistil, stamens removed.
- H. Pods.
- I. Seed.

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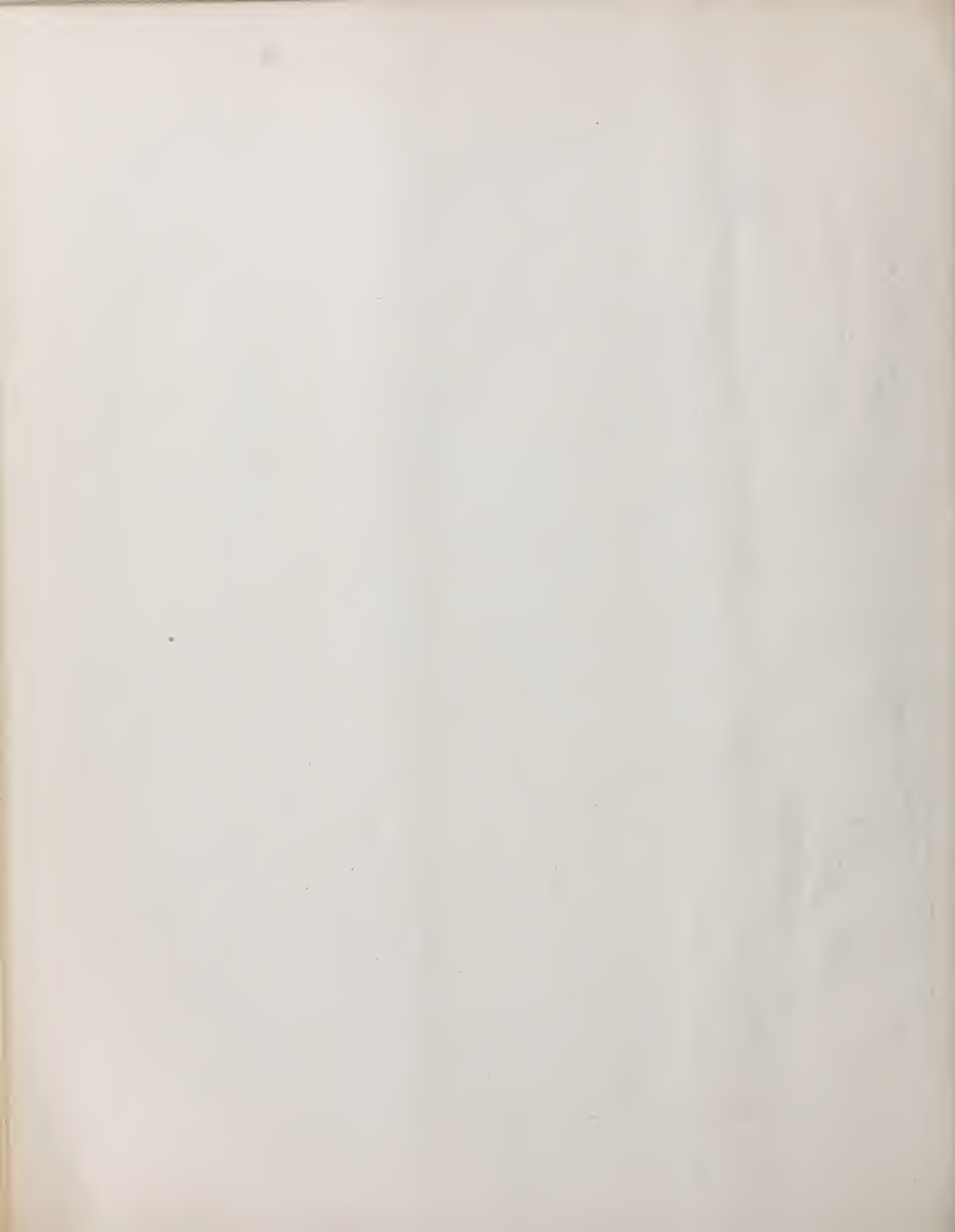
*A. accola*, Maiden and Betche (for comparison) :—

K, L, M. Narrow phyllodia, pod and seed, from Stanthorpe, Queensland.



A WATTLE.

(*Acacia adunca*, A. CUNN.)



No. 170.

*Litsæa hexanthus*, Juss.

The Ugaubie.

(Family LAURACEÆ.)

**Botanical description.**—Genus, *Litsæa*. (See Part XLIV, p. 86.)**Botanical description.**—Species, *L. hexanthus*, Juss. in *Ann. Mus.* vi, 212 (1805).

Following is the original description:—

5. *Hexanthus umbellatus*, Loureiro *cochinchinensis*, 242. Feuilles ovales oblongues acuminées, veinées et velues en dessous; petites ombelles axillaires; involucre à six feuilles contenant six fleurs. Calice partiel tubule par le bas, devise par le haut en six lobes au-dessous des quels sont insérés six filets stériles et six glandes presque sessilis alternas avec ces filets; baie ovoïde. On n'a pas vu les fleurs mâles. C'est le cay-ngat de la Cochinchine, ou il a été vu par Loureiro dont on a extrait la description. L'hexanthus n'est peut-être que l'individu femelle du tomex japonica, avec lequel il a de l'affinité par le nombre des divisions de l'involucre et des fleurs qu'il renferme. S'il est une espèce différente et seulement congénère du liste, on la distenqueroit par le nom de *litsea hexantha*.

Following is the description of *Tetranthera ferruginea*, R.Br., *Prod.* 403, as given by Bentham:—

A tree of 30 feet or more, the branches and petioles ferruginous, pubescent, or villous.

*Leaves*, from broadly ovate to elliptical-oblong, acuminate or rarely obtuse, rounded or cuneate at the base, 3 to 5 inches long, rather firm, glabrous, and shining above, ferruginous-pubescent underneath, with raised primary veins and transverse veinlets.

*Peduncles* clustered in the axils or at the old nodes, 3 to 6 lines long in the males, shorter in the females.

*Bracts* orbicular, enclosing 5 or 6 flowers on very short, thick pedicels.

*Perianth segments*, 6, lanceolate ciliate and very deciduous in the females; broader, more obtuse, and sometimes fewer in the males.

*Perfect stamens*, 2, twice as long as the perianth, the filaments hairy; staminodia in the females 12, short.

*Fruit* (not seen quite ripe) ovoid, resting in the enlarged cup-shaped truncate perianth-tube, which attains 3 to 4 lines diameter. (B.Fl. v, 305.)

(The ripe fruit is ovoid, nearly 2 cm. long by 5 cm. in diameter).

Our New South Wales plant is the following variety:—

**Var. lanceolata**, Meissn.

*Leaves*.—Oblong or oblong-lanceolate.

*Male flowers*.—As in the typical form; females unknown. (Bentham.)

4881—C

The female flowers are depicted at F in Plate 174, and may be described as follows:—

*Perianth segments*.—As in the male flowers.

*Staminodia*.—Shorter than the perianth.

*Ovary*.—Glabrous, or nearly so.

*Stigma* slightly hooked.

**Botanical Name**.—*Litsæa*, already explained (see Part XLIV, p. 86); *hexanthus*, Latin, with six flowers.

In "Loureiro's" description of *Hexanthus umbellatus*, he writes: "Involucres containing six flowers," and this, I think, is the origin of the word *Hexanthus* used by him.

**Vernacular Name**.—"White Sassafras," in the Bellinger River District, according to Mr. E. H. F. Swain.

**Aboriginal Name**.—"Ugaulbie" is the aboriginal name formerly in use in the Clarence and Richmond River District of New South Wales, according to the late Mr. Charles Moore.

**Synonyms**.—I have followed Mueller (*Secoud Census*) in calling this plant *Litsæa hexanthus*, but I note Bentham's warning (B.Fl. v, 306). It seems very doubtful whether *Hexanthus* of Loureiro, from Cochin China, usually referred to *T. ferruginea*, is really that species.

Neither one name nor the other is to be found in Hooker's *Flora of British India*, nor in Trimen's *Handbook of the Flora of Ceylon*.

All that I can say is that our plant appears to be conspecific with *Tetranthera ferruginea*, R.Br., which Mueller believes to be identical with *Litsæa hexanthus*, and which Bentham doubts. The matter should engage the attention of a specialist who has access to Cochin China plants.

*Hexanthus umbellatus*, Loureiro; *Litsæa hexanthus*, Juss., var. *ferruginea*, F.v.M.; *Litsæa ferruginea*, F.v.M.; *Tetranthera ferruginea*, R.Br., var. *lanceolata*, Meissn. (which is the name adopted by Bentham in B.Fl. v, 306); *T. nesogena*, F.v.M., from Family Island, Roekingham Bay; *Cylicodaphne Leejeana*, F.v.M. (*Fragu.* v, 169), the original of which was collected, like *T. nesogena*, at Rockingham Bay, Queensland, by Dallachy.

**Leaves**.—They vary a good deal in size, in shape, and in the tomentum, which is very ferruginous in Brown's specimen, but the depth of the colour and the amount of the tomentum are somewhat diminished, and the texture of the leaves becomes thinner as the Bellinger River, New South Wales, is approached.



**Timber.**—Mr. Moore, in the *Cat. N.S.W. Exhibits*, London Exh., 1862 (the first reference I can find to the timber), says :—

In favourable situations, this tree attains a large size. Timber hard, close-grained, but not used.

In a recent official report, referring to Bellinger River timber, occurs the following :—

Wood white, light, and fine-grained, having, when freshly cut, the pungent odour of Sassafras. (E. H. F. Swain.)

**Size.**—The height given by Bentham to the Queensland form is “30 feet or more.” Mr. Moore calls it, on the Clarence and Richmond Rivers, “a large tree.”

The *Catalogue of Indigenous Woods from the Northern Districts*, prepared for the Paris Exhibition of 1855, speaks of it under No. A 15 as “averaging in size 2 feet diameter in the stem, and from 70 to 80 feet in height.”

Mr. Baeuerlen variously estimated its height as 20–30 feet (Alstonville), and 20–40 feet (Ballina).

On the Bellinger, Mr. Swain speaks of it as “a small tree.”

It is an interesting species of which we know but little; it is, indeed, one of the brush trees of New South Wales which promise an abundant harvest, first to the scientific investigator, and then to the commercial man.

**Habitat.**—Following are the localities given by Bentham for that form of the species designated by him *Tetranthera ferruginea*; they are all in Queensland :—

Cape Grafton to Endeavour River (*Banks and Solander, A. Cunningham*); Rockingham Bay (*Dallachy*); between Cleveland and Rockingham Bay (*W. Hill*).

Then he gives the following localities for *T. ferruginea*, var. *lanceolata*, Meissn., which I do not think is a very useful variety :—

Family Island, Rockingham Bay, Queensland (*Dallachy*); Brisbane River (*C. Moore*).

This is No. A 15 in the *Cat. of Indigenous Woods of the Northern Districts*, exhibited at the Paris Exhibition of 1855, and it is catalogued as “a scrub tree of the Laurus or Cinnamon tree family . . . a common scrub tree near Brisbane.”

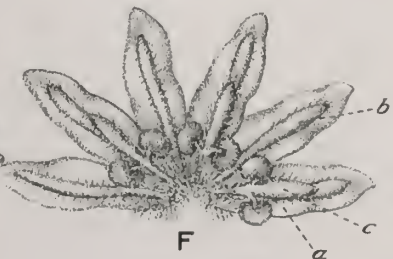
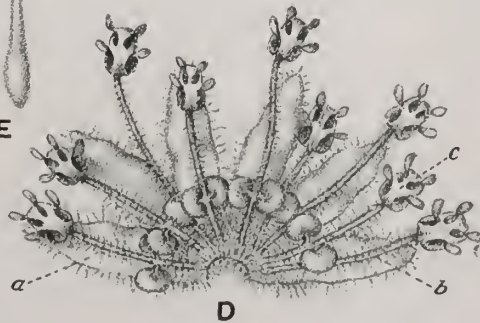
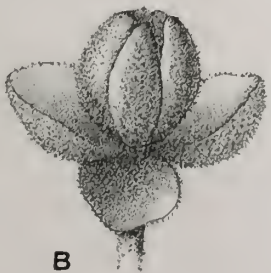
Later on, Mr. Moore, in his *Cat. Indigenous Woods for the Northern Districts*, prepared for the London Exhibition of 1862, exhibited it under No. XLIX, from “Clarence and Richmond brush forests.”

The species also occurs in the following New South Wales localities :—Ballina and Alstonville, Richmond River (both by W. Baeuerlen); and Gleniffer, Bellinger River (E. H. F. Swain), considerably to the south.

This tree is therefore confined to Eastern Australia, viz., eastern New South Wales and Queensland, in rich brushes, and its range, so far as we know it at present, is from the Endeavour River in the north to the Bellinger River in the south.

## EXPLANATION OF PLATE 174.

- A. Flowering twig.
- B. The flower head, with four bracts, enclosing five or six flowers.
- C. Male flower.
- D. Male flower, opened out, showing—
  - (a) Calyx (6 perianth segments).
  - (b) Six stamens of the outer series.
  - (c) Three stamens of the inner series, nearly all of which had glands.
- E. Rudimentary pistil.
- F. Female flower, opened out, showing—
  - (a) Calyx (6 perianth segments).
  - (b) Six staminodia of the outer series.
  - (c) Three staminodia of the inner series, with glands.
- G. Pistil.
- H. Fruits, with persistent calyx.



UGAULBIE.

(*Litsea hexanthus*, Juss.)



### THE VERTICAL GROWTH OF TREES.

The following two letters from *The Surveyor* (the official organ of the Institute of Surveyors of New South Wales) for 31st December, 1904, and 28th February, 1905, respectively, refer to a matter that often forms the subject of controversy, but which has rarely been the subject of actual experiment. The question is often put in this form—Given two nails driven into the same tree at different heights, would they become further apart as time goes on?

It will be seen that American experiments answer this in the negative; actual tests are being made in the Botanic Gardens, Sydney, on various trees under the supervision of Mr. Cambage.

(1) Mr. T. W. Fowler, of the Melbourne University, writing with reference to Mr. R. T. McKay's lecture on the Murray River, has touched upon a very interesting feature in regard to the vertical growth of trees. I had previously drawn attention to the great height of flood marks, as exemplified by logs and roots caught in the forks of trees 40 feet overhead. The particular spot I had in view is on the Lachlan River above Cowra, where the valley is considerably confined as compared to the spreading flats lower down. It was stated locally that the highest marks were the result of a flood about 1874. There are no records available of flood heights on the upper reaches of most of our rivers, but the highest flood at Gundagai, on the Murrumbidgee, reached 39 feet 6 inches in 1853, according to the records at the Sydney Observatory.

The question raised by Mr. Fowler, however, is whether, owing to upward growth, such marks as logs caught in branches can always be regarded as indicating, in their present positions, the height of the flood by which they were deposited, and he quotes a case to prove that the vertical growth of a tree extends to the trunk, and is not restricted to a prolongation of the branches.

The point is one that might well receive the attention of some of our surveyors who have fixed stations in the country, and a very valuable set of observations might be obtained, which would augment the somewhat limited available statistics in regard to tree measurement in Australia. In 1891, Mr. H. C. Russell, F.R.S., in a paper read before the Royal Society of New South Wales, drew attention to the want of information on this subject, and stated that in older countries the rate at which various trees grew had been carefully watched for many generations. He also gave the result of an investigation he had made, but which was confined to circumference measurements only. In 1897, Mr. J. H. Maiden, F.L.S., in his Presidential Address before the Royal Society, also referred to the necessity which existed for ascertaining the heights and trunk-diameters of various kinds of trees, with a view to preparing a record of the rates of growth of our Australian trees. In the August number of the *Agricultural Gazette* for 1896 are a series of reports from Forest Rangers relating to the rate of growth of indigenous forest trees.

The particular point, however, which has now been brought under notice, is one which does not appear to have received much consideration. Although it seems probable that the stems increase in length below the limbs, it must not be overlooked that among straight-growing saplings there are always many small dead and dying branches below the lowest green one, thus indicating that where a tree has a straight branchless bole for, say, 50 feet, it does not follow the first limb was always the lowest. Our Eucalypts, in a well-sheltered coast forest, run up very quickly, and rapidly lose their twiggy branches, while the Pines (*Callitris*) retain them, so that it is only in old age we find the latter species with clean boles. In the last number of *The Surveyor*, Mr. District-Surveyor Walker quotes an interesting instance of where some old blazing appeared uniformly high on the trees, and it does seem possible, in the absence of a knowledge of the conditions at the time of, and subsequent to, the marking being effected, that the rich flat upon which the trees grew may account for the rapid vertical growth of the stems. In my experience nothing has been noted to prove this vertical growth below the branches, old blazes and shields having generally been found at about the usual heights.

The matter appeals most of all, perhaps, to those surveyors who use the base of a growing tree as a referring mark for levels, and for many years the question of the variability, or otherwise, of bench marks in such positions has exercised the minds of those using them. Possibly the point has been tested; and if so, particulars of the result would be interesting to the members of the Institution, and at the same time be a valuable addition to the literature on the subject. —R. H. CAMBAGE.

(2) Acting on the suggestion of Mr. Wm. Thomas, Staff Surveyor of Dubbo, I searched some back numbers of the *Transactions of the American Society of Civil Engineers*, and found that the question of the stability of bench marks made on trees was dealt with by Mr. George W. Cooley in a paper read before that Society on 3rd October, 1888, and published in 1889, Vol. 20, p. 73. The observations were made on the shore of Lake Minnetonka, near Minneapolis, and extended over a period of five or six years, being taken yearly about the 1st October.

Mr. Cooley reports that "No upward growth was discovered, but a change from one to three-hundredths of a foot, from year to year, probably caused by action of frost during the winter. The greatest change in any one year was .03, and the greatest net change in five years .02." The table given below, summarising Mr. Cooley's tests, will be of interest.

TOTAL VARIATION.

Kind of Tree.	Diameter Inches.	Year .	Rise + or Fall -
Linden ... ..	3	5	- .0266
Ironwood ... ..	12	1	+ .016
Hickory ... ..	3	6	- .002
Linden ... ..	12	6	+ .007
Maple.. ... ..	4	6	+ .0134
Elm ... ..	4	4	- .011
Linden ... ..	5	5	- .003
Elm ... ..	20	5	- .008
Linden ... ..	18	5	- .006
Linden ... ..	12	5	- .012
Maple... ..	20	5	- .020
Ironwood ... ..	10	5	- .018
Black Oak ... ..	12	5	- .018
Maple... ..	10	5	- .019
Maple... ..	20	3	- .028

It was further pointed out that "nails driven into some of the trees, about 4 feet above ground, maintained for five years the same relative position with regard to the nails on the benches. Only three of these were tested, the others being covered with a growth of bark."

It will be seen, therefore, that in the lower parts of these trees no change of any consequence took place. But although the observations are most valuable as bearing on the stability of bench marks, they do not altogether dispose of the question raised by Mr. Fowler, viz., that the vertical growth of a tree extends to the trunk and is not restricted to a prolongation of the branches, for it seems a reasonable assumption that if the barrel of a tree grows vertically below the limbs, the greatest extent of prolongation would probably take place in the higher part of the trunk.

Again, that part of the wood which is dressed to form the bench mark usually dies, similar to the exposed part of a corner tree from which the bark is removed for the purpose of cutting the numbers, and it is well known in the latter case that, should the tree increase considerably in diameter, the originally exposed surface will not alter its position horizontally, but become covered with new wood and bark, according to the age of the tree, an instance which came under my notice giving a growth of exactly 6 inches of wood in thirty years on a Eucalypt.

A set of observations referable to permanent bench marks, and extending to the higher parts of several trees, would still afford an interesting and instructive study.—R. H. CAMBAGE.

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets) :—

<p><i>Eucalyptus acacioides</i>, A. Cunn. (XI).</p> <p>„ <i>acenioides</i>, Schauer (IX).</p> <p>„ <i>affinis</i>, Deane and Maiden (XIII).</p> <p>„ <i>amygdalina</i>, Labillardière (VI).</p> <p>„ <i>Andrewsi</i>, Maiden (VII).</p> <p>„ <i>apiculata</i>, Baker and Smith (IX).</p> <p>„ <i>Baueriana</i>, Schauer (XIII).</p> <p>„ <i>Behriana</i>, F.v.M. (X).</p> <p>„ <i>bicolor</i>, A. Cunn. (XF).</p> <p>„ <i>Boormani</i>, Deane and Maiden (X).</p> <p>„ <i>Bosistoana</i>, F.v.M. (XI).</p> <p>„ <i>Caley</i>, Maiden (X).</p> <p>„ <i>calycogona</i>, Turczaninow (III).</p> <p>„ <i>capitellata</i>, Smith (VIII).</p> <p>„ <i>Consideniana</i>, Maiden (X).</p> <p>„ <i>coriacea</i>, A. Cunn. (V).</p> <p>„ <i>crebra</i>, F.v.M. (XII).</p> <p>„ <i>dives</i>, Schauer (VII).</p> <p>„ <i>engenioides</i>, Sieber (VIII).</p> <p>„ <i>fruticorum</i>, F.v.M. (XI).</p> <p>„ <i>hamastoma</i>, Smith (X).</p> <p>„ <i>hemiphloia</i>, F.v.M. (XI).</p> <p>„ <i>incrassata</i>, Labillardière (IV).</p> <p>„ <i>leucoxydon</i>, F.v.M. (XII).</p> <p>„ <i>Luehmanniana</i>, F.v.M. (IX).</p> <p>„ <i>muerrorrhyncha</i>, F.v.M. (VIII).</p>	<p><i>Eucalyptus melanophloia</i>, F.v.M. (XII).</p> <p>„ <i>melliodora</i>, A. Cunn. (XIV).</p> <p>„ <i>microcorys</i>, F.v.M. (IX).</p> <p>„ <i>microtheca</i>, F.v.M. (XI).</p> <p>„ <i>Muelleriana</i>, Howitt (VIII).</p> <p>„ <i>obliqua</i>, L'Héritier (II).</p> <p>„ <i>ochrophloia</i>, F.v.M. (XI).</p> <p>„ <i>odorata</i>, Behr and Schlecht. (XI).</p> <p>„ <i>paniculata</i>, Sm. (XIII).</p> <p>„ <i>pitularis</i>, Sm. (I).</p> <p>„ <i>pipрита</i>, Sm. (X).</p> <p>„ <i>Planchoniana</i>, F.v.M. (IX).</p> <p>„ <i>polyanthemos</i>, Schauer (XIII).</p> <p>„ <i>populifolia</i>, Hooker (X).</p> <p>„ <i>regnans</i>, F.v.M. (VII).</p> <p>„ <i>Rudderi</i>, Maiden (XIII).</p> <p>„ <i>siderophloia</i>, Bentham (X).</p> <p>„ <i>sideroxydon</i>, A. Cunn. (XII).</p> <p>„ <i>Sieberiana</i>, F.v.M. (X).</p> <p>„ <i>Smithii</i>, R. T. Baker (XII).</p> <p>„ <i>stel ulata</i>, Sieber (V).</p> <p>„ <i>umbra</i>, R. T. Baker (IX).</p> <p>„ <i>uncinata</i>, Turcz. (XIV).</p> <p>„ <i>virgata</i>, Sieber (IX).</p> <p>„ <i>vitellina</i>, Naudin (VII).</p> <p>„ <i>vitrea</i>, R. T. Baker (VII).</p>
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, Six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.





## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (Two Plates.)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andrewsii*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (Two Plates.)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (Two Plates.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (Two Plates.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aueura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muelleri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnautha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya fatiaa*, R. T. Baker)

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations).*  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muellèriana*, Howitt)  
110.—THE NEALIE (*Acacia rigeus*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenioides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia auula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betche)

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Bauksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hamastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Bauksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus micocorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

*Recapitulatory. (Fifty-seven Plates.)*

## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).
- 148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.)
- 149.—A HICKORY (*Acacia implexa*, Benth.).
- 150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.)
- 152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).
- 153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).
- 154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

### PART XLIII. (Issued May, 1911.)

- 155.—WHITE YIEL YIEL (*Grevillea Hilliana*, F.v.M.).
- 156.—BOSISTO'S BOX (*Eucalyptus Bosistoana*, F.v.M.).
- 157.—THE PROMINENT GLANDED WATTLE (*Acacia prominens*, A. Cunn.).
- 158.—NATIVE CAMPHOR LAUREL (*Cinnamomum virens*, R. T. Baker).

### PART XLIV. (Issued August, 1911.)

- 159.—GIPPSLAND WARATAH (*Telopea oreades*, F.v.M.).
- 160.—BLACK OR FLOODED BOX (*Eucalyptus bicolor*, A. Cunn.).
- 161.—THE BOX-LEAVED WATTLE (*Acacia buxifolia*, A. Cunn., including  
*A. lunata*, Sieb.).
- 162.—*Litsæa zeylanica*, Nees.

### PART XLV (Issued October, 1911).

- 163.—A RED SILKY OAK (*Embothrium Wickhami*, Hill and F.v.M., var.  
*pinnata*, Maiden and Betcher).
- 164.—A BLACK BOX (*Eucalyptus Boormani*, Deane and Maiden).
- 165.—THE WESTERN SILVER WATTLE (*Acacia decora*, Reichb.).
- 166.—SHE BEECH OR BOLLY GUM (*Litsæa reticulata*, Benth.).

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 7.*

*Published by Authority of the*  
*GOVERNMENT OF THE STATE OF NEW SOUTH WALES.*



*PART XLVII* OF THE  
COMPLETE WORK.

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANGONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus gonicalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Casinospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphara rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).
- THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muelleri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleaefolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
- 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
- 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
- 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).
- (N.B.—The numbers of Part XIV are given erroneously in the text.)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxyton*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.)
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEeping MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)

THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLVII.

*Published by the Forest Department of New South Wales, under authority of  
The Honourable the Secretary for Agriculture.*



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*Hakea eriantha*, R.Br.

A Hakea.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Hakea*. (See Part XLVI, p. 105.)

**Botanical description.**—Species, *H. eriantha*, R. Brown, *Supp. Primum, Proteaceas Novas*, p. 29 (1830).

A tall shrub or small tree, the young shoots silky-pubescent, the adult foliage glabrous.

*Leaves* lanceolate, acuminate, acute or with a callous point, tapering into a short petiole, veinless except the scarcely prominent midrib, of a pale colour like those of *H. saligna* but rather thicker, 3 to 5 inches long.

*Flowers* in axillary clusters, not very numerous.

*Pedicels* silky-villous, 1 to 2 lines long.

*Perianth* silky, the tube about 3 lines long, reflexed under the almost acute limb.

*Torus* small.

*Gland* prominent, semi-annular.

*Ovary* shortly stipitate; style not very long, with a large lateral stigmatic disk.

*Fruit* about 1 inch long and under  $\frac{1}{2}$  inch broad, slightly incurved, rather smooth, with a short incurved or straight beak, very obscure when the fruit is quite ripe.

*Seed-wing* very shortly decurrent on the upper side only of the nucleus. (B.Fl. v, 502.)

**Botanical Name.**—*Hakea*, already explained (see Part XLVI, p. 106); *eriantha*, from two Greek words, *erion*, wool, and *anthos*, a flower, in reference to the woolliness or silkiness of the flowers. See figures B, C, D on Plate 175.

**Vernacular Names.**—I know of none.

**Leaves.**—The leaves are linear-lanceolate in the type, and figure κ, Plate 175, represents a leaf probably closely resembling it. It was collected by me in a locality near that of the type, which was collected by Fraser near the Hastings River.

According to B.Fl. v, 503, there is a specimen collected by Fraser at Mount Lindsay. We have more than one Mount Lindsay in New South Wales, but Mr. R. H. Cambage has collected the species at Mount Lindsay (4,300 feet), Nandewar Mountains, and most of the leaves are rather broader than described for the type.

Most plants of the species have leaves about the size figured in the plate; in some parts of the State—*e.g.*, on the Crawford River and Nundle—the leaves are shorter and broader.

The fungus *Uredo angiosperma*, Thüm, occurs on living *Hakea* plants (Prof. Tassi, *op. cit.*, p. 70 of this work).

**Timber.**—Pale-coloured tough wood, used sometimes for tool-handles, but hardly large enough to be called timber.

**Size.**—This species is commonly about 4 feet high, and I have never seen it more than 10 feet, with a trunk of 3 or 4 inches in diameter.

**Habitat.**—This species is chiefly found in New South Wales, extending, so far as is recorded at present, a few miles into Victoria on the south (Snowy River, E. E. Pescott, through Charles Walter), and a few miles into Queensland on the north. It is a plant of cold, usually exposed, places.

It is represented in the National Herbarium, Sydney, from the following New South Wales localities:—

Mount Dromedary (Reader); Currawang Creek, Major's Creek, and Bell's Creek, Araluen (W. Baeucrlen); Monga or Sugarloaf Mountain, near Braidwood (J. L. Boorman).

North of Sydney we have it from:—

Crawford River (E. Cheel); Nundle (J. L. Boorman); Coolpi Mountains (J. L. Boorman); Apsley Falls (W. Forsyth); Tenterfield (E. Betche); Wallangarra, on both sides of the New South Wales-Queensland border (J. L. Boorman); White Swamp, *viâ* Acacia Creek, on both sides of the border (W. Dunn).

Then we have the Hastings River and Mount Lindsay localities referred to under "Leaves."

#### EXPLANATION OF PLATE 175.

- A. Flowering twig.
  - B. Bud.
  - C. Unopened flower.
  - D. Opened flower, showing—
    - (a) Four-lobed corolla, the laminae with acute recurved points, with sessile anthers in the concave laminae.
    - (b) Style.
    - (c) Stigma.
  - E. Portion of flower (corolla removed), showing—
    - (a) Hypogynous gland.
    - (b) Stipitate ovary.
    - (c) Style.
    - (d) Stigma.
  - F. Anther.
  - G. Lateral stigmatic disc.
  - H. Fruits.
  - I. Seed—
- N.B.—A to I from Major's Creek, near Braidwood.
- κ. Leaf of narrow form, from Upper Hastings River.





HAKEA ERIANTHA, R. BR.

Flora Australasica, vol. 6, p. 117.



No. 172.

*Eucalyptus populifolia*, Hook.

## The Bimble Box.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)**Botanical description.**—Species, *E. populifolia*, Hooker, in *Icones Plantarum*, t. 879 (1852).Bentham, in B.Fl. iii, 214, confused it with *E. polyanthemos*, Schauer. It may be described in the following words:—

A small to medium sized tree, often rather erect in habit, but with more or less pendulous branches.

*Bark* subfibrous and somewhat matted (box-like); persistent on both trunk and branches; the timber pale-brown when freshly cut, drying to a deeper (cigar) brown.

*Juvenile leaves* very large, orbicular-ovate (say 5 inches in length by 4 inches in breadth), petiolate, thick, shining on both sides.

*Mature leaves* orbicular-ovate, margins somewhat undulate, shining on both sides, commonly 2½ inches in length by 1½ inches in breadth, but varying to lanceolate, 5 or 6 inches in length, with a breadth of under 1 inch. Intra-marginal vein not close to the edge, venation spreading.

*Flowers.*—Umbels paniculate, flowers in each umbel from very few to numerous, all but sessile; buds ovoid, calyx-tube semi-ovate, operculum conoid to nearly hemispherical.

*Anthers* small white, nearly globular, with nearly parallel slits not reaching to the base, and with a small gland at the top.

*Fruits* small, semi-ovate, three to five celled, valves not exsert or rarely appearing above the rim.

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *populifolia*, from two Latin words, *populus*, poplar, and *folia*, leaves.

**Vernacular Name.**—It is commonly known as Bimbil (derived from the aboriginal name); the spelling used to be Bembil; Bibble is a corruption of it.

Sometimes the names “Poplar-leaved Box,” “Glossy or Shiny-leaved Box” are used. It is also called “Round-leaved Box” and “White Box,” and Mr. R. H. Cambage quotes the name “Minty Box” as having been given to him west of Wyalong, but he did not see the trees. Perhaps some of my readers might say if they have ever heard of the name as applied to this tree.

**Aboriginal Names.**—“Bembil” is an aboriginal name from which the common vernacular name has sprung.

“Geral” was the aboriginal name on the Lower Lachlan, according to the late K. H. Bennett.

“Egolla” was the aboriginal name in Rockhampton district, of Queensland, according to the late Mr. P. O’Shanesy, and he adds, “Kaow” “of the phytographer,” whatever that may mean in this context.

**Leaves.**—In its typical form the leaf is very readily recognised, since it is shiny, and in shape like that of the common Poplar. But there are many gradations in length and width of leaf—indeed it is sometimes quite narrow.

I have already, at page 75, Part XLIV of the present work, drawn attention to the fact that the leaves of this tree are sometimes reported as edible by stock, and sometimes not, and that at the present time we cannot reconcile the two statements. All that we can certainly say is that the leaves are not edible as a rule.

Messrs. Baker and Smith report that the oil contains eucalyptol, pinene, and sesquiterpene.

**Bark.**—It was described by the late K. H. Bennett, of the Hay district, as rough and lead-coloured, and is useful for roofing purposes. It certainly has a very local use for this or any other purpose; I have already described the bark.

**Timber.**—The appearance of the timber has been already described, and it is one of the least valuable of those of the Eucalypts.

In the Bogan district it is reputed as the very best fencing timber (Eucalyptus) in the district, but useful for nothing else as it is always hollow.

A white timber, and a useless, dwarfish tree; not one tree in a hundred fit for anything.

There is scarcely a Bimbil box in my district that has not been ringbarked. The timber is only used for rough fencing in the back country, where it is impossible to get anything else. (Forest-Ranger Taylor, Wagga Wagga.)

Mr. Taylor’s specimens were collected at Warrii.

Speaking of the Lower Lachlan: “The timber is very hard and durable, and like the gum is difficult to split. Water is obtained from its roots. Although not very plentiful, it is widely distributed.” (K. H. Bennett in *litt.*)

**Tendency to sucker.**—Mr. R. H. Cambage writes: “It usually produces a large number of seedlings after the land has been ringbarked, and in this respect is a considerable source of annoyance to the landowner.”

Mr. C. J. McMaster, Chairman of the Western Land Board, says: “This is a most difficult tree to get rid of. When ringbarked, seedlings grow so thickly as to render the ground worthless for grazing purposes. It is considered one of the greatest pests in the west country.”

**Size.**—It is not one of our largest trees, but trees 60–80 feet in height, with a diameter of 2 feet 6 inches to 3 feet, are not rare.



*C. J. McMaster, photo.*

(1)



*C. J. McMaster, photo.*

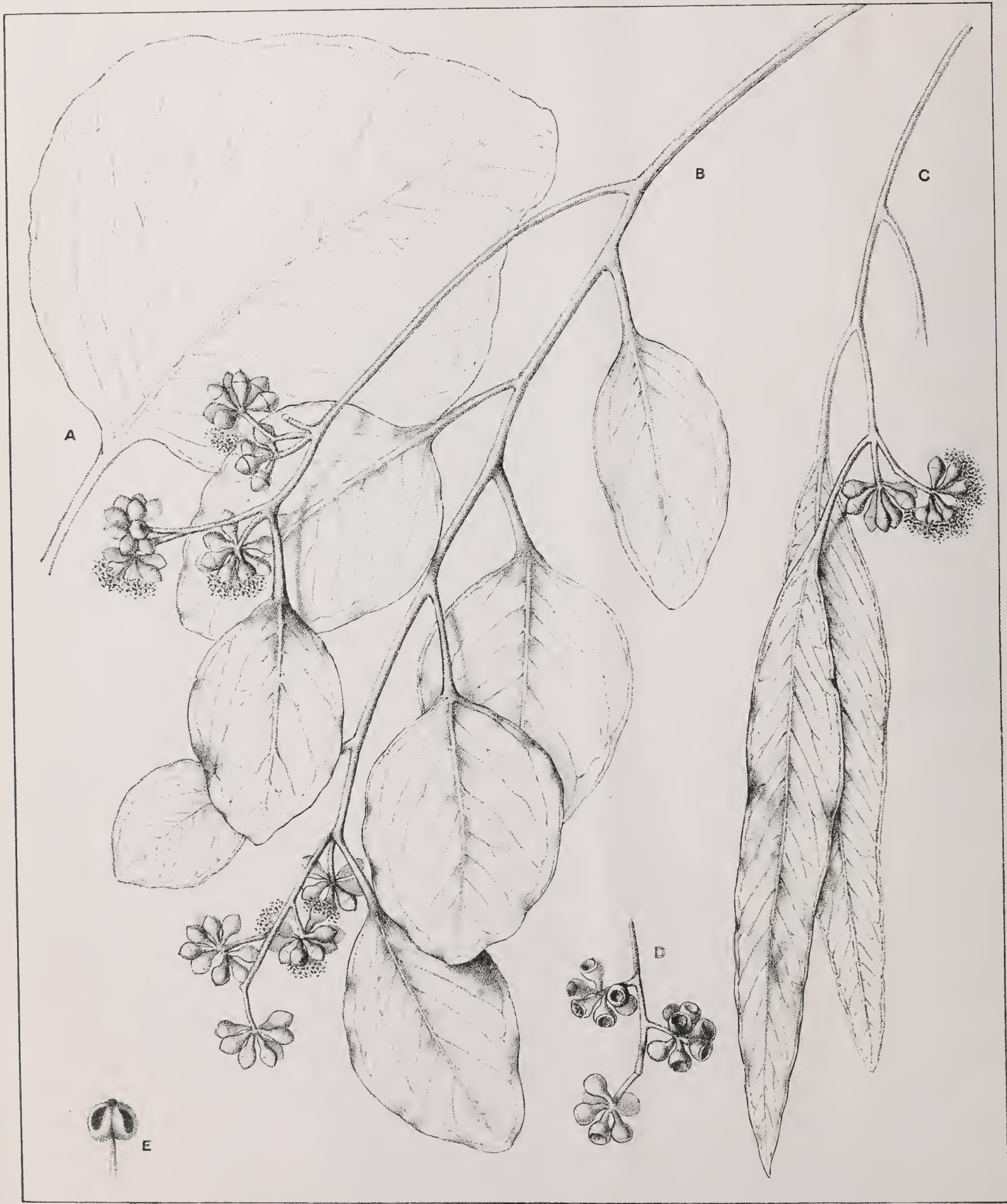
(2)

*Eucalyptus populifolia*, Hook.



*Eucalyptus populifolia*, Hook.





M. Flackton del. et lith.

THE BIMBLE BOX.  
(*Eucalyptus populifolia*, Hook. F.)



**Habitat.**—It seems to be confined to New South Wales and Queensland. It does not appear to have been recorded from South Australia, but in view of certain New South Wales localities which approach the South Australian border, I should not be surprised to hear of its occurrence in the latter State.

It is a dry country or interior species, occurring in great abundance in western New South Wales, western and northern Queensland, approaching the Gulf of Carpentaria, but it has not been recorded from the Northern Territory yet.

#### EXPLANATION OF PLATE 176.

- A. Juvenile leaf from Bogan Gate, N.S.W.
- B. Flowering twig from Mt. Boppy, N.S.W.
- C. Narrow-leaved form from Coolabah, N.S.W.
- D. Fruits from Coolabah, N.S.W.
- E. Anther.

#### PHOTOGRAPHIC ILLUSTRATIONS.

Four views of *Eucalyptus populifolia*, Hook., at Coolabah (Photo., C. J. McMaster).

1. Shows a single tree with seedlings growing all round.
2. A clump of the same trees.
3. A tree growing in a gravel pit. It cannot be more than 18 years old—about 10 feet high.
4. Matured trees about 35 feet high. The tree to the left, near the water, is a Wilga (*Geijera parviflora*).

No. 173.

*Acacia obtusata*, Sieb.

(Family LEGUMINOSÆ: MIMOSÆÆ.)

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)**Botanical description.**—Species, *A. obtusata*, Sieber, in DC. *Prodromus*, ii, 453 (1825).

Following is the original description :—

*A. obtusata* (Sieb. l.c., n. 441). Phyllodii oblongo cuneatis basi attenuatis obtusis uninerviis medio integerrimis eglandulosis coriaceis ramisque glabris, capitulis in racemum phyllodio brevioribus digestis, floribus 5-fidis. Novâ-Hollandiâ. Phyllodia 20 lin. longa, 3-4 lin. lata (v.s. sine fr.). (DC. *Prod.*, 1825, 2, p. 453.)

Then a translation of this description appeared as follows :—

*A. obtusata* (Sieb. *pl. exsicc. Nov. Holl.*, No. 441). Phyllodia oblong-cuneated, obtuse, attenuated at the base, 1-nerved, entire and glandless, coriaceous, and are, as well as the branches, glabrous; heads of flowers disposed in racemes, which are shorter than the phyllodia; flowers 5-cleft. Native of New Holland. Phyllodia 20 lines long, and 3-4 lines broad.

*Blunted-leaved Acacia.* Fl. Ap., Ju. Clt. 1824. Shrub 4 to 6 feet.  
(Don's *General History Dichlamydeous Plants*, vol. ii, p. 406.)

In the year 1842, Bentham described the species more fully in the following words :—

*A. obtusata* (Sieb., DC. *Prod.* ii, 453) glaberrima, ramulis angulatis, phyllodii oblongo-linearibus spathulatisve obtusis vix mucronulatis basi longe angustatis crassis rigidis marginatis versus medium saepe glanduliferis uninerviis venis inconspicuis, racemis phyllodio multo brevioribus oligocephalis, capitulis dense multifloris, calycibus corollisque crassiusculis, ovario glabro. Species rigida, stricta, subcærulescens. Phyllodia  $1\frac{1}{2}$ -3-pollicaria, 3-5 lin. lata. Capitula in racemo 2-4, floribus ultra 20.—Elevated parts of the Blue Mountains, *Cunningham, Fraser, Sieber*, n. 441. (Hooker's *London Journal of Botany*, vol. i, p. 354.)

In the *Flora Australiensis*, he described it as follows :—

A tall shrub, quite glabrous; branchlets angular.

*Phyllodia* oblong-linear or almost spathulate, usually straight, very obtuse,  $1\frac{1}{2}$  to 3 inches long, rigidly coriaceous, 1-nerved, with thickened nerve-like margins, the veinlets inconspicuous, with or without marginal glands.

*Racemes* short, with few densely-packed heads of above 30 flowers, mostly 5-merous.

*Sepals* thick, spathulate, half as long as the corolla, at first united but readily separating when fully out.

*Pod* unknown. (B.Fl. ii, 366.)

Mr. R. T. Baker, in *Proc. Linn. Soc. N.S.W.*, xxii, 694 (1897), described the pod in the following words :—

Pod flat, almost always straight, with only the slightest tendency to curve, glabrous, margins thickened and parallel, 3 to 4 inches long and 5 lines broad, impress of the seed prominent on the outside. Seed oblong, longitudinal, funicle filiform to the one small fold and then thickened into a small boat-shaped axil under the seed.

**Affinities.**—Bentham (B.Fl. ii, 366) says: "Allied on the one hand to *A. amœna*; on the other to *A. gladiiformis*, but apparently distinct from both." I will discuss this statement after having figured the two species referred to.

The flowers of *A. obtusata* are practically the same as those of *A. rubida*, and the phyllodes of the two species present more similarity than is apparent at first sight. The funicles of the seeds are, however, very different.

I will also discuss its affinities to *A. Dorothea*, Maiden, when I figure that species.

**Vernacular Name.**—It will be seen that Don proposed the name "Blunted-leaved Acacia" for this species, but this character does not always obtain in the species, while to many others it is as appropriate, or even more so. I therefore cannot recommend its adoption; at the same time I cannot suggest a satisfactory vernacular name.

**Leaves.**—Mr. R. T. Baker has figured the species in *Proc. Linn. Soc. N.S. Wales*, xxii, 694, and he informs me that the twig figured by him was collected at Barber's Creek.

His twig shows phyllodes with acuminate points or mucrones, which I have not seen in any specimens of Sieber's type, but such phyllodes commonly occur in the species. The marginal vein is often very prominent.

**Size.**—A shrub of 3 to 6 feet.

**Habitat.**—Sieber's type is his "Fl. Novæ. Holl., No. 441." We know that he went to the Blue Mountains, New South Wales, on at least one trip, but many of his specimens were collected in the vicinity of Port Jackson, and southward on his trip to "Argyle County."

Allan Cunningham showed him 150 species of Acacia, and we know this botanist was generous to visiting botanists (*e.g.*, to those of the French Expeditions and a Russian one), so it is quite possible that he received some of his Acacias from that source.

No New South Wales specimen of Sieber bore a locality label, so that the collecting grounds are sometimes a matter of surmise.

That Sieber collected his No. 441 on the Blue Mountains, as stated by Bentham (B.Fl. ii, 366), is probable, although I can only precisely match it, at present, from the Southern Tableland. The road across the Blue Mountains had been opened by Governor Macquarie in 1815.

In 1889 I collected a specimen at Mount Victoria in early fruit, which almost undoubtedly belongs to this species. I may have got it in the Kanimbla Valley adjacent. I do not know of another indubitable Blue Mountain specimen,\* so that the species is rare in the Blue Mountains, so far as our knowledge goes at present.

\* Since the above was in type, I have received from the Director of Kew a phyllode of *Acacia obtusata*, labelled "A. Cunningham, Blue Mountains." It matches my Mount Victoria specimen precisely. We require further search for the species on the Blue Mountains. No specimen of this species collected by Fraser in the Blue Mountains is in the Kew Herbarium.

Cunningham and Fraser were, of course, much on the Blue Mountains, and it would be desirable to examine minutely any *Acacia* attributed to *A. obtusata*, and collected by them in this locality. In this connection it should be ascertained if their plant is my var. *Hamiltoni* (erroneously referred to *A. crassiuscula*, Wendl.), see p. 114, Part XLVI. It may be mentioned that Sieber's No. 464 was collected both by Cunningham and Fraser. Mueller (Second Census, 1889) records the species from Victoria. We have no evidence that Mueller saw the species from that State, as specimens so labelled by him (kindly lent to me by Prof. Ewart) do not belong to that species. At the same time, it does extend to Victoria. I quote a specimen collected by C. Walter from "East Gippsland" in August, 1904 (given to me by Prof. Ewart), which was collected eight years after Mueller's death, and which constitutes the only proof of its occurrence in Victoria known to me.

In addition to a type specimen, I have it from New South Wales: Hilltop (E. Cheel); Wingello (J. L. Boorman); Barber's Creek, now Tallong (H. Hammond Maiden; H. J. Rumsey; R. H. Cambage, No. 2,714; J.H.M.); Marulan (J.H.M.); Monga, near Braidwood, the very image of the type (W. Baeuerlen); Taralga (Miss Georgina King); Tarago (W. W. Froggatt).

The Braidwood district is the most southern New South Wales locality for this species known to me.

*Sieber's Botanical Travels.*—Franz Wilhelm Sieber's name is the best known of the early German botanists who visited New South Wales. He took considerable and excellent collections to Europe, which he sold in numbered sets bearing the labels, "Flora Nov. Holl." and "Pls. Exot." Descriptions of many plants bearing his name as author are published in De Candolle's *Prodromus*, and other works, but whether the descriptions were actually the work of Sieber does not transpire.

We know next to nothing about his travels in New South Wales, almost all particulars being ascertained from the evidence produced by the plants themselves; and even some of these may have been given him by Cunningham and Fraser. The following information, mainly extracted from a paper by F. C. Dietrich in a Report of the Botanical Museum (? Berlin) for 1881, p. 278, by Mr. Ernst Betsche, is practically all we know about this elusive Australian botanist and collector.

Sieber was born in Prague, Bohemia, in March, 1789. His father was a rich master-carrier. Franz was an only son, and inherited ample means. At first he commenced the study of architecture, but gave it up and became an engineer; he also gave that up in 1810, and devoted his time entirely to collecting Natural History specimens, chiefly botanical, but he dabbled also in zoology, ethnology, and antiquities. He put up his collections into centuries and sold them, and not only collected himself, but employed a number of collectors travelling for him in different parts of the world. His ambition was to keep a central dépôt for distribution of herbaria from all parts of the world, but he soon got into money difficulties, and then constantly applied to the Governments of different countries for monetary assistance.

His *first journey* he advertised as Alpine plants from Salzburg and the Tyrol (Austria) and Upper Italy; he commenced the journey in 1811. He returned to Prague in 1812 with enormous collections, and remained at home till 1816, chiefly working on his collections and publications, but also studying medicine. He did not get his doctor's degree in medicine, though he is sometimes erroneously called Dr. Sieber by some authors.

In 1816 he started on his *second journey* to the Orient, Crete and other islands of the Greek Archipelago, Egypt and Palestine; a gardener named Kohant was his companion for the whole trip. He returned to Prague from this extensive journey in April, 1819. Then followed a period of working up his collections and publishing his travels, lectures, &c., also of applications to Governments for assistance for his travels, and the sale of a cure for hydrophobia which he claimed to have discovered in Egypt. Many of his collections (he is said to have brought home ninety boxes) were confiscated for debt and some were afterwards released.

In August, 1822, he commenced his *third and last journey* round the world, the journey that brought him to Australia. From Marseilles he went to Mauritius and from thence to Australia and arrived in Sydney on the 1st June, 1823. He left Sydney in December of the same year, so that he only remained seven months in Australia.

From Australia he went to the Cape of Good Hope, where he met Zeyher again, who had collected for him previously. He arrived at the Cape in April, 1824, and left again in May, proceeding to Europe. Thus Sieber spent twelve years of his life travelling and collecting.

After his return he became more and more eccentric and was constantly worried by money difficulties. He claimed that he would reform all branches of science, and demanded the assistance of the Government. He desired to sell his cure for hydrophobia; he wrote a drama in five acts, which he said surpassed the best that Shakespeare had ever written, and offered it to the world for 3,000 gold pieces; he planned to irrigate the deserts of North Africa, and so on. In 1827 he first entered the lunatic asylum of Prague for a short time, and in 1830 he was confined to the asylum for good, and died in it fourteen years later, in the year 1844.

Dietrich gives no details of Sieber's journeys in Australia; he writes only that Sieber landed at Sydney and commenced at once to botanise, in spite of the winter season, and he continues: "With the beginning of the better season he extended his excursions to the Blue Mountains, a region little visited by botanists at that time."

Dietrich makes no further mention of Sieber's travels or doings in Australia; what he knew on this subject was taken from Sieber's letters and publications. It seems to me very likely that Sieber may have visited other places without Dietrich knowing it or mentioning it. I believe he went south to Argyle County, on the track to modern Goulburn, but how far we cannot precisely say.

He confined his collecting to New South Wales.

Sieber met Cunningham, who showed him 150 specimens of Acacias. He collected about 1,500 species in 120,000 specimens, and spent a considerable time in collecting, also, zoological and ethnological specimens.

Sieber's Phanerogamæ were worked up by Reichenbach and himself, his Filices by Kaulfuss, the Musei by Schwägrichen, the Algæ by Mertens.

The novelties which Sieber brought from Australia are described and figured in Reichenbach's "Hortus Botanicus, hortorum vivorum siceorumque novitates illustrans. Cent. I." (Leipzig, bei Knoblauch, 1824-25. The Australian plants begin with Decade viii.)

Sieber's grasses were published separately as "Agrostotheca," and seem to have been determined chiefly by Nees von Esenbeck. An enumeration of the species is to be found in the latter's "Flora" from 1825.

On pages 296 and 297 of Dietrich's paper is a list of the 645 Phanerogams Sieber collected from "Port Jackson to the Blue Mountains," which contains an enumeration of the fifty-seven new species described by him. Most, if not all, will be found enumerated in the *Flora Australiensis*, but this list is certainly valuable to workers.

A list of Sieber's works is given in Pritzel.

#### EXPLANATION OF PLATE 177.

- A. Flowering twig.
- B. Flower-head.
- c. Individual bud.
- D. Flower.
- E. Bract found at the base of each flower.
- F. Flower opened out, showing—
  - (a) Calyx.
  - (b) Corolla.
  - (c) Pistil.
 (Stamens removed)
- A-F. All drawn from Sieber's type, No. 441.
- G. Pod.
- H. Seed. (G and H from Tallong.)
- I-N. Showing variation in the shape of the phyllodes. All from Tallong and Wingello.



ACACIA OBTUSATA, SIEB.

M. Flockton. del. et lith.





No. 174.

*Litsæa dealbata*, Nees.

(Family LAURACEÆ.)

**Botanical description.**—Genus, *Litsæa*. (See Part XLIV, p. 86.)**Botanical description.**—Species, *L. dealbata*, Nees, *Syst. Laurin.*, 630 (1836).

A moderate-sized tree, the young shoots softly ferruginous-villous.

*Leaves* petiolate, ovate-elliptical, or almost oblong, acuminate, contracted at the base, 3 to 6 inches long, glabrous above, with the primary veins slightly prominent, glaucous underneath, the primary veins more prominent and glabrous or villous, few in number, and the lowest pair usually longer and thicker.*Flowers* in sessile clusters, axillary or at the old nodes, the pedicels thick, 1 to 2 lines long.*Perianth-segments* 4, lanceolate, 1 to 1½ lines long, villous outside, and the margins fringed with long ferruginous hairs.*Filaments* filiform, longer than the perianth, bearded with a few hairs below the middle; the staminodia in the females small and irregular.*Ovary* slightly hairy; stigma broad and oblique.*Fruit* globular, 3 to 4 lines diameter, resting on the persistent perianth-tube enlarged into a small flat disk, 4-toothed with the persistent remains of the segments.Var. *rufa*. The rufous hairs more abundant and persistent on the branches and underside of the leaves.

Brisbane River, Moreton Bay (Fraser; F. Mueller; W. Hill; Leichhardt); Blue Mountains (Miss Atkinson). (B.Fl. v, 307.)

This variety, in its extreme form, gives the plant a different appearance to that of the normal species. A connecting locality is brush south of Cape Byron, New South Wales (E. Betehe).

**Botanical Name.**—*Litsæa*, already explained (see Part XLIV, p. 86); *dealbata*, Latin, whited, as with lime or plaster, in allusion to the white underside of the leaves. In the 16th century the parish officer whose duty it was to keep white-washed or plastered over mural and other decorations of ecclesiastical art on the walls of British churches was referred to as “dealbatus.” From time to time in modern days old lettering, paintings, and even wood-carving are brought to light encrusted with ages of layers of whitewash.**Vernacular Name.**—I have heard it called “Bolly Gum,” a name which appears to be somewhat loosely applied to timbers of this class. It is a well-known plant, and it certainly has no name commonly applied.**Aboriginal Name.**—“Bunn-ya” of the aborigines (probably County of Camden, New South Wales), according to the late Sir William Macarthur. As far

as the orthography is concerned, this expresses the same pronunciation as the aboriginal name of a totally different tree, the Bunya-Bunya (*Araucaria Bidwilli*), of Queensland.

**Synonym.**—*Tetranthera dealbata*, R.Br., Prod., 403.

**Leaves.**—These are handsome, being pale underneath, and with prominent venation. Mr. Sydney W. Jackson has drawn attention to the fact that in Northern Queensland they form one of three species of leaves most frequently used by the Tooth-billed Bower Bird (*Scenopæetes dentirostris*) in their playgrounds. (See *The Emu* for October, 1910, Plate IX.)

The leaves of an allied *Litsea* (*L. glaucescens*, H.B.K., var.) are much used in flavouring meats, soups, &c., in Mexico. They can be found in the little stores and markets everywhere. The plant is also considered to have some medicinal virtues. The leafy branches are gathered in bundles and dried. The crushed leaves are very fragrant and aromatic. It is a small glabrous shrub with narrow lanceolate leaves, pale green above, whitish beneath, and thickly covered with small pellucid dots. It grows high up on the mountains.

A tea made from the leaves is taken for colds. The plant is, however, more largely used as a flavouring. (*Contrib. U.S. Nat. Herb.*, Vol. v, No. 4.)

**Fruit.**—The fruit is of a reddish-purple colour, and of an aromatic odour.

**Bark.**—Many of the Javanese species of Lauraceæ contain, in addition to other not yet clearly-defined bases, a crystalline alkaloid termed *laurotetanine*, which has a strong tetanic action on animals. It is contained in quantity in the cortex of the stem of *Litsea chrysocoma*, Bl., and is sparingly soluble in ether, more readily in chloroform. (Greshoff, *Ber.* xxiii, 3,537; *Journ. Chem. Soc.*, lx, 337.) See also *Sohn*, p. 60. It would appear desirable for at least our common *Litsea* (*L. dealbata*, Nees) to be carefully examined.

**Timber.**—Timber pale-coloured, almost white, fissile, with a small neat grain, tough, somewhat aromatic when newly cut. I am satisfied that it is a useful timber.

**Size.**—It is usually a slender little tree, a sapling, but in favourable circumstances it may attain the dignity of a large tree.

Following are sizes given by different observers.—Wingham, Manning River, an exceptional tree 20 inches in diameter and 60 feet high (A. Rudder). Bellinger River, a slim tree of 20 feet (E. H. F. Swain); Acacia Creek, a tree of 20–30 feet (W. Dunn), while J. L. Boorman in the same district found some with girths of 4–8 feet and height of 60–80 feet.





M. Flockton del. et lith.

LITSEA DEALBATA, NEES.

**Habitat.**—Following are the localities recorded in the *Flora Australiensis*:—

*Queensland.*—Rockingham Bay (Dallachy).

*New South Wales.*—Hawkesbury and Hunter Rivers (*Beckler*); Hastings River (*Beckler*); Richmond River (*Henderson, Fawcett*); Clarence River (*C. Moore*); Illawarra (*A. Cunningham*); Sydney woods, Paris Exhibition, 1855 (*McArthur*, n. 101).

It extends from the Illawarra, New South Wales, to Northern Queensland, but neither its southern nor northern boundary has been precisely defined. It is represented from the following localities in the National Herbarium, Sydney:—

Hawkesbury River (R. Brown); this is probably a co-type Wyong Creek (H. V. Jackson, Gosford Nursery); Myall Lakes (A. Rudder); Wingham, Manning River (A. Rudder); Coff's Harbour (Forest-Guard Lawrence); Fernmount, Bellinger River (E. H. F. Swain); Casino (D. J. McAuliffe); Richmond River (W. Baeuerlen); Acacia Creek, Macpherson Range (W. Dunn); Tweed River (E. Betche); Atherton Scrub, Cairns District, Northern Queensland (S. W. Jackson).

#### EXPLANATION OF PLATE 178.

- a. Flowering twig.
- b. The flower-head, with four bracts enclosing five flowers.
- c. Male flower.
- d. Male flower opened out, showing—
  - (a) Calyx (four perianth segments).
  - (b) Four stamens of the outer series.
  - (c) Two stamens of the inner series with glands—rudimentary pistil removed.
- e. Rudimentary pistil.
- f. Female flower opened out, showing—
  - (a) Calyx (four perianth segments).
  - (b) Four staminodia of the outer series.
  - (c) Two staminodia of the inner series with glands.
- g. Pistil.
- h. Fruits with persistent calyx.

**Note on the Relations between the Geological Formation and the Vegetation  
which grows upon it.**

For several years past Mr. R. H. Cambage has specialised on the relations between the native vegetation of New South Wales and the geological formations on which it grows.

Recently Dr. H. I. Jensen has been giving attention to the same subject with reference to the soils.

Now the trees of New South Wales, if not the most abundant, form the most prominent (I would like to write permanent) items of the vegetation; and because they are most readily recognised, I ask my readers to contribute observations which may be rendered available to workers in this field.

The flood of ecological literature which has appeared during the last few years has given great impetus to the study of plants in their relations to geological formations and soils derived therefrom. This work has chiefly been carried out in Europe and the United States of America.

In Australia, with a vast and botanically imperfectly explored territory, we require specific records in abundance of the relations of plants to geological formations.

It would be well to study the geological maps of local areas and to systematically collect the more characteristic vegetation on an area to begin with. The Eucalypts would be collected as a matter of course, chiefly because they are so abundant and widely distributed, but certainly not to the neglect of the other trees, shrubs, and herbs. The sciences of botany and geology go hand in hand; and in regard to the present subject we have to feel our way, because we cannot say *à priori* what are the characteristic plants of a formation.

And when these data are collected, the trouble will commence of translating their scientific import. Soil is but one factor in the determination of the vegetation upon it—climatic conditions (really a very wide phrase) have a very important bearing on the well-being and even the existence of a species in a given spot. But data carefully collected and recorded are always valuable, even if the time may not have arrived for us to interpret their meaning.

I submit a few papers which will be of interest to my Australian readers, but the list is admittedly incomplete and tentative. It is published simply with the view to get more co-operators.

When a more ample list of papers shall have been compiled, it would be a useful task for a student to extract and collate all the specific instances given by the various authorities of the partiality of certain plants for specific areas.

I would like to say that the subject is far more difficult than it would appear to be at first sight. Given the plant records, and the determination of the geological

formations, collating them is a matter requiring the attention of men of mature judgment, who alone can interpret the results or submit tentative interpretations of value.

Mr. E. C. Andrews, B.A., Geological Surveyor, Sydney, himself an earnest worker on the subject, has favoured me with the following observations:—

In New South Wales, it would appear that climate is the chief controller of plant growths, and the climate in turn is mainly controlled by the topography. The wild and tumultuous profiles of the eastern aspects of the north and south ranges near the coastal area are composed of all types of siliceous and ferro-magnesian rocks; nevertheless, in the gorges of this well-watered area, jungle growths may be found alike on granites, slates, and basalts. The dense sandstones, however, even in this tract appear to have their own distinct flora.

In proportion as shelter and moisture decrease, so does the factor of soil composition come ever more prominently into play.

One of the generalisations made in the study of the greater problems of Australian botany, is that of Mr. R. H. Cambage, namely, that in rocks and soils of great porosity the character of the vegetation is most marked.

This great porosity is found in excessively sandy soils, such as those derived from the acid sandstones, quartzites, and granites of various geological ages.

It is not so much a question of excessive silica percentage in the soil—as may be proved by an examination of acid rhyolite soils—as it is a question of the presence of abundant free silica. The plant facies of a rock or soil possessing such an abundant *free quartz* content is so remarkably distinct as to come with the force of a revelation to workers accustomed only to clay soils.

It is, of course, possible that sandy soils may contain potash as derived from granites, but this can scarcely obtain on our sandy coastal plains, where the potash would be leached out; nevertheless the plant facies is distinct and the vegetation rich in species.

It is to Mr. Cambage again that we are indebted for our knowledge of the relative paucity of species on rich clay soils. This appears to be due in great measure to the lack of porosity in such soils, as capillary attraction is at a minimum in such rocks, but at a maximum in sandy soils.

The great trees which grow on rich soils break up the clays themselves, and thus gain access to the rich stores of magnesia, iron, lime, potash, and soda foods therein, while the luxuriant grasses on such soils simply depend for nutriment on the surface food, and perish so soon as the precipitation ceases. Grasses for this reason thrive but poorly on porous sandy soils. But plants with long roots may grope easily through the porous soils, but these again are stunted because of the relative absence of rich plant-foods.

*Prostanthera Leichhardtii* is a remarkable example of a plant which, in the writer's experience, is absolutely confined to one type of dense pre-Silurian sandstone ridge. The spinifex and *Acacia triptera*, also of the Shuttleton-Mount Hope district, are strictly delimited by the sandy and sandstone wastes in that region.

Following are some notes taken from a paper on the silvicultural conditions of New South Wales native trees, which was published by me in the *Agricultural Gazette* of New South Wales in January, 1906:—

The differentiation of the earth's vegetation is controlled by three factors—

- (a) Heat (see an Isothermal map).
- (b) Atmospheric precipitation (including winds). (See the Observatory Rain Map.)
- (c) Soil (see the Geological Map of the Geological Survey, which is very suggestive in this connection).

“Heat determines the flora, climatic humidity the vegetation; the soil as a rule merely picks out and blends the material supplied by these two climatic factors, and on its own account adds a few details.”—(Schimper.)

We have various kinds of climate, which have considerable influence on the vegetation, *e.g.*—

1. The salt-laden air of the coast, often accompanied by winds.
2. The forcing steamy atmosphere of the “brushes.”
3. The cold, bracing atmosphere of the table-lands.
4. The dry atmosphere of the western plains.

Coming to the soils, we have, for example :—

1. The sandy lands of the coast, together with the brackish swamps and tidal rivers.
2. The moist soils of river banks and fresh-water swamps.
3. The sterile soils of the Hawkesbury sandstone, characteristically developed in the Coast Range (including Sydney and the Blue Mountains), but supporting very gardens of flowers.
4. The better soils of the Wianamatta shales. The Wianamatta shale is a mud deposit on the Hawkesbury sandstone in the Counties of Cumberland and Camden—say Burwood and Homebush (near Sydney), Parramatta to Penrith, thence north in the fruit-growing districts—*e.g.*, Galston and Glenoric; then going south, Picton and surrounding districts (including Sutton Forest).
5. The rich soils of the Brushes, often the product of decomposed volcanic rocks, but often made up of soil obtained from other sources—washed down from high levels and moistened by streams. The decomposition of basalt or “trap” yields the richest soils in the State; this is the soil of that marvellous vegetation (now rapidly disappearing for dairy farms) of the “Big Scrub” of the Richmond River, and brushes generally.
6. The granite soils, found in many places all over the State—*e.g.*, Tarana to Bathurst, Young to Harden, New England.
7. The calcareous or limestone soils—*e.g.*, Yarrangobilly to Yass, Jenolan to Wombeyan, Bungonia, Nundle, Macleay. Limestone country is, of course, cave country.
8. The black-soil plains of the inner west.
9. The sandy soils of the west.

I have made the following ten divisions as convenient in practice. They are not of equal value, and some refer chiefly to soil, others to climate :—

1. Sandy coast-land and sea-side situations generally.
2. Tidal rivers and brackish swamps (salt-water).
3. River banks and swamps (fresh-water).
4. Brushes.
5. Between coast and coast-range.
6. Table-lands and mountains (say 1,000–3,000 feet).
7. Alpine situations.
8. Open forest (grass-land).
9. Western slopes.
10. Dry western plains.

Obviously, as regards the localities indicated by the numbers, averages only have been taken, but I think they will be of value as pointers. In some cases the letters N. and S. (north and south) can be added with the view to greater precision.

*Explanation of terms.*—(1), (2) and (3) seem to be self-explanatory. Sea-side situations are, however, not always sandy.

(4) A “brush” corresponds to what in India would be called jungle, and consists of well-watered, sheltered rich soil areas in the coast districts and valleys of the coast ranges, which not only support rich arboreal vegetation, but also creepers and climbers of various kinds, and shrubby undergrowth. The tree vegetation is of a most varied kind, but rarely includes Eucalypts. The soil of brushes is not always volcanic; in the County of Cumberland, for example, the Wianamatta shales often give the necessary richness of soil. In brushes the variety of trees is very great, and they are less gregarious than those of the open forest. There is a good deal of uniformity in the barks of the trees—a nearly smooth bark being of very common occurrence, while the trees are so close together that their leafy tops intertwine, and it is impossible, in many cases, to get a fair idea of the shape and general appearance of a particular tree. Only those who have visited our dense northern brush forests can form an idea of the difficulty of distinguishing more than a few kinds of trees. The massive trees, wonderfully vertical, remind one of cathedral columns; craning the neck for an upward view in the dim forest light is inconvenient and painful, and results in only general impressions; while if a gun be fired with the view of bringing down a twig for purposes of identification, the probability is that it cannot be stated, with certainty, from what particular tree the specimen has fallen. If one cuts through a tree, it very often happens that other trees prevent its falling down, and thus its leafy top is not available for examination.

(5) “Between coast and coast-range” is rather a vague term used to indicate trees which grow in the coastal belt from the sea-level to, say, 1,000 feet. Much of the country is grass-land, and also sides of hills mostly with an easterly aspect.



(6) Table-lands and mountains (say 1,000 to 3,000 feet) will roughly include the Blue Mountains, and such districts as New England and the Southern Tableland. Many English trees flourish in this area.

(7) "Alpine situations" is taken to indicate the coldest situations in the State, and includes not merely such mountains as Kosciusko, but anything between 3,000 or 4,000 and 6,000 feet.

(8) "Open forest (grass land)" is employed in a general sense.

In open forests Eucalypts form the prevailing vegetation in the coast districts and also on the western slopes, and frequently attain a great size. As compared with brush forests, the soil is less rich and moist. Of the open forest timbers we may say that we possess a fair knowledge; it is mainly in regard to the brush timbers that our knowledge is defective.

(9) "Western slopes."—These connect the table-land with the western plains.

Following are two contributions of general remarks to the subject—the first European, the second Australian :—

This form of natural selection finds illustrations everywhere, though one cannot always say why any particular species of plant is abundant in one place and not in another. As an example, the following notes have been supplied to me by Rev. Wentworth Webster from the south of France. He writes :— "I cannot at all make out the *differentia* of soil and position which determine the very restricted and sporadic, so to say, habitat of the *Daphne* round Biarritz, and in the Bidasoa Valley; nor why the *Anemone fulgens* grows in some spots and not in others. I believe that I know the general conditions in which one may expect to find it, and where it is found if anywhere; but I cannot explain its *absence* when all the requisite conditions appear continually; but this *Anemone* is sporadic only. The Gromwell clings along the coast, and I know almost to a yard where it ends on the red sandstone at an elevation of some 400 metres in this direction; but soil and geological formation within those limits of its habitat seem to have no effect on it. The *Narcissi* are still more baffling; nor can I see that either size or colour depend on elevation. The *Hepatica* stops at the limit of the tidal wave, and is almost, as far as I can see, confined to calcareous formations. (\**Origin of Plant Structures*, Henslow, p. 12.)

I do not know whether you are aware of it or not, but in this State (Queensland), people on the land, in describing country, usually describe by means of the timber in order to define its value; and on the 2-mile map of the country, published by the Government, reference is made to the timber on it mostly, which I believe is for the purpose of giving an idea of the soil value, or the value of the grasses, or the possible presence of any poisonous plants. If I remember rightly, early Victorian geologists took up the matter, and referred to the prevalence of certain trees in the vicinity of some of the gold fields compared with the comparative scarcity for a short distance away, and under general conditions that were the same.—(Captain G. H. Richard, General Manager of Mount Morgan, in a letter.)

The following papers are listed in chronological order :—

1. "Effects of geological position on Conifers," by Earl Dueie, a paper contributed to the *Trans. of the Scottish Arboricultural Society*, and reproduced (? in abstract) in "The Garden," of 4th July, 1874. I have not been able to consult the original.

2. "The Forest Vegetation of Central and Northern New England, in connection with Geological Influences," by W. Christie, L.S., *Proc. Roy. Soc. N.S.W.*, xi, 21 (1876).

The most valuable of the early papers known to me and copiously illustrated by specimens. Unfortunately, however, the botanical knowledge of the local

\* For further discussions on this subject, the reader may be referred to *Influence chimique du Sol sur la Végétation des sommets des Alpes*, par M. J. Vallot; *Bull. de la Soc. Bot. de Fr.*, 33, 1886, p. 25. *Quelques observations sur les Relations entre la Distribution des Phanérogames et la Nature chimique du sol*, par M. G. Bonnier; *Bull. de la Soc. Bot. de Fr.*, 1879, 26, p. 338. And *Quelques mots sur les Causes de la Localisation des Especes d'une Région*, par M. Battandier; *Bull. de la Soc. Bot. de Fr.*, 1886, 33, p. 189.

botanists was not equal to the task of determining Mr. Christie's specimens, which were mostly Eucalypts, and it is not possible in all cases now to determine the species referred to in the paper.

3. M. Naudin has briefly touched upon Eucalyptus and geological formations, as regards France, in his 1st Mem. (Eucalyptus), p. 361, 1883, and his second Mem., p. 5, 1891.

4. In a brief paper by me, "Notes on the Geographical Distribution of some New South Wales plants" (*Proc. Linn. Soc. N.S.W.*, xiv, 107 [1889]), will be found some reference to plants and geological formations in the South Coast district of this State.

5. In the Bendigo district for many years, and to a limited extent at present, it was considered by the miners that the Victorian Ironbark, *Eucalyptus leucoxyton* (should be *sideroxyton*.—J.H.M.) was a direct indication that the country on which it grew was auriferous, and that only therein would payable reefs be found. There is a good deal of truth in the statement, yet it cannot be considered as invariably true, as payable reefs have been found, and are being worked, where the Ironbark never grew.

\*From very early times it has been noticed that the soil overlying mineral veins is favoured by special vegetation; and though the occurrence of such vegetation cannot be taken as an infallible indication of the existence of such veins, it will be interesting to record the results of past observations, so that they may serve for a guidance to further observation in future.

*Iron*.—A vein of iron ore near Siegen, Germany, can be traced for nearly 2 miles by birch trees growing on its outcrops; while the remainder of the country is covered with oak and beech.

*Lead*.—The lead plant (*Amorpha canescens*) is said by prospectors in Michigan, Wisconsin, and Illinois, to be most abundant in soils overlying the irregular deposits of galena in limestone. It is a shrub 1 to 3 feet high, covered with hoary down; the light blue flowers are borne on long spikes, and the leaves are arranged in close pairs on stems being almost devoid of footstalks. Gum trees, or trees with dead tops, as also sumac and sassafras, are observed in Missouri to be abundant where float galena is found in clays.

*Limestone*.—The beech tree is almost invariably prevalent on limestone, and detached groups of beech trees have led to discoveries of unsuspected beds of limestone.

*Phosphate*.—The phosphate miners in Estremadura, Spain, find that the *Convolvulus althæoides*—a creeping plant with bell-shaped flowers—is a most reliable guide to the scattered and hidden deposits of phosphorite occurring along the contact of the Silurian slate and Devonian dolomite.

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\* Lock's *Miner's Pocket Book*.

*Silver*.—In Montana, experienced miners look for silver wherever the *Eriogonum ovalifolium* flourishes. This plant grows in low, dense bunches, its small leaves coated with thick white down, and its rose-coloured flowers being borne in clusters on long, smooth stems.

*Zinc*.—"The 'zinc violet,' Galmeiveilchen or Kelmesblume (*Viola calaminaria*), of Rhenish Prussia and neighbouring parts of Belgium, is there considered an almost infallible guide to calamine deposits, though in other districts it grows where no zinc ore has been found. In the zinc districts its flowers are coloured yellow, and zinc has been extracted from the plant. The same flower has been noticed at zinc mines in Utah." (Ernest Lidgley on "Some Indications of Ore Deposits," in *Trans. Australasian Inst. of Mining Engineers*, Vol. iv (1897), p. 116.)

6. "The copper plant (*Polycarpea spirostylis*, F.v.M.)," a paper published by the Geological Survey of Queensland, in 1897, to illustrate Mr. S. B. J. Skertchly's "Report on the Mines of Watsonville, &c." contains a figure of the plant—a plant reputed in Queensland to be always associated with copper lodes.

This useful paper has added value by reason of the list which it contains of minerals in various parts of the world reputed to be accompanied by specific plants.

7. In "The distribution of Desert Plants in relation to the Soil," by S. le M. Moore, *Journ. Linn. Soc.—Botany*, xxxiv, 259 (1899), we have—

Allusion has already been made to the prevalence of Myrtaceæ in certain districts between Southern Cross and Siberia; and I propose now to describe briefly the peculiar flora found in the immediate neighbourhood of the large granite outcrops known as gnamma-rocks. The red soil, so common elsewhere, here gives place to soil of a pale-yellow colour, and this change is invariably accompanied by a change in the flora.

The exclusively gnamma-rock plants observed by me are the following:—

*Keraudrenia integrifolia*, *Stuckhousia* spp., *Cryptaultra petraea*, *Oxylobium graniticum*, *Mirbelia microphyloides* *Drosera* spp., *Kunzea sericea*, *Podolepis pallida*, *Helichrysum semipapposum*, *Helipterum Manglesi*, *Goodenia hederacea*, *Dampiera larandulacea*, *Isotoma petraea*, *Solanum lasiophyllum*, *Eremophila granitica*, *Prostanthera Baxteri*, *Grevillea nematophylla*, *Hakea suberea*, *Parietaria debilis*, *Thelymitra longifolia* and *T. antennifera*, *Pterostylis pyramidalis*, *Borya nitida*, *Juncus bufonius*, *Centrolepis mutica*, *Scirpus cartilagineus* and *S. cernuus*, *Notholena distans*, *Gymnogramme Pozoi*.

The whole of the paper, which is short, should be read.

8. In *Proc. Linn. Soc. N.S.W.*, xxv, 711 (1900), R. H. Cambage has notes on the geological formations, out west, on which *Eucalyptus Morrisi*, *E. dealbata*, and *E. tereticornis* are found.

9. Cowles,\* in a very comprehensive paper, gives the results of his observations on the influence of rocks on vegetation. The physical and chemical causes for different vegetation on different rocks is discussed. Attention is called to the facts that the resemblances, and not the differences, are the most striking, and that a number of factors have hitherto been neglected. Siliceous and calcareous rocks give rise to siliceous soils, so that there is more uniformity in the soils produced than in the rocks from which they were derived. The physiographic factor has also

\* "Contributions from the Hull Botanical Laboratory," xxxiv, *Bull. Am. Bureau Geog.*, 2, 163-176, 376-388.

been neglected. No matter what kind of rock, the ecological conditions will be much the same in the initial stages of erosion, and, consequently, the plants will be similar; while in the last stages of life history, the plants and conditions will be exactly the same. The vegetation of all hills in a given region, of whatever chemical or physical nature, is tending toward an ultimate common destiny, which in most parts of the United States is the Mesophytic forest. The succession of plant societies is sometimes slow and sometimes fast, and hence we have, at any given period before the ultimate stage is reached, a difference in soils. Were the stages equally rapid in all cases, there would be no such differences.

The author's researches comprise studies made on granites, gneisses, basalts, &c., in northern Michigan and in Connecticut, on quartzites in northern Michigan, and in Montana; sandstones in northern Michigan, northern Illinois, and in eastern Tennessee; shales in the Cumberland mountains of eastern Tennessee; and limestone and dolomites in Illinois, Wisconsin, Tennessee and Montana (H. N. Whitford). This is given as a reminder of the great store of American contributions to this subject.

10. R. H. Cabbage has several references in *Proc. Linn. Soc. N.S.W.*, xxvi (1901), viz., p. 201 (last six lines), concerning *E. Morrissi*, &c. At p. 207 the flora of sedimentary hills is compared with local hills of porphyry, and at p. 317 we have further notes on the same subject.

11. In my Presidential Address, read before the Linnean Society of New South Wales, 1902, under the heading, "Adaptability of Plants to certain Geological Formations" (*Proc. Linn. Soc. N.S.W.*, xxvi, 772) will be found a brief bibliographic survey which may be referred to.

12. In *Proc. Linn. Soc. N.S.W.*, xxvii (1902) we have, at pp. 577 and 579, notes on Kurrajongs and limestone (R. H. Cabbage).

13. In a paper, "The Geology of the Glass-house Mountains and District," by H. I. Jensen (*Proc. Linn. Soc. N.S.W.*, xxviii, 842, 1903), are some notes on "the close correspondence" between the vegetation and geological formation in the East Moreton district (Queensland) (p. 848), and some plants are cited.

14. In *Proc. Linn. Soc. N.S.W.*, xxix (1904) we have, at p. 782, a note on *Angophora lanceolata*, and at p. 792 similar phyto-geological notes on *Eucalyptus sideroxylon*, by R. H. Cabbage.

15. "The occurrence of *Casuarina stricta*, Ait., on the Narrabeen shales," by R. H. Cabbage (*Proc. Linn. Soc. N.S.W.*, xxx, 376, 1905), is most valuable. A few other species are incidentally referred to. See also p. 214 (last paragraph) of the same volume for a brief note.

16. "Climatic and geological influence on the Flora of New South Wales," R. H. Cabbage (*Proc. Aust. Assoc. Adv. Science*, Vol. xi, Adelaide, 1907)—a valuable and comprehensive paper, with specific instances of the formations which plants, chiefly trees, prefer, and its value is enhanced by a short bibliography.

17. Mr. R. H. Cabbage, in a presidential address delivered before the Institution of Surveyors, N.S.W. ("The Surveyor," 31st January, 1908), took for his subject "Botany as an accessory to Surveying," and (particularly pp. 14, 15) gave a number of instances of the relation of plants to geological formations.

18. The same author in *Proc. Linn. Soc. N.S.W.*, xxxiii, 55 (1908) has a note on *Eucalyptus Bancrofti* on granite.

19. Mr. J. F. Campbell, L.S., read a paper on "Soil Physies" before the Institution of Surveyors, N.S.W. ("The Surveyor," 31st May, 1909), which contains specific instances of the partiality of species for certain geological formations. It is a valuable paper from a competent observer, who has given attention to the subject for many years.

20. In *Proc. Linn. Soc. N.S.W.*, xxxiv, 313 (1909), R. H. Cabbage has a valuable paper on "Acid and basic rocks on Monaro, and the vegetation they support."

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Mr. T. Stephens, M.A., told me many years ago that, as regards the following Tasmanian species, he has never seen *Eucalyptus Risdoni*, Hook. f., grow on anything but mudstone, while *E. cordata*, Labill., grows in decomposed volcanic rock (greenstone, diabase), not in recent volcanic rock (basalt).

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets):—

<i>Eucalyptus acacioides</i> , A. Cunn. (XI). „ <i>acmenioides</i> , Schauer (IX). „ <i>affinis</i> , Deane and Maiden (XIII). „ <i>amygdalina</i> , Labillardière (VI). „ <i>Andrewsi</i> , Maiden (VII). „ <i>apiculata</i> , Baker and Smith (IX). „ <i>Baueriana</i> , Schauer (XIII). „ <i>Behriana</i> , F.v.M. (X). „ <i>bicolor</i> , A. Cunn. (XI). „ <i>Boormani</i> , Deane and Maiden (X). „ <i>Bosistoana</i> , F.v.M. (XI). „ <i>Caleyii</i> , Maiden (X). „ <i>calycogona</i> , Turczaninow (III). „ <i>capitellata</i> , Smith (VIII). „ <i>Consideniana</i> , Maiden (X). „ <i>corymbosa</i> , A. Cunn. (V). „ <i>crebra</i> , F.v.M. (XII). „ <i>dives</i> , Schauer (VII). „ <i>eugenioides</i> , Sieber (VIII). „ <i>fruticetorum</i> , F.v.M. (XI). „ <i>hemastoma</i> , Smith (X). „ <i>hemiphloia</i> , F.v.M. (XI). „ <i>incrassata</i> , Labillardière (IV). „ <i>leucoxydon</i> , F.v.M. (XII). „ <i>Luehmanniana</i> , F.v.M. (IX). „ <i>macrorrhyncha</i> , F.v.M. (VIII).	<i>Eucalyptus melanophloia</i> , F.v.M. (XII). „ <i>melliolora</i> , A. Cunn. (XIV). „ <i>microcorys</i> , F.v.M. (IX). „ <i>microtheca</i> , F.v.M. (XI). „ <i>Muelleriana</i> , Howitt (VIII). „ <i>obliqua</i> , L'Héritier (II). „ <i>ochrophloia</i> , F.v.M. (XI). „ <i>odorata</i> , Behr and Schlecht. (XI). „ <i>paniculata</i> , Sm. (XIII). „ <i>pilularis</i> , Sm. (I). „ <i>pipерита</i> , Sm. (X). „ <i>Planchoniana</i> , F.v.M. (IX). „ <i>polyanthemos</i> , Schauer (XIII). „ <i>populifolia</i> , Hooker (X). „ <i>regnans</i> , F.v.M. (VII). „ <i>Rudderi</i> , Maiden (XIII). „ <i>siderophloia</i> , Bentham (X). „ <i>sideroxydon</i> , A. Cunn. (XII). „ <i>Sieberiana</i> , F.v.M. (X). „ <i>Smithii</i> , R. T. Baker (XII). „ <i>stellulata</i> , Sieber (V). „ <i>umbra</i> , R. T. Baker (IX). „ <i>uncinata</i> , Turcz. (XIV). „ <i>virgata</i> , Sieber (IX). „ <i>vitellina</i> , Naudin (VII). „ <i>vitrea</i> , R. T. Baker (VII).
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, Six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.

## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (Two Plates.)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andrewsii*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (Two Plates.)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraserianum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (Two Plates.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (Two Plates.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraserianum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsf.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muellieri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenoides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya foetida*, R. T. Baker).

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations).  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muellieriana*, Howitt)  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenoides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betche).

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hæmastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

Recapitulatory. (Fifty-seven Plates.)

## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).  
148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.)  
149.—A HICKORY (*Acacia implexa*, Benth.).  
150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.)  
152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).  
153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).  
154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

### PART XLIII. (Issued May, 1911.)

- 155.—WHITE YIEL YIEL (*Grevillea Hilliana*, F.v.M.).  
156.—BOSISTO'S BOX (*Eucalyptus Bosistoana*, F.v.M.).  
157.—THE PROMINENT GLANDED WATTLE (*Acacia prominens*, A. Cunn.).  
158.—NATIVE CAMPHOR LAUREL (*Cinnamomum virens*, R. T. Baker).

### PART XLIV. (Issued August, 1911.)

- 159.—GIPPSLAND WARATAH (*Telopea oreades*, F.v.M.).  
160.—BLACK OR FLOODED BOX (*Eucalyptus bicolor*, A. Cunn.).  
161.—THE BOX-LEAVED WATTLE (*Acacia buxifolia*, A. Cunn., including  
*A. lunata*, Sieb.).  
162.—*Litsæa zeylanica*, Nees.

### PART XLV. (Issued October, 1911.)

- 163.—A RED SILKY OAK (*Embothrium Wickhami*, Hill and F.v.M., var.  
*pinnata*, Maiden and Betche).  
164.—A BLACK BOX (*Eucalyptus Boormani*, Deane and Maiden).  
165.—THE WESTERN SILVER WATTLE (*Acacia decora*, Reichb.).  
166.—SHE BEECH OR BOLLY GUM (*Litsæa reticulata*, Benth.).

### PART XLVI. (Issued February, 1912.)

- 167.—THE WILLOW-LEAVED HAKEA (*Hakea saligna*, R.Br.).  
168.—THE BROAD-LEAF MALLEE (*Eucalyptus Behrmana*, F.v.M.).  
169.—A WATTLE (*Acacia adunca*, A. Cunn.).  
170.—THE UGAULBIE (*Litsæa hexanthus*, Juss.).



*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 8.*

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*PART XLVIII* OF THE  
COMPLETE WORK

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyraoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANGONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniocalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).  
THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muellieri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleaefolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
- 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
- 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
- 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).

(N.B.—The numbers of Part XIV are given erroneously in the text

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxyton*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.).
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)

#  
THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,  
Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLVIII.

*Published by the Forest Department of New South Wales, under authority of  
The Honourable the Secretary for Agriculture.*



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## *Hakea dactyloides*, Cav.

### A Hakea.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Hakea*. (See Part XLVI, p. 105.)

**Botanical description.**—Species, *H. dactyloides*, Cavanilles, *Anal. Hist. Nat.*, i, 215, t. 12; *Icones*, vi, 535 (1801).

A tall shrub with erect branches, the young shoots usually silky, the adult foliage rarely retaining more or less of pubescence, usually quite glabrous.

*Leaves* from linear-lanceolate to oblong-lanceolate, acute or scarcely obtuse, tapering into a short petiole, falcate oblique or straight, 2 to 4 inches long, rigid, prominently triplinerved, smooth between the nerves, or rarely in the broader leaves a few irregular veins forming almost one or two additional longitudinal nerves.

*Flowers* very small and numerous in axillary clusters or short racemes, the villous rhachis 1 to 1½ lines long.

*Pedicels* silky-hairy, 1 to 1½ lines long.

*Perianth* glabrous, the tube about 1 line long, revolute under the globular limb.

*Torus* small, nearly straight.

*Gland* small.

*Ovary* shortly stipitate; style short, with an erect stigmatic cone.

*Fruit* ¾ to 1 inch long, ½ to ¾ inch thick, smooth or slightly rugose, with a very small straight beak.

*Seed-wing* narrowly decurrent along the upper margin only of the nucleus. (B.Fl. v, 524.)

Bentham (*loc. cit.*) speaks of some of C. Stuart's New England specimens as "with more rigid almost pungent narrow leaves, approaching those of *H. ulicina*, but with silky pedicels."

At L (plate 179) I have figured a narrow-leaved form from Emmaville, which is probably very similar to C. Stuart's specimen. This form is unusual and appears worthy of a name; I therefore designate it var. *angustifolia*.

**Synonyms.**—*Banksia dactyloides*, Gaertner, *De Fructibus*, vol. 1, 221, t. 47, f. 2. The figure of the fruits is an excellent one, and was depicted from a Sir Joseph Banks' specimen, *Banksia oleifolia*, Salisbury, *Prod.* 51.

*Conchium dactyloides*, Vent. *Jard. de la Malmaison*, t. 110: also Smith in *Trans. Linn. Soc.*, ix, 123.

*Conchium nervosum*, Donn, Cant. 21, but *Hakea dactyloides* in the later editions.

*Hakea nervosa*, Knight, *Prot.* 108; *H. ferruginea*, Lodd., *Bot. Cab.*, t. 1501 with no doubt, I think; not of Sweet.

**Botanical Name.**—*Hakea*, already explained (see Part XLVI, p. 106); *dactyloides*, from two Greek words *daktulos* (*dactylus*, the Latin form) a finger, or *dactylis*, a long grape like a finger, and *oidos*, like. The fruits (*e.g.*, in Gaertner's figure referred to under "Synonyms") are often clustered together like grapes, and are somewhat elongated. In Plate 179 the fruits are shown fully ripe and open, when the resemblance to a bunch of grapes is less apparent.

In the *Botanical Magazine*, vol. lxvi, t. 3760, is a figure of this plant in flower, where it is called "Finger-leaved Hakea." I never saw any human fingers of this shape, and do not recommend this designation for adoption.

**Vernacular Name.**—I know of none which can with certainty be attributed to this plant.

**Timber.**—This shrub—it can hardly be called a small tree, it is too small for timber; it is sometimes used for handles, but it has no conspicuous merit.

**Size.**—I do not remember having seen this species more than 15 feet high, with a trunk diameter of more than a few inches.

**Habitat.**—It extends from the extreme north of Victoria, all through coastal New South Wales and its table-lands and coastal ranges, to the Queensland border. A precise Queensland locality remains to be recorded.

It is one of the species collected at Botany Bay on Captain Cook's voyage by Banks and Solander. See a figure in Britten's "Illustrations of the Botany of Cook's voyage," tab. 267, p. 82.

In the *Flora Australiensis* it was only known from Port Jackson and to the north as follows:—

Port Jackson to the Blue Mountains, *R. Brown, Sieber, n. 12*, and many others; Clarence River, *Beckler*; New England, *C. Stuart*.

Following are some specimens represented in the National Herbarium, Sydney:—

Dividing Range, Victoria (*C. Walter*). I have no more definite locality, but on this specimen I record it from Victoria.

Localities connecting with Victoria and Port Jackson, New South Wales, are:—

Monga or Sugarloaf Mountain, Braidwood (*J. L. Boorman*); Conjola, near Milton (*W. Heron*); West Dapto (*R. H. Cambage*); Barber's Creek (*H. J. Rumsey*); Wingello (*J. L. Boorman*); Bundanoon (*J. Lumsden*), varying much in width of leaves.





M. Flockton, del. & lith.

HAKEA DACTYLOIDES, Cav.



Western localities are :—

Katoomba (J. H. Camfield); Mount Victoria (J. H. Maiden). Some of the leaves are almost as narrow as those of var. *angustifolia*; Jenolan Caves (W. F. Blakely); Murrumbo, 50 miles north of Rylstone, near the Goulburn River (R. T. Baker). This form is var. *angustifolia*.

Going north we have :—

Emmaville (J. L. Boorman), some of the specimens being var. *angustifolia*; Coaldale Road, Copmanhurst, Upper Clarence River (Rev. H. M. R. Rupp),—these are var. *angustifolia*; Guy Fawkes and Round Mountain (J.H.M.); these specimens closely approach var. *angustifolia*.

Then we have it from Wallangarra, on the New South Wales—Queensland border (J. L. Boorman), and I have no doubt it extends over the border into Queensland, *e.g.*, into the Stanthorpe country. Indeed, Mr. F. M. Bailey records it as a Queensland plant “towards Wallangarra,” but a Queensland locality is a desideratum.

It will be observed that most of the specimens from northern New South Wales are narrow leaved.

A specimen labelled Cape York, coll. E. Dämel, kindly communicated by the Director of the Bremen Museum, is probably of New South Wales origin.

#### EXPLANATION OF PLATE 179.

- A. Leaf from type—Cavanilles' *Icones*, Vol. vi, 535.
- B. Flowering twig.
- C. Bud.
- D. Unopened flower.
- E. Opened flower, showing—
  - (a) Four-lobed corolla, with sessile anthers in the concave laminæ.
  - (b) Ovary.
  - (c) Style.
  - (d) Stigma.
- F. Portion of flower (corolla removed), showing—
  - (a) Hypogynous gland.
  - (b) Stipitate ovary.
  - (c) Style.
  - (d) Stigma.
- G. Anther.
- H. Conical stigma.
- I. Fruits.
- K. Seed.
- L. Narrow-leaved form from Emmaville (var. *angustifolia*, Maiden, *ante*, p. 147).
- M. Fruit.
- N. Broad juvenile leaf, from Conjola.
- O. Acuminate leaf, from Wingello.

No. 176.

*Eucalyptus acacioides*, A. Cunn.

Green Mallee.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. acacioides*, A. Cunn., herb. First referred to by Allan Cunningham in his Journal (Oxley's Expedition), on the Lachlan River under date 23rd May, 1817. It is in the Hookerian Herbarium, 1835, now at Kew, in the herbarium of the University of Cambridge, and was from that, and other herbaria, distributed under Cunningham's name. See my "Critical Revision of the genus *Eucalyptus*," ii, 45.

It may be described in the following words:—

A tall spindly shrub or slender small tree attaining a height of 20 to 30 feet.

Has hard, thin, blackish, scaly bark, for the lower part of the trunk, smooth above.

Has a considerable portion of pale-coloured sap-wood, the mature wood being of a deep reddish-brown.

*Juvenile leaves* linear-lanceolate or almost linear, the venation, except the midrib, not observable, the young branchlets angular.

*Mature leaves*, narrow lanceolate with short petioles, commonly about  $3\frac{1}{2}$  inches long and  $\frac{1}{4}$  inch or a little more broad in the type specimens, but a width of  $\frac{1}{2}$  inch is common in specimens since collected. Dull green and of a uniform colour on both sides. Feather-veined, but the lateral veins not conspicuous.

*Flowers.*—Opercula conoid, with the calyx-tube tapering gradually into a short pedicel. Flowers usually 5 to 10 in the umbel, which has a well-defined peduncle of at least a quarter of an inch in length.

*Anthers* small, globular, opening with pores near the top, filaments at the base, and with a small gland near the top.

*Fruits* nearly globular in shape, 4-4.5 mm. in diameter, truncate at the orifice, which is about 3 mm. in diameter; tips of valves well insert.

**Vernacular Names.**—"Green Mallee" is the name I have usually heard it known by, as the foliage is usually of a brighter green than that of other trees and shrubs associated with it.

A large specimen has also been called, in my hearing, "Mallee Box," this being the name by which comparatively large trees growing amongst Mallee are sometimes known, but it does not appear to be applied to only one species.

Mr. R. T. Baker quotes Mr. W. Bacuerlen as using the names "Red Mallee" and "Brown Mallee" because of the appearance of the bark, but the use of the former name at least, being in use for many years for another species (*E. oleosa*, F.v.M.) should be discouraged.

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *acacioides*, from the word *Acacia*, and the Greek *oidos*, like, it having reminded Cunningham of the general appearance of certain *Acacias* (Wattles). The name is not specially appropriate.

**Synonyms.**—*E. viridis*, R. T. Baker, *Proc. Linn. Soc. N.S.W.*, xxv, 316 (1900); *E. odorata*, Behr, var. *linearis*, Maiden, *Proc. Roy. Soc. S.A.*, xxvii, 241 (1903).

**Timber.**—I have already stated that the trunk has a considerable proportion of pale-coloured sap-wood, the mature wood being of a deep reddish-brown.

If it is used for any specific purpose it must be quite local, as I could never learn of any special use to which it was put.

Mr. L. Abrahams, of Cobar, writes: "The emu makes its nest amongst these shrubby trees."

**Size.**—Usually a tall, erect shrub, it may attain a maximum height of 30 feet. I have not seen the trunk more than 9 inches in diameter.

**Habitat.**—In my "Critical Revision of the genus *Eucalyptus*," Vol. ii., Part 1, p. 46, I predicted that it might be found in Queensland. It has since been discovered in that State, as will be seen below. It is, however, mainly developed in New South Wales, chiefly in the western plains, usually on rather dry, stony ridges of moderate elevation.

It is represented from the following places in the National Herbarium, Sydney:—

#### NEW SOUTH WALES.

Wyalong (R. H. Cambage; District Forester Osborne).

Palesthan, Lake Cudgellico (Miss Clements); Bundaburra, between Fifield and Condobolin (P. J. Holdsworth); Condobolin (R. Kidston).

Dubbo and Minore (J. L. Boorman); 12 miles north of Dubbo (H. Deane); Peak Hill (J. L. Boorman); Dubbo-Gilgandra Road (W. Forsyth); east of Bidden Road, Gilgandra (R. H. Cambage).

Cobar, on red ironstone hills (W. Woolls, E. Betchc, Archdeacon F. E. Haviland, L. Abrahams, J. L. Boorman); Nymagee (J. Wharton Cox); Boppy Mountain (J. L. Boorman); Mount Hope (J. L. Boorman); Nyngan (Forester John Martin, Forest Guard E. F. Rogers); Parish of Kickabel, County Ewenmar, east of

Warren (Assistant Forester A. R. Samuels); Green Mallee, Girilambone, type of *E. viridis*, R. T. Baker (W. Baeuerlen, E. Betche, J. L. Boorman, J.H.M.); Coolabah (R. W. Peacock); Coolabah to Girilambone (J.H.M. and J. L. Boorman).

“Mallee Box,” Warialda (J. L. Boorman, E. J. Hadley).

QUEENSLAND.

Brush Creek, Inglewood (J. L. Boorman); Jericho (H. Deane). The latter specimen in leaf only, and therefore doubtful.

EXPLANATION OF PLATE 180.

- A. Young foliage from Warialda.
- B. Twig bearing buds and fruits, from the type. Hookerian Herbarium, 1835.
- C. Anther.
- D. Flowering twig with fruits from Dubbo-Gilgandra Road, 14 miles from Dubbo.
- E. Small fruits from Minore.
- F. Flowering twig from Inglewood, Queensland.



M. Flockton, del. et lith.

GREEN MALLEE.  
(*Eucalyptus acacioides*, A. CUNN.)



No. 177.

*Acacia obtusata*, Sieb.,  
var. *Hamiltoni*, Maiden.

Hamilton's Wattle.

(Family LEGUMINOSÆ: MIMOSEÆ.)

THIS plant is identical with Sieber's No. 464, and I have already referred to it when speaking of *A. adunca*, A. Cunn., in Part XLVI of the present work.

At the risk of some repetition I again give quotations in which Sieber's No. 464 is referred to:—

Then we have "*A. crassiuscula*, Wendl.," described in *B.Fl.* ii, 372 (1864). Bentham repeats this in *Trans. Linn. Soc.*, xxx, 473.

This is in part Sieber's No. 464, as stated by him, but it includes Queensland and Tasmanian plants of whose identity I am in doubt at present, as I have been unable to obtain satisfactory specimens.

I will show later that Sieber's No. 464 is *A. obtusata*, Sieber, var. *Hamiltoni*, var. nov., which I will figure and describe in Part XLVIII of this work. (A promise carried out in the present Part).

Then Bentham (*B.Fl.* ii, 368) (1864) gives *A. crassiuscula*, Meissn., in *Pl. Preiss.* i, 16 (not of Sieber) as a synonym of *A. pycnophylla*, Benth. He repeats this in *Trans. Linn. Soc.*, xxx, 471 (1875). Meissner's specimen was collected near Albany, W.A. (Princess Royal Harbour.)

So that we have—

- (1) *A. crassiuscula*, Wendl. This is *A. pycnophylla*, Benth.
- (2) *A. crassiuscula*, Meissner. This is *A. pycnophylla*, Benth., also (as, indeed, stated by Bentham).
- (3) *A. crassiuscula*, Sieber. His No. 464. This is, I repeat, *A. obtusata*, Sieber, var. *Hamiltoni*, Maiden.

I am indebted to Colonel Prain, Director of Kew, for giving permission to Miss Smith to figure the Kew specimen of Sieber's No. 464, which has been lithographed by Miss Flockton on Plate No. 181, and also for some small specimens of the plant itself.

I cannot separate it from *A. obtusata*, Sieb., although the two plants look different enough at first sight.

It may be described in the following words:—

An erect, bushy shrub of 5 or 6 feet, quite glabrous, exhibiting a bluish-green cast when growing, branchlets angular.

*Phyllodia* lanceolate, straight or a little curved, sometimes tending to be spatulate, terminating in a fine point, the end of the phyllode sometimes bent obliquely, usually  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inch long, rigidly coriaceous, one-nerved, with thickened nerve-like margins, the veinlets inconspicuous, with or without marginal glands, the gland when present being about one-fifth of the way up from the base.

B

*Racemes* not exceeding or equalling the phyllodes, with numerous heads of about twenty flowers, all 5-merous.

*Sepals* thick, spatulate, angled, fringed at the top and along the angles with fine hairs, half as long as the corolla. *Petals* glabrous. *Ovary* smooth.

*Pod*  $\frac{1}{4}$  inch broad, the valves with a raised rim along the margin, the pod contracted between the seeds, which are longitudinally arranged.

*Seed* with a club-shaped aril and a funicle short or as long as the seed, but not encircling it.

Mr. R. T. Baker, *Proc. Linn. Soc. N.S.W.*, xxii, Plate xxiii, has figured *Acacia obtusata*, Sieber, and at figure 2 has figured "Flowering twig of variety with small phyllodes." This twig came from Tallong (Barber's Creek) (H. J. Rumsey), and is reminiscent of var. *Hamiltoni*, but the phyllodes are more attenuate-spatulate than the type, have the gland usually more distant from the articulation of the phyllode, and the gland usually more prominent.

With this exception, I have not found a form similar to var. *Hamiltoni* in southern New South Wales.

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *Hamiltoni*, in honour of Arthur Andrew Hamilton, Botanical Assistant, Botanic Gardens, who found this plant at Leura, Blue Mountains.

**Vernacular Name.**—I know of none in actual use, and propose the name "Hamilton's Wattle" for it.

**Synonym.**—*A. crassiuscula*, Benth. non Wendl. in part.

**Habitat.**—Leura, Blue Mountains, New South Wales. So far as I know this is the only locality in which this *Acacia* has been collected since Sieber's time, Mr. A. A. Hamilton having obtained it in fruit in December, 1907, and in flower in September, 1908.

I collected an *Acacia* at Mount Wilson in April, 1896, which is in young bud and doubtful, but which appears to be this form.

Tallong, between Moss Vale and Goulburn, is a southern form, and I expect this variety to be obtained in the rough country connecting the southern line and the western line (Blue Mountains).

#### EXPLANATION OF PLATE 181.

- A. Flowering twig.
- B. Flower-head.
- C. Individual bud.
- D. Flower.
- E. Bract.
- F. Flower opened out, showing—
  - (a) Calyx.
  - (b) Corolla.
  - (c) Pistil (stamens removed).
- G. Phyllode enlarged, showing gland (a).
- H. Pod.
- I. Seed.





HAMILTON'S WATTLE.

(*Acacia obtusata*, SIEB., var. *Hamiltoni*, MAIDEN.)



No. 178.

*Casuarina equisetifolia*, Forst.,  
var. *incana*, Benth.

Coast She-Oak.

(Family CASUARINACEÆ.)

**Botanical description.**—Genus, *Casuarina*. (See Part XIII, p. 74.)

**Botanical description.**—Species, *C. equisetifolia*, Forst., *Char. Gen.*, 103, t. 52 (1776).

A tree attaining a large size, but so frequently cut that it is generally met with much smaller, the principal branches elongated and spreading or ascending, the smaller ones often pendulous, glabrous or tomentose when young.

*Whorls* usually 7-merous, but the parts varying from 6 to 8.

*Sheath-teeth* short and acute or sometimes fine-pointed on the persistent branches, the internodes rarely exceeding  $\frac{1}{4}$  inch, the ribs rather prominent.

*Flowers* diœcious, male spikes about  $\frac{3}{4}$  inch long, terminating slender deciduous branchlets, the sheaths of the spikes closely imbricate.

*Fruit-cones* very shortly pedunculate on the persistent branches, globular, usually about  $\frac{1}{2}$  inch diameter, the valves protruding about 1 line, broadly ovate, obtuse, pubescent outside, without any or with a very obscure dorsal protuberance at the base.

Var. *incana*, young shoots very tomentose. *C. incana*, A. Cunn. Herb. (*B. Fl.* vi, 197.)

The typical form having been so long described, and so widely diffused in the tropics, has been often figured. Forster's figure has been already quoted, and he, as he states, obtained the name from Rumphius' *Herbarium Amboinense*, 3, t. 57 (1750), in which the Dutch artist has depicted the branchlets like plumes of horse-hair, indeed like tails.

Lamarck's *Encyclopédie*, pl. 746 fig. 2, may be referred to; the plate has also details based on Forster's figure.

Then we have Loddiges' *Bot. Cabinet*, t. 607, which is not good. Then there is *Miq. Rev. Cas.* t. 5, also t. 1, as *C. excelsa* (a garden variety).

Modern drawings are given in Engler's *Nat. Pflanzenfamilien*, iii, 1, p. 17, fig. 15, and Knuth's *Bluten-biologie*, iii (1), fig. 29.

The variety *incana* has only been once previously figured so far as I am aware. See Poisson, under Habitat.

**Botanical Name.**—*Casuarina*, already explained (see Part XIII, p. 79); *equisetifolia*, from *Equisetum*, marsh plants known in Britain as “Horse tails,” and *folia*, Latin, leaves, the branchlets of *Casuarina* reminding the first describer irresistibly of *Equisetum*.

**Vernacular Name.**—I do not know any actually in use, but suggest “Coast She-Oak” as as good as any.

**Aboriginal Names.**—*Typical form.* Dalgan is a name used in North Queensland (see N. Q. Ethnography, *Bull.* No. 2, Roth); var. *incana*, “Wunna-wunnarumpa” is a name given by Queensland aborigines. Mr. George Watkins gives the spelling as “Wunna-wunnarumpin” as in use on Stradbroke Island.

**Bark.**—The bark, according to Dr. Gibson, is an excellent astringent, and may be used with advantage in chronic diarrhoea and dysentery. It is not used medicinally by the natives of India. The Chinese in Bombay say that it is used as an astringent in China (Dymock). Doubtless the barks of the numerous other Australian species possess similar properties. See also *Pharmacographia indica*, p. 357.

The bark was formerly used by South Sea Islanders to dye their cloth.

**Kino.**—For a brief examination of this kino, collected by the Horn Exploring Expedition, see “Notes on some vegetable exudations.”\* Kino in this genus is rare, and the reference to the gum (kino) of *C. equisetifolia* (*Pharmacographia indica*, 375) will be useful.

**Timber.**—The following notes on the timber are quoted by Mueller:—

Splendid for fuel, giving great heat and leaving little ashes. The timber is tough, nicely marked. The tree will live in somewhat saline soil at the edge of the sea. Colonel Campbell-Walker estimates the yield of firewood from this tree as four times as great as the return from any tree of the forests of France. Known to have grown in ten years to a height of 80 feet, but then only with a comparatively slender stem (Blechynden). In India the wood is much used as fuel for railway locomotives; the tree is there also extensively employed to reclaim sand-land of the coast, it succeeding in growth down to high-water mark, throwing often out decumbent branches, which develop roots, further to fix the sand and to throw up independent shoots (Dr. Bidie). It yields a lasting wood for piles of jetties, for posts and for underground work, and is much used for knees of boats and for tool-handles (Wilcox); it is very heavy and singularly dark. The cost of raising *Casuarinas* in India has been from £4 to £10 per acre, and the return, after only eight years, £13 to £32.

The following notes were published in my “Useful Plants of Australia” (1889):—

Wood coarse-grained and beautifully marked; it is used for fuel, and also for purposes where lightness and toughness are required (Hill). It is employed for log fencing, gates, and shingles. This tree will live in somewhat saline soil at the edge of the sea. In India it grows on pure sand, and is used as fuel for railway purposes. For this purpose plantations of it have been made near Madras. The ashes of this tree yield a quantity of alkali, which is used in some places to produce a coarse soap. The name

\*Appendix to the *Report of the Horn Expedition to Central Australia*. Part 3, Geology and Botany, March, 1896.

“Iron-wood,” which it sometimes bears, is given to it on account of its colour, hardness and durability. The natives of the South Sea Islands make clubs of it. The weight per cubic foot varies from 55 lb. to 63 lb., according to Gamble. Diameter, 12 to 20 inches; height, 50 to 70 feet.

Clubs made of this wood are used in Fiji for beating the bark of the Paper Mulberry (*Broussonetia papyrifera*, Vent.) in the manufacture of Tapa cloth. (*Cat. Kew Museums.*)

All the above refer to the typical form, and the timber of the variety appears to be much the same.

**Habitat.**—Bentham gives the following localities in the *Flora Australiensis* for the typical form of the species:—

*North Australia.*—North coast, *A. Cunningham*; islands of the Gulf of Carpentaria, *Henne*; Escape Cliffs, *Hulse*; Port Darwin, *Schultz*, n. 9, 225.

*Queensland.*—Northumberland Islands, *R. Brown*; Cape Bedford and islands off Cape Flattery, *F. Mueller*; Entrance Island, Endeavour Straits, *Leichhardt*; Percy Islands, *Walter*; Rockingham and Edgecombe Bays, *Dallachy*; Port Denison, *Fitzalan*.

Bentham adds:—

This species is widely spread over East India and the Archipelago. With *C. distyla* it has long been cultivated in gardens, where varieties have arisen which have been described as new Australian species. Amongst them *C. excelsa*, Dehn., Miq. Rev. Cas. 23, t. 1, F., is referred by Miquel in DC. Prod. xvi, ii, 344, positively to *C. equisetifolia*; and *C. truncata*, Willd., *C. sparsa*, Tausch., and *C. tortuosa*, Hortul., are supposed to be either this species or *C. distyla*. (*B.Fl.* vi, 197.)

It occurs round the whole of the Queensland and North Australian coast. Mr. A. Murphy, who collected it for me north of Roekhampton, says: “It grows in salt water, like *C. glauca*.” Indeed, it has been confused with that species.

It is only the variety *incana*, the tomentose form, that is found in New South Wales, so far as I am aware. This form is also found in Queensland, and it is often difficult to separate the species from the variety.

This is a coastal form, and occurs in southern Queensland and northern New South Wales.

Bentham gives it, in the *Flora Australiensis*, from Port Maequarie (*A. Cunningham*, *Leichhardt*); Moreton Island, Queensland (*C. Moore*).

He adds, “This variety appears to be found in New Caledonia, from a specimen received from the Paris Herbarium.” This has been confirmed by Jules Poisson in his “Recherches sur les Casuarina, et en particulier sur ceux de la Nouvelle-Calédonie” (*Nouv. Arch. du Muséum*, Vol. x, 1876), who says it is frequent in New Caledonia, and figures it at Pl. iv.

I now record it for the first time from the Nambueea Heads (J. L. Boorman). “A medium-sized tree of 15–20 feet, the branches exceedingly pendulous. Has a griseous colour throughout, not dealbate or cinerascens, but of a sort of mouse-grey colour. Grows close to the ocean on an embankment, in moist clayey soil. Exceedingly rare.” This is the most southerly locality recorded so far.

## EXPLANATION OF PLATE 182.

- A. Branch with staminiferous flowers (*a*) and pistilliferous flowers (*bb*).
- B. Branch with ripe cone (*a*) and seeds (*b*).
- C. Part of branchlet, showing portions of two joints.
- D. Whorled bracts representing leaves, opened out.
- E. Staminiferous flowers.
- F. The same opened out, inside view, showing the seven individual flowers.
- G. Flower.
- H. Pistilliferous flower.

All from Nambucca Heads, New South Wales.



M. Floeklan del et lith.

COAST SHE OAK.  
(*Casuarina equisetifolia*, FORST.)





## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets):—

<p><i>Eucalyptus acacioides</i>, A. Cunn. (XI).</p> <p>„ <i>acmenioides</i>, Schauer (IX).</p> <p>„ <i>affinis</i>, Deane and Maiden (XIII).</p> <p>„ <i>amygdalina</i>, Labillardière (VI).</p> <p>„ <i>Andrewsi</i>, Maiden (VII).</p> <p>„ <i>apiculata</i>, Baker and Smith (IX).</p> <p>„ <i>Baueriana</i>, Schauer (XIII).</p> <p>„ <i>Behriana</i>, F.v.M. (X).</p> <p>„ <i>bicolor</i>, A. Cunn. (XI).</p> <p>„ <i>Boormani</i>, Deane and Maiden (X).</p> <p>„ <i>Bosistoana</i>, F.v.M. (XI).</p> <p>„ <i>Caleyi</i>, Maiden (X).</p> <p>„ <i>calycogona</i>, Turczaninow (III).</p> <p>„ <i>capitellata</i>, Smith (VIII).</p> <p>„ <i>Consideiniana</i>, Maiden (X).</p> <p>„ <i>coriacea</i>, A. Cunn. (V).</p> <p>„ <i>crebra</i>, F.v.M. (XII).</p> <p>„ <i>dives</i>, Schauer (VII).</p> <p>„ <i>eugenioides</i>, Sieber (VIII).</p> <p>„ <i>fruticetorum</i>, F.v.M. (XI).</p> <p>„ <i>Gillii</i>, Maiden (XV).</p> <p>„ <i>hemastoma</i>, Smith (X).</p> <p>„ <i>hemiphloia</i>, F.v.M. (XI).</p> <p>„ <i>incrassata</i>, Labillardière (IV).</p> <p>„ <i>leucoxyton</i>, F.v.M. (XII).</p> <p>„ <i>Luehmanniana</i>, F.v.M. (IX).</p> <p>„ <i>macrorrhyncha</i>, F.v.M. (VIII).</p>	<p><i>Eucalyptus melanophloia</i>, F.v.M. (XII).</p> <p>„ <i>meliiodora</i>, A. Cunn. (XIV).</p> <p>„ <i>microcorys</i>, F.v.M. (IX).</p> <p>„ <i>crotheca</i>, F.v.M. (XI).</p> <p>„ <i>Muelleriana</i>, Howitt (VIII).</p> <p>„ <i>obliqua</i>, L'Héritier (II).</p> <p>„ <i>ochrophloia</i>, F.v.M. (XI).</p> <p>„ <i>odorata</i>, Behr and Schlecht. (XI).</p> <p>„ <i>oleosa</i>, F.v.M. (XV).</p> <p>„ <i>paniculata</i>, Sm. (XIII).</p> <p>„ <i>pilularis</i>, Sm. (I).</p> <p>„ <i>piperita</i>, Sm. (X).</p> <p>„ <i>Planchoniana</i>, F.v.M. (IX).</p> <p>„ <i>olyanthemos</i>, Schauer (XIII).</p> <p>„ <i>populifolia</i>, Hooker (X).</p> <p>„ <i>regnans</i>, F.v.M. (VII).</p> <p>„ <i>Rudderi</i>, Maiden (XIII).</p> <p>„ <i>siderophloia</i>, Bentham (X).</p> <p>„ <i>sideroxyton</i>, A. Cunn. (XII).</p> <p>„ <i>Sieberiana</i>, F.v.M. (X).</p> <p>„ <i>Smithii</i>, R. T. Baker (XII).</p> <p>„ <i>stellulata</i>, Sieber (V).</p> <p>„ <i>umbra</i>, R. T. Baker (IX).</p> <p>„ <i>uncinata</i>, Turcz. (XIV).</p> <p>„ <i>virgata</i>, Sieber (IX).</p> <p>„ <i>vitellina</i>, Naudin (VII).</p> <p>„ <i>vitrea</i>, R. T. Baker (VII).</p>
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.



## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (Two Plates.)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andreusi*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (Two Plates.)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (Two Plates.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (Two Plates.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muellieri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya fætida*, R. T. Baker).

### PART XXX. (Issued March, 1908.)

Recapitulatory. (Seventeen Photographic Illustrations).

- 109.—THE YELLOW STRINGYBARK (*Eucalyptus Muellieriana*, Howitt)  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenoides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betche)

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hæmastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

Recapitulatory. (Fifty-seven Plates.)

## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).
- 148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.).
- 149.—A HICKORY (*Acacia implexa*, Benth.).
- 150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.).
- 152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).
- 153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).
- 154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

### PART XLIII. (Issued May, 1911.)

- 155.—WHITE YIEL YIEL (*Grevillea Hilliana*, F.v.M.).
- 156.—BOSISTO'S BOX (*Eucalyptus Bosistoana*, F.v.M.).
- 157.—THE PROMINENT GLANDED WATTLE (*Acacia prominens*, A. Cunn.).
- 158.—NATIVE CAMPHOR LAUREL (*Cinnamomum virens*, R. T. Baker).

### PART XLIV. (Issued August, 1911.)

- 159.—GIPPSLAND WARATAH (*Telopea oreades*, F.v.M.).
- 160.—BLACK OR FLOODED BOX (*Eucalyptus bicolor*, A. Cunn.).
- 161.—THE BOX-LEAVED WATTLE (*Acacia buxifolia*, A. Cunn., including *A. lunata*, Sieb.).
- 162.—*Litsaea zeylanica*, Nees.

### PART XLV. (Issued October, 1911.)

- 163.—A RED SILKY OAK (*Embothrium Wickhami*, Hill and F.v.M., var. *pinnata*, Maiden and Betche).
- 164.—A BLACK BOX (*Eucalyptus Boormani*, Deane and Maiden).
- 165.—THE WESTERN SILVER WATTLE (*Acacia decora*, Reichb.).
- 166.—SHE BEECH OR BOLLY GUM (*Litsaea reticulata*, Benth.).

### PART XLVI. (Issued February, 1912.)

- 167.—THE WILLOW-LEAVED HAKEA (*Hakea saligna*, R.Br.).
- 168.—THE BROAD-LEAF MALLEE (*Eucalyptus Behriana*, F.v.M.).
- 169.—A WATTLE (*Acacia adunca*, A. Cunn.).
- 170.—THE UGAULBIE (*Litsaea hexanthus*, Juss.).

### PART XLVII. (Issued May, 1912.)

- 171.—A HAKEA (*Hakea eriantha*, R.Br.).
- 172.—THE BIMBLE BOX (*Eucalyptus populifera*, Hook.).
- 173.—*Acacia obtusata*, Sieb.
- 174.—*Litsaea dealbata*, Nees.

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 9.*

*Published by Authority of the*  
**GOVERNMENT OF THE STATE OF NEW SOUTH WALES.**



*PART XLIX* OF THE  
COMPLETE WORK.

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phillyræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTY (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANDONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniocalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodora*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizzia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).
- THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muelleri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleafolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
- 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
- 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
- 59.—A DECIDUOUS FIG (*Ficus Henneana*, Miquel).

(N.B.—The numbers of Part XIV are given erroneously in the text)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxylon*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.).
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEeping MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer).
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)

#  
THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,  
Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney.

PART XLIX.

*Published by the Forest Department of New South Wales, under authority of  
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PHYSICS DEPARTMENT

PHYSICS 354

1962



*Hakea lorea*, R.Br.

A Western Cork-tree.

(Family PROTEACEÆ.)

**Botanical description.**—Genus, *Hakea*. (See Part XLVI, p. 105.)

**Botanical description.**—Species, *H. lorea*, R.Br., *Proteaceas Novas*, p. 25 (1830).

A tall shrub or tree attaining 20 feet.

*Leaves* terete, smooth, often above 2 feet long, and rarely under 1 foot, very rarely (on barren branches? on young plants?) a few once or even twice forked or trifold.

*Racemes* cylindrical, in the upper axils, sometimes forked or in a terminal cluster, more dense than in *H. Cunninghamii*, from under 3 inches to fully 6 inches long, the rhachis, pedicels and perianths densely pubescent with shorter hairs much less appressed than in *H. Cunninghamii*.

*Perianth tube* nearly four lines long, slightly dilated below the middle, revolute upwards.

*Torus* oblique, but less so than in *H. Cunninghamii*.

*Gland* large, horseshoe-shaped.

*Ovary* stipitate; style long, with a very oblique broadly stigmatic disk. (B.Fl. v, 496.)

In describing the plants of the Elder Exploring Expedition collected by Mr. R. Helms, Mueller and Tate say:—

*Hakea lorea*, R. Brown. *South Australia*:—Arkaringa Valley and near Everard Range. *Western Australia*:—Cavenagh and Barrow Ranges. "Cork-bark tree," attaining to 20 feet; bark corky, deeply fluted, three and a half inches at most, half an inch at least in thickness. (*Proc. Roy. Soc. S.A.*, xvi, 362.)

In describing his *Hakea suberea*, S. le M. Moore gives it the synonym (*H. lorea*, Mueller and Tate, non R.Br.).

He further says:—

Specimens of the same tree were obtained by Mr. Helms of the Elder Expedition in the Cavenagh and Barrow Ranges. In the report of that Expedition these specimens are referred to *Hakea lorea*, R.Br., a course I find it impossible to acquiesce in, at the same time feeling doubts as to whether there can be authentic specimens of *H. lorea* at Melbourne. Two congeners more easily separable it would be scarcely possible to find. The chief differences lie in the shorter and slenderer leaves of *H. suberea*, its short, stout pedicels not longer than the perianths, the latter organs larger and much broader with a dilated base, the larger anthers, the bigger gland, subsessile ovary, and elongated stout style. Moreover, the distribution of the vascular scars left upon the stem after the fall of the leaves, a point to which Meissner attaches importance, is different in the two, *H. suberea* being, in this respect, more like *H. Cunninghamii*, R.Br.

This tree was seen from the Black Gin soak, between Goongarrie and Mt. Margaret, northwards to our farthest point—some high granite rocks fourteen miles north of Lake Darlot. Wherever it occurs, subterranean water is supposed to be somewhere in the vicinity, and experience has so far, I believe, justified the supposition.

My specimen—unfortunately only a single one and not very good—agrees perfectly with that of the Elder Expedition in the Kew Herbarium. (*Journ. Linn. Soc. Bot.*, xxxiv, 224.)

Commenting on these observations, Mr. W. V. Fitzgerald (*Journ., Mueller, Bot. Soc. W.A.*, i, 60) remarks:—

The Eastern Gold-fields' form of this species has been recently described as a distinct species, under the name of *H. suberea*, by Moore. Having examined specimens of the typical *H. lorea* and compared them with the Gold-fields plant, I failed to observe any combination of characters of sufficient importance to justify the creation of a new species.

There the matter must remain for the present. I have one of Helms' Everard Range specimens, but it is leaf only. I cannot, however, see any difference between it and leaves of the same species from the Eastern States.

I shall be glad if correspondents in Western Australia will collect flowering and fruiting specimens of such "Cork-trees" and "Cork-woods" as have foliage similar or nearly similar to that of Plate 183, and then we shall see whether the foundation of *Hakea suberea* is justified or not.

#### Variety *fissifolia*, F.v.M.

The leaves are sometimes once or twice forked or trifid (as pointed out by Bentham), the prongs of the forks being 1 or  $1\frac{1}{2}$  inch or so long. This gives the foliage a very different appearance from that of the type in which the foliage is simple and very long. Mueller (*Fragm.* vi, 190) suggests the name *fissifolia* for this form, and draws attention to its resemblance to *H. purpurea*, Hook., which is certainly apt.

**Botanical Name.**—*Hakea*, already explained (see Part XLVI, p. 106); *lorea*, Latin, made of leather thongs, in allusion to the thong-like leaves.

**Vernacular Name.**—"Cork tree" is a common name, owing to the fissured, corky appearance of the bark. There are, however, several trees in New South Wales which go by this name, and therefore I have called this particular one "A Western Cork-tree" (*i e*, in contradistinction to the coastal New South Wales ones).

**Aboriginal Name.**—I know of none to be attributed to this with certainty, but it is simply impossible for the aborigines to have avoided knowing the tree and giving it a name.

**Synonym.**—*Grevillea lorea*, R.Br., in *Trans. Linn. Soc.*, x. 177; *Prod.* 380.

**Leaves.**—I have already drawn attention to the leaves under the variety *fissifolia*. Mitchell likened them to those of the She-Oaks (*Casuarina*), but they are not jointed. They have a drooping habit.

**Flowers.**—The flowers of all Proteaceæ contain more or less honey, but those of this species contain it abundantly. Writing from the Grey Range, New South Wales, Mr. Baeuerlen reported "Flowers rich in a brown sticky treacle."

**Fruit.**—Brown had not seen a fruit at the time of description of the species, nor was it seen by Bentham. Bailey (*Queensland Flora*, p. 1346) appears to have been the first to describe it, which he does as follows:—"Fruit  $1\frac{1}{4}$  inch long, ovate, somewhat flattened, and about  $\frac{3}{4}$  inch broad the flat way."

**Timber.**—This interior tree is rather rare, but the timber is much prized for bullock yokes, being very strong and durable.

**Range.**—It is found in the drier parts of all the mainland States except Victoria.

Following are the localities given in the *Flora Australiensis* (v, 496):—

*N. Australia.*—Attack Creek, *McDouall Stuart's Expedition*.

*Queensland.*—Shoalwater Bay, *R. Brown*; Port Denison, *Fitzalan*; Rockhampton, *Thozet*; Cape River and Nerook Creek, *Bowman*; Dyngie, *Miss Ross*; also in *Leichhardt's* collection.

Bentham, however, adds "Several of the above quoted specimens are not in flower, and are therefore in some measure doubtful."

The type locality is "within the tropics" as defined by Brown at p. vii of Preface to his *Prodromus*, referring to Queensland and Northern Queensland. Brown gives Shoalwater Bay as one locality for *Grevillea* (afterwards *Hakea*) *lorea*. (*Trans. Linn. Soc*, x, p. 177). Shoalwater Bay is, of course, near the modern Bowen.

#### QUEENSLAND.

I have a specimen collected by Robert Brown in Northern Queensland. The leaves are about 26 inches long (see Plate).

I am indebted to Mr. F. M. Bailey for specimens from the following localities:—

Springsure. This is a little south of Emerald, on the Central Railway (? Collector); Bouldercombe, a few miles south of Rockhampton (G. Smith); Beaufort, near the Belyando and in the Mitchell country, to be referred to presently (C. W. de Burgh Birch).

In the scrubs near this camp [Mount Mudge, 2,247 feet, near the sources of the Belyando, near 24° S. lat., and 147° E. long., a few miles south-east of Ashinurst, Central Railway, Queensland.—J.H.M.], Mr. Stephenson discovered a very remarkable tree, apparently a *Casuarina*, having long drooping hair from its upper boughs. (Mitchell's *Tropical Australia*, p. 241.)

At p. 285 of Mitchell's work is a rough sketch of this tree, with a note that the same tree was found at the camp of 24th August, viz., about 50 miles due west of the modern Emerald.

Mueller (*Fragm.* vi, 190) suggests that the above passages refer to *Hakea lorea*, and I have no doubt correctly.

#### NEW SOUTH WALES.

Robert Brown (App. Sturt's "Central Australia," ii, 87) says: "A single specimen also occurs of *Grevillea* (or *Hakea*) *lorea*, but without fructification." This probably came from the north-west angle of New South Wales.

Mr. W. Baeuerlen collected it at Olive Downs, Grey Range, which is in the Sturt country.

## SOUTH AUSTRALIA.

I have already quoted the South Australian localities cited by Mueller and Tate.

We have it also from "Near the MacDonell Range" (Lieut. Dittrich, quoted by Mueller in "Australasian Journal of Pharmacy," Novr., 1886).

## WESTERN AUSTRALIA.

I have already quoted Mueller and Tate for some localities of this State. Mr. Fitzgerald (*loc. cit.*) states as follows:—

Scattered throughout the eastern interior, chiefly north of Mount Malcolm, extending east to the South Australian border and west to near Shark's Bay, but apparently does not penetrate the tropics.

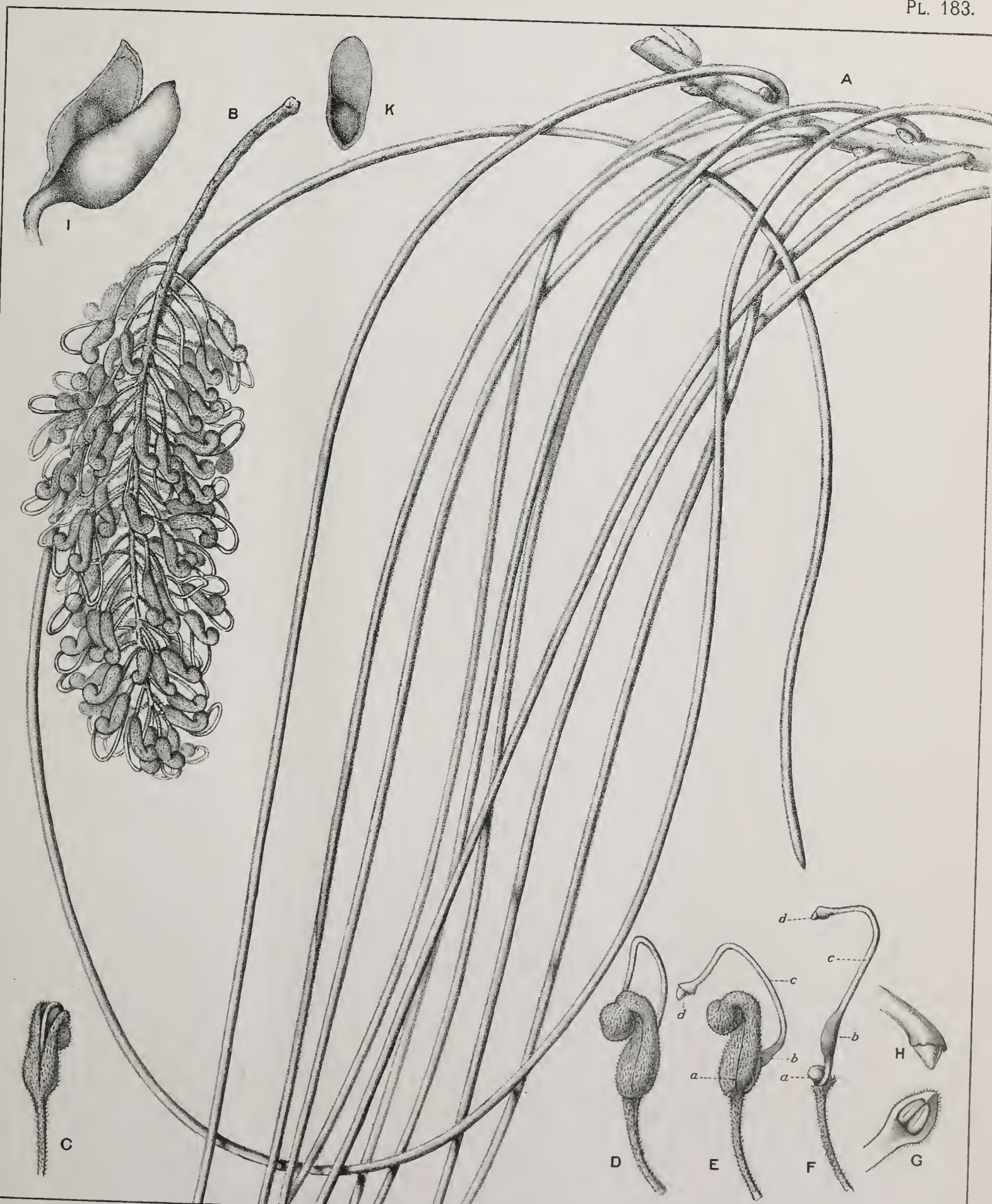
Occurring in small clumps, covering considerable tracts of country or lining the banks of dried watercourses. It is common in the vicinity of Mt. Malcolm, Tuckanarra, and other gold-field centres, growing usually in granitic areas, and among many prospectors has the reputation of denoting the proximity of fresh water.

It is also from Ularung, say 50 miles south-west of Menzies (Young), Herb. Melb.

## EXPLANATION OF PLATE 183.

- A. Twig showing leaves which are about 26 inches long.  
(Collected by Robert Brown in north coastal Queensland, and typical for the species.)
- B. Raceme of flowers. (Bouldercombe, Queensland, G. Smith, Herb. Queensland.)
- C. Bud.
- D. Flower.
- E. Flower—the stigma slips out of the corolla-tube usually without separating the four lobes, which contain the anthers.
  - (a) Corolla.
  - (b) Ovary.
  - (c) Style.
  - (d) Stigma.
- F. Portion of flower, corolla removed, showing—
  - (a) Hypogynous gland.
  - (b) Stipitate ovary.
  - (c) Style.
  - (d) Stigma.
- G. Anther.
- H. Stigmatic disc.
- I. Fruit from Ularung, W.A. (Herb. Melb.)
- K. Winged seed.

This is one of the few drawings which has not been prepared from exclusively, or nearly exclusively, New South Wales material. I have not specimens of the typical form from New South Wales, only of the variety *fissifolia* from this State, and I trust that publication of this plate will lead to records of New South Wales localities for the species.



A WESTERN CORK-TREE.  
(*Hakea lorea*, R. Br.)

M. Fleckfom del. et lith.



No. 180.

## *Eucalyptus Thozetiana*, F.v.M.

### Thozet's Gum.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. Thozetiana*, F.v.M., in “*Eucalyptographia*” (under *E. gracilis*), 1879.

This affords another instance of a plant imperfectly described (“*Eucalyptographia*”) being distributed in herbaria, and then, years after, being adequately described. Mr. R. T. Baker first described it adequately from complete material. Following are almost entirely his words:—

An erect, graceful tree, rarely attaining a height of over 70 feet. [The average height given to me by Mr. C. C. Chapman is about 30 feet, and Mueller quoted 60 feet.]

*Timber*, brown or black brown, very hard.

*Bark*, smooth, compact, whitish, decorticating in hard short flakes at the base (Mueller).

*Branchlets* angular, but soon terete, reddish-coloured.

*Juvenile leaves* linear or narrow lanceolate.

*Leaves* mostly alternate, from lanceolate to oblong-lanceolate, under 6 inches long and half an inch wide, occasionally shining. Venation rather obscured in the thick epidermis; lateral veins sparse, oblique, distant; intramarginal vein removed from the edge. Oil glands numerous, but exceedingly small.

*Flowers* small on axillary peduncles or terminal panicles. Calyx turbinate, angled, gradually tapering into a short pedicel. Operculum conical, blunt.

*Fruits* small, oval-urnshaped, angled, under 3 lines long, and under 1½ lines in diameter, valves depressed. (*Proc. Linn. Soc. N.S.W.*, xxxi, 1906, 305.)

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *Thozetiana*, in honour of Anthèlme Thozet (? 1826–1878), born in France, and a resident of Rockhampton, Queensland, for many years. He devoted the greater part of his life to the study of the cultivation and the economic products of Queensland plants and of interesting and useful plants generally. His end was hastened through the botanical exploration of Expedition Range, west of Rockhampton, and this species was found on his last trip. For fuller particulars see my “Records of Queensland botanists” in *Proc. Austr. Assocn. for Adv. of Science* (Brisbane Meeting, 1909), xii, 382.

**Vernacular Names.**—I have given the name “Thozet's Gum” to this species. Mr. Baker proposes the name “*Lignum Vitæ*” for it, but that name is already applied to two *Eucalypts*, and to one, if not two, species of *Acacia*.

**Aboriginal Names.**—"Yapunyah" or "Napunyah" near Goondiwindi, according to Mr. C. C. Chapman. These names are, however, shared by *E. ochrophloia*, F.v.M.

**Synonyms.**—

- (1) *E. gracilis*, F.v.M., var. *Thozetiana*, F.v.M., in "Euealyptographia" under *E. gracilis*.
- (2) *E. calycogona*, Turcz., var. *Thozetiana*, Maiden, in "Critical Revision of the genus Euealyptus," Vol. i, p. 82.

**Leaves.**—Note their narrowness, and their slender, graceful character.

**Bark.**—Evidently a smooth-barked species, with a little rough bark at the butt. Following are collectors' notes:—

"It sheds all the bark except that on the butt of the trunk." (Mr. E. Bowman, on a specimen from the Mackenzie River, from Rev. Dr. Woolls' herbarium.)

"Bark smooth, white, and entirely deciduous. The trunk is beautifully fluted, which appears to be a constant character of this species." (P. O'Shanesy.) This is interesting, for the Western Australian Gimlet Gum (*E. salubris*) is the only other species described with a fluted bark, so far as I know.

**Timber.**—Mr. R. T. Baker says that it is harder than that of any other Euealyptus timber known to him. That it is very heavy, close-grained and interlocked, has a chocolate colour, and resembles the Lignum-vitæ of commerce. He suggests its suitability for sleepers, posts, rails, bridges, eogs, mallets, &c.

**Size.**—Messrs. E. Bowman and P. O'Shanesy found it attaining a height of 60 feet on the Maekenzie and Comet Rivers (Cometville).

"It is like a Mallee, but do not think it has the bulbous stock of a Mallee. The average size of the stems is a diameter of 7-8 inches, with a length of 25 feet (as poles drawn into the station), so that the length may be fairly put at 30 feet." (Mr. C. C. Chapman, of Newinga.)

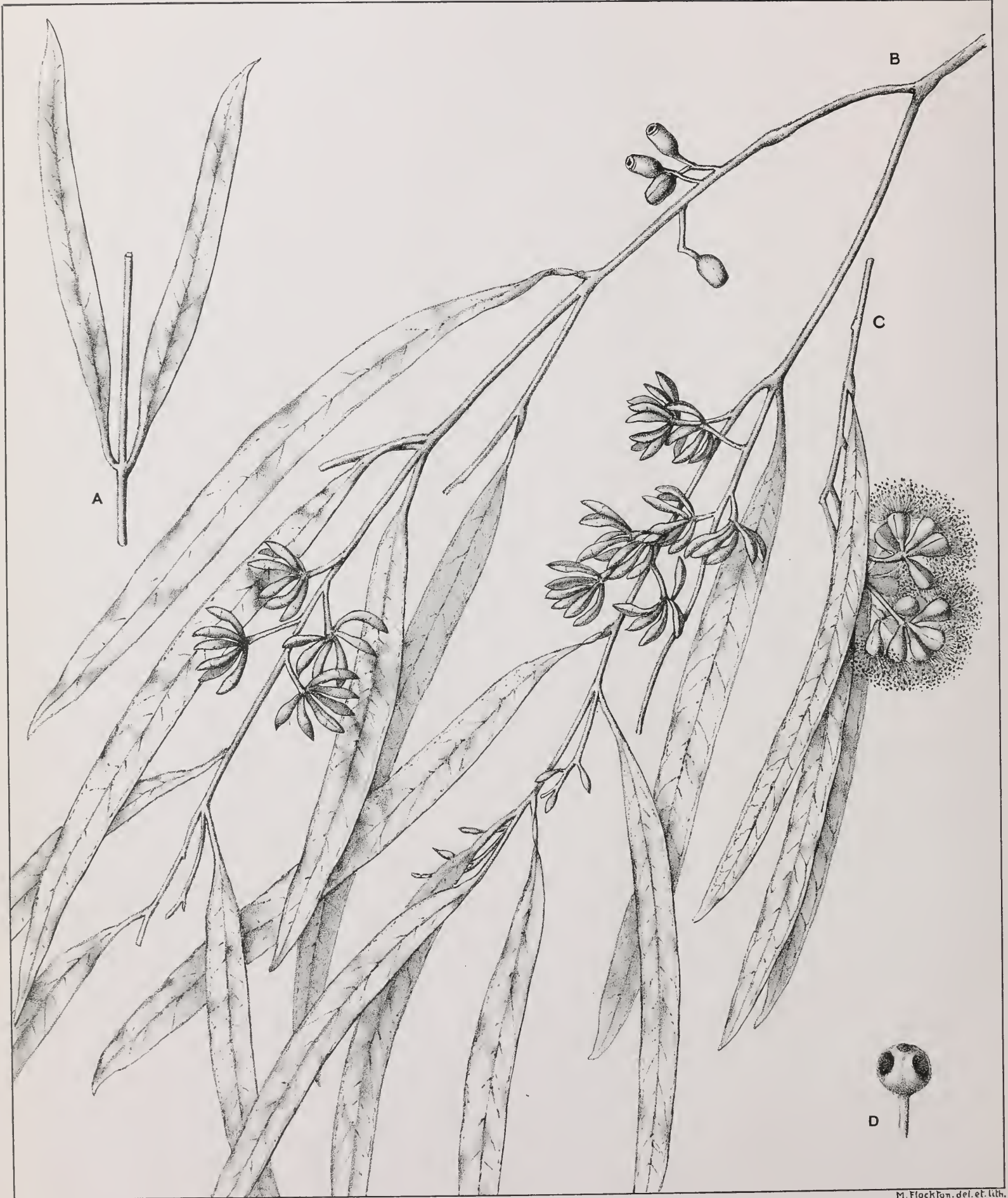
These two localities are some hundreds of miles apart. It is evidently a very large tree about Cometville, and it may be that it does not attain its greatest size even there.

**Habitat.**—Originally found on the Expedition Range, say 120 miles west of Rockhampton, by M. Thozet.

Maekenzie River (E. Bowman); Comet River, at Cometville, (P. O'Shanesy). These two rivers run into each other at Cometville. Warrego River (F. M. Bailey). No part is stated; Cunnamulla and Charleville are on the Warrego. Flinders River, probably, but not very good specimens (F. M. Bailey). Tandwanna, a few miles north-west of Newinga (C. C. Chapman).







THOZET'S GUM.  
(*Eucalyptus Thozetiana*, F. v. M.)

Plentiful at Newinga Station, which is 65 miles west of Goondiwindi. Newinga is on the Barwon or Macintyre River where it separates New South Wales from Queensland. I have not actually got it from the left (New South Wales) bank, but it is very abundant on the right bank, and it is the usual practice, when a species occurs on the border line of two States, to record it for both States. At the same time I hope collectors will look out for it actually within New South Wales territory. Baron von Mueller told me that when a species was recorded 15 miles from a border he recorded it in both States. That may turn out to be correct in practice, but it would be desirable to use this assumption very carefully.

The localities for *E. Thozetiana* therefore, so far as we know them, are the typical one of the Expedition Range and the Mackenzie and Comet Rivers (say Cometville) in the same district; secondly, the Goondiwindi district, on the New South Wales border of Queensland, with the Warrego as an intermediate locality.

It is evident that the species is of wide range, but we require very much more collecting to define that range, and to put us into possession of more facts concerning this interesting species.

#### EXPLANATION OF PLATE 184.

- a. Sucker leaves from Newinga Station, St. George, Goondiwindi Rd., Q.
- b. Twig with buds and fruit. From the type, Expedition Range, *via* Rockhampton, Q. (Thozet).
- c. Flowering twig from the Mackenzie River scrubs. (Herbm. of late Rev. Dr. Woolls).
- d. Anther.

No. 181.

*Acacia rubida*, A. Cunn.

## Red-leaved Wattle.

(Family LEGUMINOSÆ : MIMOSEÆ.)

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)**Botanical description.**—Species, *A. rubida*, A. Cunningham, in Barron Field's *New South Wales*, 344 (1825).

Following is the original description :—

*Acacia rubida*. Foliis ovato-lanceolatis; apice obliquis mucronatis; mucrone innocuo: margine superiore uni-glanduloso, racemis pedunculatis (parvis) axillaribus terminalibusve, costae margine que foliorum rubido-coloratis. A shrub frequent on the edge of mountain-rills, Blue Mountains. (Allan Cunningham in *Field's N. S. Wales*, 344.)

Then we have the description in English by Don :—

*A. rubida* (Cunningh. in Field's *New South Wales*, p. 344). Phyllodia ovate-lanceolate, ending in an oblique innocuous mucrone at the apex, bearing a gland on the upper margin; racemes small, pedunculate, axillary, and terminal; the rib and margins of the leaves coloured with red. Native of New Holland, frequent on the edge of rills on the Blue Mountains.

*Reddish Acacia*. Fl., April, June. Clt., 1823. Sh., 4 to 6 feet. (Don's *Gen. Hist. Dichlamydeous Pls.*, Vol. 2, p. 406.)

The description in Bentham's revision of the genus follows :—

*A. rubida* (Cunn. in Field's *N. S. Wales*, 344), glaberrima, ramulis angulatis, phyllodiis elongato-lanceolatis acutis breviter calloso-mucronulatis rectis v. leviter falcatis crassiusculis basi longe angustatis uninerviis tenuiter marginatis, venis inconspicuis, glandula a basi distante, racemis phyllodio plerisque brevioribus, capitulis parvis 10–20-floris ovarioque glabris. *A. amoena*, Sieb. Pl. ex., non Wendl.—Planta siccitate rubescit. Phyllodia pleraque 3.–poll. longa, 4–6 lin. lata. Racemi numerosi, 10–12–cephali. Pedunculi 2–3 lin. longi. Rami inferiores etiam floriferi folia saepe ferunt bipinnata, petiolis pubescentibus, glandula basilari immersa, jugalibus nullis, pinnis 4–7 jugis foliolis 10–15–jugis oblongo-falcatis mucronulatis crassiusculis glabris subciliatis.—Blue Mountains, *Cunningham, Sieber*, n. 452. (Hooker's *London Journal of Botany*, Vol. 1, 355.)

Bentham's description in English is as follows :—

*A. rubida*, A. Cunn. in Field, *N. S. Wales*, 344. A tall shrub, quite glabrous, allied to *A. amoena*, and perhaps a variety; branchlets angular.

*Phyllodia* lanceolate, often falcate, rather acute, much narrowed towards the base, mostly about 3 inches long, rather thick, 1-nerved, with nerve-like margins, the veinlets inconspicuous, and never more than 1 marginal gland.

*Racemes* shorter than the phyllodia, with several, often 10 to 12, rather small heads of 10 to 15 flowers, mostly 5-merous.

*Sepals* half as long as the petals, usually coherent.

*Petals* smooth.

*Pod* unknown. (B.Fl. ii, 366)

Mr. R. T. Baker (*Proc. Linn. Soc. N.S.W.*, xxii (1897), 695) described and figured the pod and seed. His words are as follows:—

Pod 4 to 5 inches long and 4 lines broad, slightly curved or straight, valves thinly coriaceous.

Seeds longitudinal, oblong; funicle slightly or not at all enlarged under the seed, encircling it in a double fold, and occupying the space between the seed and the margins of the valves.

It may be added that the valves are often glaucous. As regards the funicle encircling the seed, it will be seen, on reference to the plate now published, how variable this character is.

The *funicle* terminates under the seed in a club-shaped aril, then almost or more than encircles the seed, doubles back on itself, again encircles the seed, doubles back sharply, and then, by one or more folds, attaches itself to the margin of the valve.

Four other seeds with their funicles showing are figured, showing variations of the above, and I have seen other variations.

The ovarium is glabrous. The tops of the sepals are besprinkled with short hairs.

**Affinities.**—I will deal with the relations of this species to *A. amœna*, Wendl., to which it is most closely related, when I come to that species (in Part L).

**Botanical Name.**—*Acacia*, already explained (see Part XV, p. 104); *rubida*, Latin, of a deep red colour, referring to the foliage. See "Leaves."

**Leaves.**—This is one of the species in which true leaflets, as well as the phyllodia, are present. The reddish-brown colour of the foliage, particularly observable on the true leaflets, but often also on every phyllode, is a character which is easy of observation.

**Habitat.**—The species occurs in Northern Victoria and Southern Queensland, and from end to end of New South Wales, chiefly in rocky, elevated localities.

It was for long supposed to be confined to New South Wales, and the following localities are quoted in the *Flora Australiensis*:—

*New South Wales.*—Port Jackson to the Blue Mountains, Sieber, n. 452; head of the Gwydir, Leichhardt; Clarence River, Beckler? (Specimens not in flower.)

Following are some localities represented in the National Herbarium, Sydney (so far as I know the Victorian and Queensland localities now given are new for those States):—

#### NEW SOUTH WALES.

Thornleigh, Sydney (W. W. Froggatt); Woodford, Blue Mountains (J.H.M.); Fauleonbridge, Blue Mountains (R. H. Cambage and J.H.M.), two localities alongside Cunningham's old track, close to where he obtained his type-specimens.

We now turn south.

Cataract Dam (J.H.M.); Bowral to Bullio (R. H. Cambage and J.H.M.); Bowral (W. Greenwood); Berrima (J. L. Boorman and J.H.M.); Wingello (J. L. Boorman, J.H.M.).

"Small erect tree, No. 3. Steep sides of Shoalhaven gullies, Glen Rock, February, 1865. C. Moore." This specimen was labelled *A. amœna*, Wendl., by Mueller. Glenrock is near Marulan, not far from Wingello.

Gundaroo (Rev. J. W. Dwyer); Queanbeyan (Forester Harris, 1893); Clyde Mountain, near Nelligen (J. L. Boorman); Michelago and Little Tinderry Mountain (J. L. Boorman and E. Betche); Cooma (J.H.M.); Cowra Creek, N.E. of Cooma (R. H. Cambage); Tumut (J. L. Boorman, J.H.M.)

Going north, we have it from the Walcha district (J. F. Campbell). Bentham has recorded it from the head of the Gwydir.

It has been found mostly in southern localities, and it remains to be found in the rocky country connecting the southern with the Blue Mountains localities. We now want the connecting localities from the Blue Mountains to New England, the recording of which is simply a matter of opportunity.

#### QUEENSLAND.

It occurs near Stanthorpe, Queensland (J. L. Boorman).

#### VICTORIA.

Buffalo Mountain (West coll. through C. Walter). Rocky Mountains on the Macalister River 2-4,000 feet (Mueller). This specimen was referred both by Mueller and Bentham to *A. amœna*, Wendl., see B.Fl. ii, 366. It is only in fruit, but its phyllodes are those of *A. rubida*, while, in my opinion, so are its valves and seeds.

#### EXPLANATION OF PLATE 185.

- A. Phyllode and bipinnate leaf.
- B. Flowering twig from Falconbridge. A type locality.
- C. Flower-head.
- D. Individual bud.
- E. Flower with bract (*a*).
- F. Flower opened out, showing—
  - (*a*) calyx.
  - (*b*) corolla.
  - (*c*) pistil.
  - (stamens removed).
- G. Narrow phyllode form, from Cooma.
- H. Pod.
- I. Seed.

Seeds showing variation in the funicle (all enlarged):—

- K. From Wingello, N.S.W.
- L. „ Falconbridge, N.S.W.
- M. „ Rocky Mountains, Macalister River, Victoria.
- N and O. From Little Tinderry Mountain, N.S.W.



RED-LEAVED WATTLE.  
(*Acacia rubida*, A. CUNN.)

M. Flockton del. of lith.





No. 182.

## *Ceratopetalum gummiferum*, Sm.

### The Christmas Tree or Bush.

(Family CUNONIACEÆ.)

**Botanical description.**—Genus, *Ceratopetalum*. (See Part VI, p. 127.)

**Botanical description.**—Species, *C. gummiferum*, Sm., *Bot. Nov. Holl.*, t. 3.

A tree attaining 30 to 40 feet.

*Leaflets* 3, lanceolate, in some specimens all under  $1\frac{1}{2}$  inch long, in others mostly twice that size, obtuse or obtusely acuminate, obtusely serrulate, narrowed at the base, coriaceous, shining, penniveined and strongly reticulate.

*Cymes* or panicles loosely trichotomous, the common peduncle shorter or longer than the leaves.

*Calyx-lobes* in flower scarcely above 1 line long, in fruit linear-oblong, fully  $\frac{1}{2}$  inch long.

*Petals* rather shorter than the calyx, deeply cut into 3 to 5 very narrow lobes.

*Stamens* as long as the calyx.

*Fruit* without the wings above  $1\frac{1}{2}$  lines diameter, the adnate calyx-tube strongly ribbed. (B.Fl. ii, 442.)

**Botanical Name.**—*Ceratopetalum*, already explained (see Part VI, p. 127); *gummiferum*, Latin, gum-bearing. See “Exudation” below.

This, Mr. White informs us, is one of the trees, for there are several, it seems, besides the *Eucalyptus resinifera* (mentioned in his Voyage, p. 231) which produce the red gum, *i.e.*, the astringent kino which was early sent to England for medicinal purposes, having previously been tested by Surgeon-General White and the doctors here. (Smith, original description, p. 10.)

#### The Family Cunoniaceæ.

*Ceratopetalum* is found in the “Flora Australiensis” under Saxifragaceæ. The Cunoniaceæ are united in all British systems with the Saxifragaceæ, but are kept as a distinct Family in Engler’s “Natürliche Pflanzenfamilien.” They are distinguished chiefly in habit from the true Saxifragaceæ; they always have opposite or whorled leaves, with often very conspicuous stipules, and are always trees or shrubs, while the latter have alternate or radical leaves without stipules, and are mostly herbaceous, though the whole tribe of Escalloniæ consists of shrubs or small trees.

Bentham and Hooker’s system in the “Genera Plantarum” is “Natural” only in the main groups—and not even that; the position of the Gymnospermæ is quite unnatural—the grouping of the families into Polypetaleæ, Monopetaleæ, and Monoehlamydeæ is almost as artificial as Linne’s system, based on the stamens.

At the same time, the "Genera Plantarum" was an enormous step in advance. Mueller's system, published in his "Census," is almost as unnatural; he merely gives one artificial system in place of another. Engler, profiting by study of the earlier systems, and with access to vast stores of additional information, to which he himself contributed, has produced the most natural system at present known, though it is doubtless not yet a perfect Natural System. The extent of the Families is still somewhat a matter of opinion; it does not matter much whether the Cunoniaceæ are regarded as a separate Family, or as a Tribe of the Saxifragaceæ, but as we are mainly following Engler in the rearrangement of the Families in the new Census of New South Wales plants, it is convenient to follow his view with regard to the extent of the Families as far as possible.

**Vernacular Names.**—"Light Wood," "Officer Plant," "Christmas Tree."

"A beautiful flowering plant, rendered conspicuous from afar by the brilliant scarlet colour of the persistent calyxes of its numerous flowers; used for the decoration of churches at Christmas, whence one of its local names."

So wrote Sir William Macarthur nearly sixty years ago. "Officer Plant" is an allusion to the bright coloured tunics of the officers, and the name "Light Wood" was given to this tree the very first year of settlement.

**Aboriginal Name.**—I know of none, though it is not possible that such a conspicuous plant could have escaped their special notice.

**Flowers.**—The flowers are white, small, and very dainty. But they are not particularly conspicuous. What are usually known as the "flowers" are the enlarged calyxes which heighten in colour to a more or less deep scarlet.

**Exudation.**—By well wounding the tree, or, better still, by felling a tree and cutting it into logs, there exudes a kind of exceptionally beautiful appearance. It is of a rich ruby colour, perfectly transparent, very tough, though when it has become thoroughly hard it breaks with a bright fracture. It is exceedingly astringent, sticks to the teeth, and obviously contains a large proportion of gummy matter.

The resinous substance also exudes from the leaves, which causes them to slightly stick to the papers as dried specimens.

The first parcel of *C. gummiferum* gum I received was in small tears of a beautiful ruby colour, perfectly transparent, and having a bright fracture. It is powerfully astringent to the taste, sticks to the teeth, and obviously contains a large proportion of gummy matter. This sample was removed from the cut ends of a log, from which it exuded in small drops and in thin pieces which dried very quickly. The tree was 6 to 9 inches in diameter. It seems, as far as our experience goes at present, that ringbarking or wounding the tree, or even cutting it down merely, is of little avail to obtain the gum; the tree must be cut into

logs or pieces, so that the timber is open *at both ends*, before the gum will exude in any quantity. It remains to be seen whether the gum exudes most freely in summer.

I have received a cake of the substance obtained by draining the ends of a severed log on to a plate. When first received it was exceedingly tough; but on exposure to the air for two or three months, it fractured without difficulty between the fingers. The fractures are quite bright. It has no odour. To cold water it imparts a dark, rich orange-brown colour; at the same time, the insoluble portion forms a bulky gelatinous mass.

In bulk, the gum of *C. apetalum* appears in no way different from that of *C. gummiferum*. It, however, smells more or less strongly of coumarin, which is also contained in abundance in the bark. It is obtained either by wounding the tree or by felling it. In cold water it swells up largely, and at the same time, possesses a good deal of coherence. It imparts to the water a pale orange-brown colour and an intense odour of coumarin.

**Timber.**—“He (Surgeon-General White) further remarks that it is the only wood of the country that will swim in water.” (Smith; original description, p. 10.) This is the earliest reference to the timber. It shows that trees of fair size grew about Sydney, and, knowing as we do the great demand there was for soft wood, one can readily understand how the plant, as a tree, would soon be exterminated in the vicinity of the infant town.

This wood is fine-grained, of a reddish colour, and is used occasionally by turners. It is useful for tool handles. A slab of this wood in the Technological Museum, which has been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862), has a weight which corresponds to 41 lb. 14 oz. per cubic foot.

In the South Coast district it is used for house-work, butter kegs, &c. (Forester J. S. Allan).

**Size.**—This plant is usually called “Christmas-bush” for the reason that the people of Sydney, where the plant is in such great demand, rarely see it in any other form than that of a bush, *i.e.*, young plants or second growth. I have told many Sydney people, much to their surprise, that it attains the magnitude of a medium sized or even large tree.

Following are some figures:—

Bermagui district. Height 40–90 feet, diameter 1–2 feet. (Forester J. S. Allan.)

Termeil Creek, Bateman’s Bay district, 50 feet high, diameter 1 foot (J.H.M.). The above are South Coast localities.

At Linden, Blue Mountains, there is one specimen (see photo.) over 30 feet high, and over 18 inches in diameter (Dr. A. Houson and J.H.M.).

Port Macquarie to Comboyne Brush, 20-30 feet to first branch, and up to 4 feet or more in girth. (Forester G. R. Brown.)

Head of Bellinger, 25-30 feet high, diameter 12-15 inches. (Forester Meham.)

Murwillumbah, Tweed River, 20 feet high, 8 inches diameter. (Forester Pope.)

Moonambah, Tweed River, 60 feet high, 15 inches diameter. (W. Baeuerlen.)

**Habitat.**—It is confined to New South Wales, so far as we know, but in view of the fact that it is of large size in the Bermagui district, I expect to hear of its discovery in East Gippsland, Victoria, sooner or later. It extends to the Tweed in New South Wales, and one may be absolutely certain that it will be found across the border in Queensland.

In the *Flora Australiensis* it is recorded from Port Jackson to the Blue Mountains only.

It is found in various places about Sydney, and I know a plant of it (which is never permitted to flourish) in the Sydney Domain.

In the Blue Mountains we have it from Lapstone Hill (R. H. Cambage), while it is a large tree at Linden (Dr. A. Houson, J.H.M.). This is the farthest west known to me.

Following are coastal localities:—

*South.*—Kiama to Bermagui (east of Coast Range) (Forester J. S. Allan, Milton); Termeil Creek (J.H.M.); Conjola, near Milton (W. Heron).

*North.*—Stroud (A. Rudder). In small patches from about 2 miles north of Camden Haven River southwards to John's or Stewart River, and within 8 miles of the coast.

There is a patch from Port Macquarie to Comboyne Brush, I suppose about 30 or 40 acres. (Forester G. R. Brown.)

Chiefly in the high lands at the head of the Bellinger. (Forester Meham, Bellingen.)

Occurs abundantly in dry beds and on banks of rivers and creeks. (Forester Pope, Murwillumbah.)

At Moonambah, Tweed River. (Mr. W. Baeuerlen, through Mr. R. T. Baker.)

Copmanhurst, Upper Clarence River. "Common in this district on sand." (Rev. H. M. R. Rupp.)





*A. Honison, photo.*

*Ceratopetalum gummiferum*, MARTIN'S FOLLY LINDEN.





M. Flockton, del. et lith.

CHRISTMAS TREE.  
(*Ceratopetalum gummiferum*, Sm.)



## EXPLANATION OF PLATE 186.

- A. Twig of normal flowers.
- B. Flowers in a more advanced stage, from the original plate in Sir J. E. Smith's  
"Zoology and Botany of New Holland." MDCCXCII.
- C. Flower opened out, showing—
  - (a) Calyx-lobes.
  - (b) Petals.
  - (c) Stamens.
  - (d) Perigynous disc.
  - (e) Pistil.
- D. Flower with stamens removed.
- E. Portion of flower showing pistil, &c.
- F. Petals, various forms. Note how in shape they are like stags' horns, and hence  
"Ceratopetalum."
- G. Fruit, calyx-lobes, petals and stamens persistent.

## PHOTOGRAPHIC ILLUSTRATION.

*Ceratopetalum gummiferum*, Martin's Folly, Linden, Blue Mountains. (Photo., Dr. A. Houson.)

### Some Timbers which cause Irritation of the Skin and Mucous Membrane.

This is a subject concerning which little information has been systematically collected. I drew attention to the matter in the *Agricultural Gazette for N.S.W.*, December, 1909, this being a second paper, Poison Ivy (*Rhus*), having been dealt with in the February issue. The *Philippine Journal of Science*, iv, 431, in dealing with "Indo-Malayan Woods," has some brief notes on Poison Woods, by F. W. Foxworthy, which supplements my notes. Dr. Foxworthy's paper was not received in Sydney until January, 1910.

New South Wales and some other Australian States are rich in forests, and will become increasingly interested in the timbers of other nations for manufacturing and structural purposes, as time goes on.

I offer some notes which may have the result of causing deeper consideration to be given to the subject than it has hitherto received

#### MELIACEÆ.

*Dysoxylon Richii*, C. DC. (*D. alliaceum*, Seem.), native name Maotamea, is found in several Polynesian islands. Dr. Funk, of Apia, Samoa, informs me that the sap or sawdust causes a kind of eczema on the hands, also eye inflammation, and a burning feeling in the throat.

*Dysoxylon Muelleri*, Benth. ("Red Bean").—This well-known furniture wood of New South Wales has been accused as follows:—Some cabinet-makers report that after working at it for "four or five days they begin to suffer from a virulent form of influenza, accompanied by violent fits of vomiting and bleeding at the nose, while, if they cut themselves in handling the timber, blood-poisoning almost inevitably ensues. Remarkably enough, the more seasoned the wood is, the worse it becomes."

It appears to me that the language of exaggeration has been here employed. So far as I can glean, the wood, and particularly the sawdust, is exceedingly irritating to some people, and it has indeed, induced severe dermatitis, and also irritation of the mucous membrane.

We have, of course, several species of *Dysoxylon* (of which *D. Fraserianum* is the most important) which produce commercial timbers in New South Wales.

#### *Chloroxylon Swietenia*, DC. ("East Indian Satin-wood.")

Some time ago reference was made to the irritant properties of East Indian Satin-wood (*Chloroxylon Swietenia*) on the workers in that wood, and it has been alleged that it was partly responsible for an outbreak of dermatitis among workmen employed at a saw-mill in Scotland some years ago. We now observe, from the Bulletin of the Imperial Institute, that an investigation of the constituents of the wood has been made at that institute, and the results have been recently communicated to the Chemical Society by Dr. Auld, of the Scientific and Technical Department.

The wood contains a considerable amount of calcium oxalate, a peculiar protein compound, two inert resins, a yellowish-brown fixed oil, and a small quantity of an alkaloid. The oil does not appear to exert any irritant action on the skin. . . .

As it cannot be identified with any known substance, the alkaloid has been given the name *Chloroxylonine*. (*Indian Forester*, xxxv (1909), 662.)

## ANACARDIACEÆ.

See my paper in the *Agricultural Gazette, N.S.W.*, for February, 1909, "The Poison Ivy (*Rhus radicans*) and its close relations." I do not wish to draw especial attention to this plant at this place, for I am dealing mainly with timbers, but Dr. Foxworthy (*loc. cit.*) has shown that in the Philippines the *timbers* of some Anacardiaceæ are undoubtedly irritant:—

The principal poisonous woods of this part of the world are a few *Anacardiaceæ*, which cause a skin irritation similar to that produced by the "Poison Ivy" and "Poison Oak (*Rhus spp.*) of temperate regions. These woods are produced by species of *Gluta*, *Holigarna*, *Melanorrhæa*, *Semecarpus*, and *Swintonia*; and they are usually known by the name of "ringhas" in the Malay region.

When seasoned, the wood is much less likely to cause poisoning than when fresh. The seriousness of such poisoning is often exaggerated, and many persons are entirely immune to this class of poisoning.

## LEGUMINOSÆ.

*Castanospermum australe*, A. Cunn. (the "Black Bean").—This well-known furniture timber of New South Wales and Queensland has, like the Red Bean (*Dysoxylon Muelleri*), been accused of injuriously affecting the health of workmen.

## MYRTACEÆ.

*Eucalyptus maculata*, Hook. (the "Spotted Gum").—In parts of Queensland, timber-getters and sawyers who handle Spotted Gum are sometimes affected with a rash, called "Spotted Gum rash." I asked a number of timber experts: "Do you know any district in which this skin complaint prevails, and can you furnish any particulars in regard to it?"

Most questionees never heard of it, but Mr. A. Vogele, Mt. Douglas, Paterson, N.S.W., reports:—"Spotted Gum rash prevails here. Some are affected more than others. One of my neighbours who worked with me in the bush for years, felt its influence if only working beside a Spotted Gum; to work one up was out of the question. If persisting in doing so he would itch, and afterwards break out in pimples. Every occasion he got affected more; at length he had to sell his selection on account of it.

*Eucalyptus hemiphloia*, F.v.M. ("White or Grey Gum").—I have heard on one occasion of this timber causing a rash in a man, or at least of a rash being attributed to this timber.

Nor is this irritation confined to Eastern Australia.

*Eucalyptus marginata*, Sm. (probably).

Port Hedland, January 26, 1910.

The steamer "Gorgon" arrived here yesterday, but the union lumpers refused to work under the rates asked for.

The union's principal reason for asking for an increase in the wage previously given is that the poison on sleepers inflames their flesh wherever it touches them, their hands, arms, and faces swelling up. When the stuff is dry matters are worse, as it gets on their bodies, and men have had to lay up in consequence.—Extract from *Western Mail*, Perth, West Australia, 29th January, 1910.

The sleepers are most probably *Eucalyptus marginata*, the "Jarrah," but I have never heard of Jarrah being accused of being irritant before. I could obtain no further information in Western Australia.

I shall be glad of particulars in regard to the supposed irritant character of Eucalyptus timbers from any part of Australia.

#### CONIFERÆ.

*Thuja Douglasii*, Carr.—A curious case of a woman being poisoned by handling the branches and leaves of this tree while gardening is recorded by Neudorffer in the *Centralb. f. Innere Medicin.*\*

The symptoms were spasmodic convulsions, dyspnoea, and coma. Other persons appear to have been more or less affected who were working at the same employment. It appears probable, therefore, that the tree, which is cultivated for ornamental purposes, contains some poisonous ingredient to which some persons are more susceptible than others.

I admit this plant to the present list with doubt. But attention should be widely drawn to such a well-known tree, in order that we may ascertain what are the real facts of the danger of handling it.

It will be noted below that the wood of the Yew (*Taxus baccata*) and of the Savin (*Juniperus sabina*) are irritant.

#### EUPHORBIACEÆ.

*Excæcaria agallocha*, L.; *Excæcaria parvifolia*, Muell., Arg.—"Blind your eyes." These two yield an acrid juice which is more or less volatile, and which, if it gets into the eyes, will produce temporary loss of sight and other local irritation.

Both are natives of Australia, and the latter also of the East Indies. Concerning it Dr. Foxworthy, *op. cit.*, says:—

*Excæcaria agallocha*, L., the "eye-blinding plant" of India, is of evil repute. The wood contains an extremely acrid dark-coloured gum, which is very irritant in contact with the skin, and is said to cause blindness if rubbed on the eyes. It is said that the coolies who work this wood for charcoal suffer a great deal from the effects of the fumes of the burning wood.

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#### APPENDIX I.

##### Poisonous Woods.

A number of woods show in less or more degree during their technical use disturbances of health. Some of these are woods which possess neither odoriferous nor colouring matter, and the opinion that these bodies are the source of the poisonous action is, therefore, untenable. Amongst indigenous woods the following possess poisonous properties: *Taxus baccata*, *Juniperus sabina*, *Cytisus laburnum*, *Rhus tiphina*, *Rhus Cotinus*, and *Coriaria myrtifolia*. These, however, are seldom used, and then only in small pieces. Of foreign woods, poisonous properties have been found in *Buxus sempervirens*, *Hippomane mancinella*, *Excæcaria agallocha*, *Amyris balsamifera*, *Convolvulus scoparius*, and *Santalum album*, and various satin woods.—J. Grossman (*Bayr. Ind-u. Gewerbebl.*, 1910, 51; through *Jahresber d. Pharm.*, 45, 12, 1911), in *The Pharmaceutical Journal and Pharmacist*.

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\* *Nouv. Rem.*, 1903, 65. Quoted in *Pharmaceutical Journal*, 21st March, 1903, p. 422.

## APPENDIX II.

## Irritant Woods.

In connection with our (*Gard. Chron.*) article on "Plants and Skin Irritants," printed on p. 110, the following contribution on "irritant" wood, which we extract from the *Journal of the Royal Society of Arts*, is interesting:—

In the course of the past year inquiry was made by the Factory and Workshop Department into the effect of irritant woods, and the extent to which they are used in this country. For example, in the case of satiu-wood, there was inquiry into (1) the extent and class of work in which it was used; (2) the evidence there is as to its irritant action on the skin; (3) the precautions taken in its use. Much confusion was found as to the kind of wood referred to as satin-wood, the two covering East and West Indian satin-wood and satin walnut. The first two are practically confined to high-class furniture and furniture-making, and to decoration of cabins and overmantel work in ships. Occasionally thermometer stands, backs of toilet brushes, and similar articles are made of it. In those trades it is used as an inlay or veneer, involving little exposure to irritant dust. East Indian satin-wood possesses much more irritant properties than the West Indian variety. Satin walnut appears to be no more harmful than deal. The East Indian wood is only used in two shipyards. It causes an eruption on the skin of the worker exposed to the dust or shavings produced during manufacture; but some persons are much more susceptible to its effect than others. One man stated to the Inspector that if he only placed a shaving of the wood on the back of the hand, it caused a sore on the skin at that point. The injurious effects, however, appear to be only temporary. Exhaust ventilation is in use for carrying off dust, &c., from the machines in most of the works, including one of the shipyards in which the East Indian wood is used. Reference to occasional contact action on the skin is made as to teak by Mr. Inspector Wright (North London), who refers to reports of "swollen arms and eyes," by Mr. Shannin (Liverpool), and by Mr. Grant (Preston), as to teak and olive-wood. The Inspector in Sheffield states that "in the manufacture of knife scales and tool handles the following woods are considered to be irritant:—Some of the ebonies, magneta rose-woods, West Indian box-wood, cocos-wood, and partridge-wood. Irritation of the eyes and nose is caused also by woods of the mahogany type. East Indian wood had to be discarded in the shuttle trade owing to its irritating action on the eyes." Mr. Lewis (Manchester) states that salica-wood, from Cuba, was stated to give off "a fluffy dust under the machines and hand planes, the effect of which upon the workers is to cause a running of the eyes and nose, and a general feeling of cold in the head. The symptoms pass off in an hour or so after discontinuance of work." Eczematous eruptions are said to be produced by the so-called Borneo rose-wood—a wood used owing to its brilliant colour and exquisite grain in fret-saw work; but the Director of the Imperial Institute, Sir Wyndham Dunstan, who has interested himself in this wood, has failed to discover injurious properties in it.—*Gardeners' Chronicle*, 29th August, 1908, p. 167.

The above refers more or less to *Chloroxylon Swietenia*, already referred to.

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets):—

<i>Eucalyptus acacioides</i> , A. Cunn. (XI). „ <i>acmenioides</i> , Schauer (IX). „ <i>affinis</i> , Deane and Maiden (XIII). „ <i>amygdalina</i> , Labillardière (VI). „ <i>Andrewsi</i> , Maiden (VII). „ <i>apiculata</i> , Baker and Smith (IX). „ <i>Baueriana</i> , Schauer (XIII). „ <i>Behriana</i> , F.v.M. (X). „ <i>bicolor</i> , A. Cunn. (XI). „ <i>Boormani</i> , Deane and Maiden (X). „ <i>Bosistoana</i> , F.v.M. (XI). „ <i>Caley</i> , Maiden (X). „ <i>calycogona</i> , Turczaninow (III). „ <i>capitellata</i> , Smith (VIII). „ <i>Consideniana</i> , Maiden (X). „ <i>coriacea</i> , A. Cunn. (V). „ <i>crebra</i> , F.v.M. (XII). „ <i>dives</i> , Schauer (VII). „ <i>eugenioides</i> , Sieber (VIII). „ <i>fruticetorum</i> , F.v.M. (XI). „ <i>hemastoma</i> , Smith (X). „ <i>hemiphloia</i> , F.v.M. (XI). „ <i>incrassata</i> , Labillardière (IV). „ <i>leucoxydon</i> , F.v.M. (XII). „ <i>Luehmanniana</i> , F.v.M. (IX). „ <i>macrorrhyncha</i> , F.v.M. (VIII).	<i>Eucalyptus melanophloia</i> , F.v.M. (XII). „ <i>melliodora</i> , A. Cunn. (XIV). „ <i>microcorys</i> , F.v.M. (IX). „ <i>microtheca</i> , F.v.M. (XI). „ <i>Muelleriana</i> , Howitt (VIII). „ <i>obliqua</i> , L'Héritier (II). „ <i>ochrophloia</i> , F.v.M. (XI). „ <i>odorata</i> , Behr and Schlecht. (XI). „ <i>paniculata</i> , Sm. (XIII). „ <i>pilularis</i> , Sm. (I). „ <i>piperita</i> , Sm. (X). „ <i>Planchoniana</i> , F.v.M. (IX). „ <i>polyanthemus</i> , Schauer (XIII). „ <i>populifolia</i> , Hooker (X). „ <i>regnans</i> , F.v.M. (VII). „ <i>Rudderi</i> , Maiden (XIII). „ <i>siderophloia</i> , Bentham (X). „ <i>sideroxydon</i> , A. Cunn. (XII). „ <i>Sieberiana</i> , F.v.M. (X). „ <i>Smithii</i> , R. T. Baker (XII). „ <i>stellulata</i> , Sieber (V). „ <i>umbra</i> , R. T. Baker (IX). „ <i>uncinata</i> , Turcz. (XIV). „ <i>virgata</i> , Sieber (IX). „ <i>vitellina</i> , Naudin (VII). „ <i>vitrea</i> , R. T. Baker (VII).
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, Six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.

## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (Two Plates.)  
78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andreusi*, Maiden).  
79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (Two Plates.)  
81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (Two Plates.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (Two Plates.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
95.—THE MULGA (*Acacia aneura*, F.v.M.).  
96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxylon*, Maiden and Betcher).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muelleri*, Benth.).  
98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
106.—A WHITE STRINGYBARK (*Eucalyptus eugenoides*, Sieb.).  
107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
108.—THE STINKING CRYPTOCARYA (*Cryptocarya foetida*, R. T. Baker).

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations).  
109.—THE YELLOW STRINGYBARK (*Eucalyptus Muelleriana*, Howitt).  
110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
116.—THE WHITE MAHOGANY (*Eucalyptus acmenoides*, Schauer).  
117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
121.—IRONWOOD (*Acacia excelsa*, Benth.).  
122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L. f.).  
124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
129.—THE YARRAN (*Acacia homalophylla*, A. Cunn.).  
130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees.).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Betcher).

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.).  
136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hamastoma*, Sm.).  
137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
138.—ENDIANDRA MUELLERI, MEISSN.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
145.—THE COOBA (*Acacia salicina*, Lindl.).  
146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

Recapitulatory. (Fifty-seven Plates.)

## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).
- 148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.).
- 149.—A HICKORY (*Acacia implexa*, Benth.).
- 150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.).
- 152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).
- 153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).
- 154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

### PART XLIII. (Issued May, 1911.)

- 155.—WHITE YIEL YIEL (*Grevillea Hilliana*, F.v.M.).
- 156.—BOSISTO'S BOX (*Eucalyptus Bosistoana*, F.v.M.).
- 157.—THE PROMINENT GLANDED WATTLE (*Acacia prominens*, A. Cunn.).
- 158.—NATIVE CAMPHOR LAUREL (*Cinnamomum virens*, R. T. Baker).

### PART XLIV. (Issued August, 1911.)

- 159.—GIPPSLAND WARATAH (*Telopea orchades*, F.v.M.).
- 160.—BLACK OR FLOODED BOX (*Eucalyptus bicolor*, A. Cunn.).
- 161.—THE BOX-LEAVED WATTLE (*Acacia buxifolia*, A. Cunn., including *A. lunata*, Sieb.).
- 162.—*Litsea zeylanica*, Nees.

### PART XLV. (Issued October, 1911.)

- 163.—A RED SILKY OAK (*Embothrium Wickhami*, Hill and F.v.M., var. *pinnata*, Maiden and Betche).
- 164.—A BLACK BOX (*Eucalyptus Boormani*, Deane and Maiden).
- 165.—THE WESTERN SILVER WATTLE (*Acacia decora*, Reichb.).
- 166.—SHE BEECH OR BOLLY GUM (*Litsea reticulata*, Benth.).

### PART XLVI. (Issued February, 1912.)

- 167.—THE WILLOW-LEAVED HAKEA (*Hakea saligna*, R.Br.).
- 168.—THE BROAD-LEAF MALLEE (*Eucalyptus Behriana*, F.v.M.).
- 169.—A WATTLE (*Acacia adunca*, A. Cunn.).
- 170.—THE UGAULBIE (*Litsea hexanthus*, Juss.).

### PART XLVII. (Issued May, 1912.)

- 171.—A HAKEA (*Hakea eriantha*, R.Br.).
- 172.—THE BIMBLE BOX (*Eucalyptus populifolia*, Hook.).
- 173.—*Acacia obtusata*, Sieb.
- 174.—*Litsea dealbata*, Nees.

### PART XLVIII (Issued July, 1912).

- 175.—A HAKEA (*Hakea dactyloides*, Cav.).
- 176.—GREEN MALLEE (*Eucalyptus acacioides*, A. Cunn.).
- 177.—HAMILTON'S WATTLE (*Acacia obtusata*, Sieb., var. *Hamiltoni*, Maiden).
- 178.—COAST SHE-OAK (*Casuarina equisetifolia*, Forst., var. *incana*, Benth.).



2507

*THE FOREST FLORA*  
*OF*  
*New South Wales.*

J. H. MAIDEN.

*VOL. V. PART 10.*

*Published by Authority of the*  
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*PART L*      *OF THE*  
*COMPLETE WORK*

# INDEX OF TREES DESCRIBED.

## Volume I (Parts I-X).

### PART I. (Issued February, 1903.)

- 1.—THE SILKY OAK (*Grevillea robusta*, A. Cunn.).
- 2.—THE RUSTY FIG (*Ficus rubiginosa*, Desf.).
- 3.—THE TURPENTINE TREE (*Syncarpia laurifolia*, Ten.).
- 4.—THE NARROW-LEAVED PITTOSPORUM (*Pittosporum phylliræoides*, DC.).

### PART II. (Issued March, 1903.)

- 5.—THE WOOLLY BUTT (*Eucalyptus longifolia*, Link and Otto).
- 6.—THE RED ASH (*Alphitonia excelsa*, Reissek.).
- 7.—THE NEW SOUTH WALES SASSAFRAS (*Doryphora sassafras*, Endl.).
- 8.—A BITTER BARK (*Alstonia constricta*, F.v.M.).

### PART III. (Issued May, 1903.)

- 9.—THE RED CEDAR (*Cedrela australis*, F.v.M.). (Two Plates.)
- 10.—THE RED MAHOGANY (*Eucalyptus resinifera*, Sm.).
- 11.—A SHE-BEECH (*Cryptocarya obovata*, R.Br.).

### PART IV. (Issued July, 1903.)

- 12.—THE N.S.W. BLUE OR FLOODED GUM (*Eucalyptus saligna*, Sm.).
- 13.—THE BROWN OR SHE PINE (*Podocarpus elata*, R.Br.).
- 14.—THE BROAD-LEAVED TEA-TREE (*Melaleuca leucadendron*, Linn.).
- 15.—THE QUANDONG (*Fusanus acuminatus*, R.Br.).

### PART V. (Issued November, 1903.)

- 16.—THE BRUSH BOX (*Tristania conferta*, R.Br.).
- 17.—A WHITE OAK (*Lagunaria Patersonii*, D. Don.).
- 18.—THE MOUNTAIN GUM (*Eucalyptus goniacalyx*, F.v.M.).
- 19.—A CUPANIA (*Cupania anacardioides*, A. Rich.).

### PART VI. (Issued February, 1904.)

- 20.—THE COACH WOOD (*Ceratopetalum apetalum*, D. Don.).
- 21.—THE WHITE OR GREY BOX (*Eucalyptus hemiphloia*, F.v.M.).
- 22.—A BEEF-WOOD (*Stenocarpus salignus*, R.Br.).
- 23.—THE BLACK PENCIL CEDAR (*Panax elegans*, F.v.M.).

### PART VII. (Issued March, 1904.)

- 24.—THE BLACK BEAN (*Castanospermum australe*, A. Cunn.). (Two Plates.)
- 25.—THE SPOTTED GUM (*Eucalyptus maculata*, Hook.).
- 26.—THE BRUSH BLOODWOOD (*Baloghia lucida*, Endl.).

### PART VIII. (Issued May, 1904.)

- 27.—WHITE HONEYSUCKLE (*Banksia integrifolia*, Linn., f.).
- 28.—WHITE OR GREY IRONBARK (*Eucalyptus paniculata*, Sm.).
- 29.—*Barklya syringifolia*, F.v.M.
- 30.—A YELLOW WOOD (*Rhodosphæra rhodanthema*, Engler).

### PART IX. (Issued May, 1904.)

- 31.—THE WHITE BEECH (*Gmelina Leichhardtii*, F.v.M.).
- 32.—THE SUPPLE JACK (*Ventilago viminalis*, Hook.).
- 33.—THE YELLOW BOX (*Eucalyptus melliodoru*, A. Cunn.).
- 34.—*Evodia accedens*, Blume.

### PART X. (Issued July, 1904.)

- 35.—A GREY GUM (*Eucalyptus punctata*, DC.).
- 36.—A STINKWOOD (*Albizia pruinosa*, F.v.M.).
- 37.—THE LEOPARD WOOD (*Flindersia maculosa*, F.v.M.).
- 38.—THE QUEENSLAND NUT (*Macadamia ternifolia*, F.v.M.).

## Volume II (Parts XI-XX).

### PART XI. (Issued September, 1904.)

- 39.—THE FOREST RED GUM (*Eucalyptus tereticornis*, Sm.).
- 40.—THE BLACK APPLE (*Sideroxylon australe*, Benth. et Hook., f.).
- 41.—THE SMOOTH-BARKED APPLE (*Angophora lanceolata*, Cav.).
- 42.—*Scolopia Brownii*, F.v.M.

### PART XII. (Issued November, 1904.)

- 43.—THE BLOODWOOD (*Eucalyptus corymbosa*, Sm.).  
THE CYPRESS PINES OF NEW SOUTH WALES (*Genus Callitris*):—
- 44.—*Callitris Macleayana*, F.v.M.
- 45.—*Callitris verrucosa*, R.Br.
- 46.—*Callitris robusta*, R.Br.
- 47.—*Callitris columellaris*, F.v.M.
- 48.—*Callitris Muelleri*, Benth. et Hook., f.
- 49.—*Callitris propinqua*, R.Br.
- 50.—*Callitris calcarata*, R.Br.
- 51.—*Callitris cupressiformis*, Vent.

### PART XIII. (Issued November, 1904.)

- 52.—THE MUGGA; A RED IRONBARK (*Eucalyptus sideroxylon*, A. Cunn.).
- 53.—THE NATIVE ELM (*Aphananthe philippinensis*, Planch.).
- 54.—THE BELAH (*Casuarina lepidophloia*, F.v.M.).
- 55.—THE WESTERN ROSEWOOD (*Heterodendron oleæfolium*, Desf.).

### PART XIV. (Issued February, 1905.)

- 56.—THE GRUIE OR COLANE (*Owenia acidula*, F.v.M.).
- 57.—THE BLACK SALLY (*Eucalyptus stellulata*, Sieb.).
- 58.—THE SWAMP OAK (*Casuarina glauca*, Sieb.).
- 59.—A DECIDUOUS FIG (*Ficus Hennesseeana*, Miquel).

(N.B.—The numbers of Part XIV are given erroneously in the text)

### PART XV. (Issued March, 1905.)

- 60.—THE BLACKWOOD (*Acacia melanoxyton*, R.Br.).
- 61.—A WHITE OR CABBAGE GUM (*Eucalyptus coriacea*, A. Cunn.)
- 62.—THE RIVER OAK (*Casuarina Cunninghamiana*, Miq.).
- 63.—THE WESTERN WHITEWOOD (*Atalaya hemiglauca*, F.v.M.).

### PART XVI. (Issued June, 1905.)

- 64.—THE WEEPING MYALL (*Acacia pendula*, A. Cunn.).
- 65.—A PEPPERMINT (*Eucalyptus amygdalina*, Labill.).
- 66.—THE FOREST OAK (*Casuarina torulosa*, Ait.).
- 67.—THE IVORY WOOD (*Siphonodon australe*, Benth.).

### PART XVII. (Issued October, 1905.)

- 68.—THE DROOPING SHE-OAK (*Casuarina stricta*, Ait.).
- 69.—THE RIVER WHITE GUM (*Eucalyptus numerosa*, Maiden).
- 70.—THE NATIVE TEAK (*Flindersia australis*, R.Br.). (Two Plates.)

### PART XVIII. (Issued November, 1905.)

- 71.—THE CUDGERIE (*Flindersia Schottiana*, F.v.M.). (Two Plates.)
- 72.—THE GIANT GUM TREE (*Eucalyptus regnans*, F.v.M.).
- 73.—THE BLACK SHE-OAK (*Casuarina suberosa*, Otto et Dietr.).

### PART XIX. (Issued January, 1906.)

- 74.—THE YELLOW-WOOD (*Flindersia Oxleyana*, F.v.M.). (Two Plates.)
- 75.—THE BROAD-LEAVED PEPPERMINT (*Eucalyptus dives*, Schauer)
- 76.—THE BULL OAK (*Casuarina Luehmanni*, R. T. Baker).

### PART XX. (Issued July, 1906.)

Recapitulatory. (Sixteen plates.)

THE FOREST FLORA  
OF  
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the  
Botanic Gardens, Sydney

PART L.

*Published by the Forest Department of New South Wales, under authority of  
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### NOTICE TO SUBSCRIBERS.

THIS Part 50 completes the 5th Volume, and contains, as usual, some supplementary notes, to keep the work up to date; also 17 photographic illustrations and 3 lithographs. An Index to the 5th Volume will be supplied with Part 51.

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*Eucalyptus ochrophloia*, F.v.M.

Napunyah.

(Family MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, p. 33.)

**Botanical description.**—Species, *E. ochrophloia*, F.v.M., in *Fragm.* XI, 36 (1878).

It may be described in the following words :—

It has clean limbs, but at the base of the trunk it is very rough, scaly, peeling off, and very black. (Murphy). A Gum, sometimes with dark red bark on limbs and black on butt, or brownish yellow.

Branches slightly angular, scantily leaved.

*Juvenile leaves* lanceolate, narrower than the mature foliage.

*Mature leaves* falcate or oblong-lanceolate, 4 to 6 inches long, often between two-thirds and an inch wide, shining green on both sides, irregularly pellucid dotted, with not much spreading veins and anastomosing veinlets, the marginal vein remote from the margin.

*Umbels* axillary, solitary, or crowded-corymbose.

*Pedicels* longer than the not-dilated peduncle, gradually merging into the rather long obconical slightly quadrangular calyx-tube.

*Flowers.*—Operculum conical, acute, hardly half as long as the calyx-tube. Outer stamens anantherous; anthers broad, widening to the base, opening in parallel slits; gland on the top; filament at base; variable in size and shape. Stigma hardly thicker than the style.

*Fruits* clavate-ovate, truncate, about half an inch long, 3- or rarely 4-celled, the mouth of the margin thin, much elongated beyond the valves. (Adapted from original description, with additions.)

**Botanical Name.**—*Eucalyptus*, already explained (see Part II, p. 34); *ochrophloia*, from two Greek words, *ochros*, pale, and *phloia*, bark, referring to the pale-coloured bark.

**Vernacular Names.**—“Yellow Jacket.” This in allusion to the yellow cast of the bark, but the tree is not to be confused with better known “Yellow Jackets” (e.g., *E. melliodora*).

**Aboriginal Names.**—“Napunyah” is the common name, but there are variants of this. It shares this name with *E. Thozetiana*, and that species also has names variously spelt and pronounced. “Yappunyah” is one of these variants. “Yipunyah” is another spelling I have seen, while Mr. Dalton, of Wanaaring, gave me the unusual spelling of “Kappundya.” What the actual meaning of the word is, I do not know.

**Leaves.**—The Editor of the *Pastoralists' Review*, Sydney, wrote me in November, 1904, concerning this tree, stating that pastoralists had found it of immense value for feeding stock in droughty times, and that Messrs. Christian, of Brindingabba, in the Wanaaring district, had brought the tree under his notice.

Shortly afterwards the following letter appeared in the *Stock and Station Journal*, of Sydney, under date 9th December, 1904 :—

Department of Mines and Agriculture,  
Sydney, December 3, 1904.

Sir,—Referring to your letter of the 10th ult., forwarding extract from a letter from Mr. A. E. Christian, of Brindingabba, together with specimens of the plant "Yapunyah," or "Napunyah," for analysis, I am directed to inform you that Mr. F. B. Guthrie, Chemist, of this Department, reports :—

	per cent.
Moisture ... ..	7.01
Ash ... ..	.77
Fibre ... ..	9.71
Albuminoid ... ..	7.62
Carbohydrates ... ..	66.19
Ether Extract (fat or oil) ... ..	8.70
	100.00
Nutritive value ... ..	93.3
Albuminoid ratio ... ..	1 to 11.2

Remarks : The sample as received for analysis was very dry, and, in comparing the analysis with those of other fodders, allowance will have to be made for this fact.

The fibre is very low, and the above leaves should be a very nutritious food.

A pamphlet giving analyses of other plants for comparison is enclosed.—Yours, etc.,

WALTER S. CAMPBELL,  
Director of Agriculture.

A. Muggridge, Esq.,  
Messrs. Pitt, Son, and Badgery, Ltd.,  
Sydney.

Mr. W. H. Clarke, then Editor of the *Agricultural Gazette of N.S.W.*, wrote on behalf of Mr. William Christie, sending some twigs from the Maranoa district, Western Queensland.

The leaves and blossoms are reported to be not only a good sheep food in themselves, but good also to use with more astringent scrub. Mr. Christie has fed thousands of sheep, and is now feeding a great many, on this "Napunyah" foliage.

In view of the possibility of sheep-owners in some districts having again to feed their sheep on scrub, many pastoralists would be interested in a report as to the identity of "Napunyah."

Eucalyptus leaves must always be looked upon as famine food ; at the same time, western sheep have often to put up with fare that their more favoured relations in the central and eastern divisions would turn up their noses at.

Reference to Eucalyptus Leaves for Fodder will be found in the *Gazette* for June, 1899, p. 496, and for August, 1903, p. 765.

There is no doubt that Napunyah leaves did good service at a time when they were badly wanted, and careful record should be made of all Eucalyptus trees which yield fodder. We have problems to solve as to their identity yet, and if friends would send twigs (showing buds, flowers or fruit, or all three), together with precise locality and date of collection, the matter will be followed up.



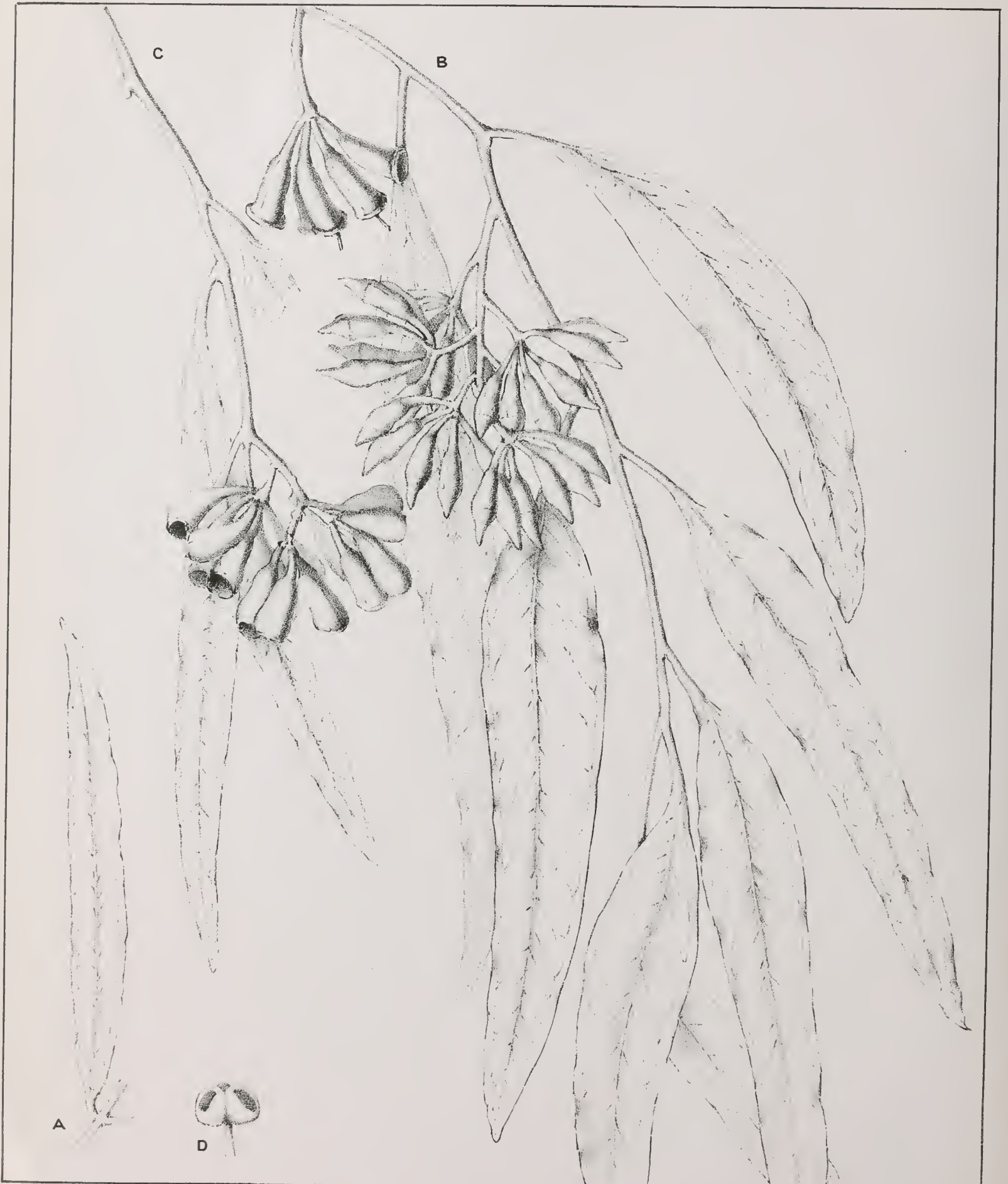


A. W. Mullen, photo.

"YIPUNYAH" (*Eucalyptus ochrophloia*, F.v.M.), PAROO FLATS N.S.W.







M. Fleckton del et lith.

NAPUNYAH.

(*Eucalyptus ochrophloia*, F.v.M.)

**Timber.**—Of a brownish colour, hard, heavy and close-grained.

Yappunya, or Yappundya, is a very useful timber for shafts, undercarriages of drays and waggons, and any heavy work; also good for house-blocks and posts. Some posts I know of have been used about forty years in a stockyard, being once shifted when about twenty years in first yard, and at the present time quite sound. It is a very close grained wood, and will not break, but splinters. It is hard to get straight, as it grows very crooked. A good firewood, as it burns away to ash and leaves no charcoal. I have a picture-frame made from ring kappundya, which is very much admired. (R. J. Dalton, Wanaaring).

“It is the toughest timber of the district; you cannot break it. It is used for buggy-shafts, &c.” (A. Murphy, then on Paroo.)

“A valuable and durable building and fencing timber.” (A. W. Mullen.)

**Size.**—Originally described as a tree of 50 feet or less.

Has an erect trunk for 20-30 feet; it then branches off into a number of limbs. The trunks are up to 3 feet 6 inches in diameter. It has very drooping branches, almost like a willow, and this, conjoined with the straight trunk, gives the tree a peculiar appearance. (A. Murphy, speaking of the Paroo.)

“About 40 feet high.” (A. W. Mullen.)

**Habitat.**—The specimens originally described by Mueller came from the rivers Warrego and Paroo.

Mr. Surveyor A. W. Mullen says it grows on the grey soil of the Paroo flats.

Mr. A. Murphy, who collected it on the Paroo, speaks of it as growing along the river banks, on low, flat country, and very abundant. Yantabulla, Cuttaburra River.

“Found only on the Paroo and Cuttaburra, in New South Wales, on black or flooded soil.” (Mr. Surveyor A. W. Mullen.)

Tinapagee, Wanaaring. (R. J. Dalton.)

#### QUEENSLAND.

I have received it from the following localities:—Bulloo River (J. F. Bailey); near Thargomindah (Collector of F. M. Bailey); Maranoa district (ditto).

It is a dry-country species, and we require further observations as to its range, both in New South Wales and Queensland. As regards the former State, it has not been found east of the Darling, so far.

#### EXPLANATION OF PLATE 187.

- A. Sucker leaf, from Cuttaburra River, Yantabulla, N.S.W.
- B. Twig, with buds and young fruit.
- C. Ripe fruits.
- D. Anther.

#### PHOTOGRAPHIC ILLUSTRATION.

“Yipunyah” (*Eucalyptus ochrophloia*); grey soil, Paroo Flats, N.S.W. (Photo, A. W. Mullen, Bourke.)

No. 184.

*Acacia amœna*, Wendl.

(Family LEGUMINOSÆ : MIMOSEÆ.)

**Botanical description.**—Genus, *Acacia*. (See Part XV, p. 103.)**Botanical description.**—Species, *A. amœna*, Wendl.; *Commentatio de Acaciis Aphyllis*, Hannoveræ (1820).

The following is the original description:—

*A. inermis*, capitulis racemosis multifloris; petiolis, oblongis, basi valde attenuatis, margine antico glandulis pluribus; calyce quinquefido; germine tomentoso.

Habitat in Novâ Hollandiâ.

*Frutex* glaber, sexpedalis, cortice fusco; ramis teretibus, erecto-patentibus, nunc laevibus, nunc verrucosis, superne angulatis, striatis, viridibus.*Petioles* alterni, remotiusculi, patentes, oblongo-lanceolati, oblongi vel obovato-oblongi, subfalcati, basi valde attenuati, apice acuti, breviter obtuse mucronati, uninervi, subvenosi, marginati, margine saepe subundulato, antico glandulis binis vel ternis dentiformibus remotis instructo, bi-tripollicares et longiores, 3-6 lineas lati. Stipulae nullae.*Flores* capitati, lutei, bracteolis spatulatis breviter ciliatis interstincti. Capitula numerosa in racemos axillares, solitarios, petiolo triplo breviores collecta, multiflora semine *Viciae* paulo minora insidentia pedicellis duplo longioribus, basi, sicut pedunculus communis, bractea ovata, obtusa, minima in structis.*Calyx* brevissimus, monophyllus, quinquefidus, laciniis subcuneiformibus, leviter pubescentibus.*Corolla* pentapetala; petalis lanceolatis, acutis, glabris.*Stamina* numerosa, corolla longiora.*Germen* oblongum, albo-tomentosum. Stylus staminibus paulo longior, lateralis in geminis summitate.*Legumen*.....(v.v.)

Fortunately this description was accompanied by a fairly good drawing (Tab. IV, reproduced in Plate 188), which, however, represents the plant in flower and not in fruit. I have not been able to see the type specimen; I do not even know whether it was preserved.

Then we have the brief description of the *Prodromus*, in which De Candolle, who quotes and compares Sieber's specimens wherever he can, surmises that it may be Sieber's No. 452.

Bentham (B.Fl. ii, 366) says that the surmise is correct; in other words, that the *A. amœna* of Sieber (not of Wendl.) is *A. rubida* A. Cunn. The *Prodromus* description follows.

*A. amœna* (Wendl., *Diss.* n. 8. t.4) phyllodiis oblongis basi valde attenuatis uninerviis margine antico glandulis 1-3, capitulis racemosis, floribus 5-fidis. Hab. Nova Hollandia. Ad sequentem valde accedit sed racemi phyllodiis dimidio breviores. Petala 5 distincta et ovarium tomentosum.—Planta Sieb. pl. exs. nov.-holl. n. 452 (*A. rubida*, A. Cunn. J.H.M.) a Wendl.iana differe videtur phyllodiis vix marginatis antice 1-glandulosis. An eadem? (v.s.) (DC. *Prod.* 2 (1825), p. 452.)

Then we have Don, whose description is, as usual, based upon the *Prodromus* account.

*A. amœna* (Wendl. *Diss.* no. 8. t. 4.) phyllodia oblong, tapering much at the base, 1-nerved, bearing 1-3 glands in front on the upper margin; heads of flowers racemose; flowers 5-cleft. Native of New Holland. Very like the following species (*A. myrtifolia*), but differs in the racemes being one-half shorter than the phyllodia. Petals 5, distinct. Ovary tomentose. The plant under this name in Sieb. pl. exsicc. nov. holl. No. 452 differs from Wendland's in the phyllodia being scarcely margined, and only furnished with one gland in front on the upper margin, although perhaps the same.

*Pleasant Acacia.* Fl. April, June. Clt. 1820. Shrub, 4 to 6 feet. (Don's *Gen. Hist. Dichlamydeous Plants*, Vol. 2, p. 405.)

Here is Bentham's description, and it will be observed that he attributes specimens collected on the Laehlan and Macquarie Rivers by Fraser and Cunningham (presumably on Oxley's Expedition of 1817) to this species. These are comparatively dry country localities, whereas the others recorded for *A. amœna* are coastal mountain regions; the plants should be further examined. It will also be observed that these specimens are "ovario glabriusculo."

*A. amœna* (Wendl., *Diss.* 16. t. 4.), glabra, ramulis angulatis, phyllodiis oblique lanceolatis rectiusculis uncinato-mucronatis basi longe angustatis marginatis plerisque 2-3 glanduliferis nitidis uninerviis venis tenuibus, racemis phyllodio sub brevioribus, capitulis parvis 8-12-floris glabris, ovario glabriusculo. Phyllodia  $1\frac{1}{2}$ - $2\frac{1}{2}$  pollicaria, glandulis saepissime 2, a basi et inter sese distantibus. Near the Laehlan and Macquarie Rivers, *Fraser, Cunningham.* (Bentham, in Hooker's *London Journal of Botany*, Vol. 1, 356.)

Then Bentham describes it in the following words:—

A tall shrub, quite glabrous, young branches pubescent.

*Phyllodia* obliquely lanceolate or oblanceolate, straight or falcate, obtuse, or with a small recurved point, much narrowed towards the base, not very thick, 1-nerved, with nerve-like margins, and more or less distinctly veined, with 1, 2, or 3 often prominent distant marginal glands,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long on the flowering shoots, longer on the barren branches.

*Racemes* usually shorter than the phyllodia, with several small globular heads of about 8 to 12 flowers, mostly 5-merous.

*Sepals* short, broad, usually separating when the flower is fully out.

*Petals* 5, distinct, smooth, with prominent midribs.

*Pod* flat, straight or curved, with nerve-like margins, several inches long, 3 to 4 lines broad, not contracted between the seeds.

*Seeds* ovate, longitudinal; funicle dilated and reticulate from near the base, very long, extending round the seed, returning on the same side and bent back a third time, encircling the seed in a triple-fold, and thickened at the end into a fleshy aril, two-thirds the length of the seed. (B.Fl. ii, 366).

Bentham adds,—

The funicle completely encircling the seed a third time does not occur in any other species which I have been able to observe, and is in all the seeds I have examined of *A. amœna*; it remains, however, to be ascertained whether it is really so constant a character as it appears to be. (B.Fl. ii, 367).

Bentham's description, as far as the pods and seeds are concerned, applies both to *A. rubida* and to *A. amœna*.

The first part of the description applies to Wendland's plant, and could have been compiled largely from Wendland's figure. Bentham had not (to his knowledge) seen the pods of *A. rubida*.

**Botanical Name.**—*Acacia*, already explained. (See Part XV, p. 104); *amœna*, Latin, signifying "delightful to the eye," in one word, "pretty."

**Habitat, and some Botanical Notes.**—It is confined to the southern and eastern half of New South Wales and to north-eastern Victoria, so far as we know at present.

Turning to the localities given by Bentham (B.Fl. ii, 366) for *A. amœna*, I am of opinion that the Blue Mountains locality is probably that of *A. rubida*, where it is very common, while *A. amœna* has not been found on the Blue Mountains yet.

The Illawarra as a locality is somewhat vague; *A. rubida* certainly occurs there, while *A. amœna* may.

I have already stated my doubts as to the Lachlan and Macquarie Rivers as localities for *A. amœna*.

As regards the Victorian locality, Macalister River (Mueller), I have seen the specimen, which is in pod only, and believe it to be *A. rubida*.

I have been on the quest for *A. amœna* for many years, but failed to get specimens sufficiently near to Wendland's figure until Mr. Cambage sent me his Burragorang specimens in August, 1905. A specimen is figured in Plate 188, and comparison with Wendland's figure (Tab. IV) leaves no doubt in my mind that we have got Wendland's plant.

The Burragorang locality, or country similar to it nearer Sydney, was visited by botanists and collectors in ample time before the publication of Wendland's work (1820).

Then came the search for the pods. It was not convenient for Mr. Cambage to re-visit the locality again in pod-time until December, 1911, and his specimens enable me now to figure and describe the pods for the first time.

The phyllodes are scimitar-shaped, with (as regards Wendland's figure) usually two especially prominent glands.

The sepals are nearly half the length of the petals, bluntly-pointed spathulate, the upper portion and the angle (sometimes the angle is not very evident) densely covered with short hairs; the sepals usually separating when the flower is fully out. The ovary is densely pubescent.

The pods of *A. amœna* are about 5-6 cm. long and 1 cm. broad, constricted between the seeds, the valves shiny, the seeds longitudinally disposed, the funicle imperfectly and interruptedly encircling the seed two or three times and terminating in a club-shaped aril under the seed.

Mueller's description of *A. amœna*, Wendl., is in the following words:—

*Flowers rather few in each headlet.* Shrubby; phyllodia narrow or elongate-lanceolar, slightly curved, provided at the upper edge and distant from the base with one or two, or rarely three, prominent glandules; flower-heads small, in short racemes; fruit elliptic, or broad linear, flat; valves thin; seeds almost completely surrounded in a double line by the dark-brown funicle. (*Key System Vict. Plants*, i, 191.)



I have already discussed the localities given by Bentham in B. Fl. ii, 366, for *A. amœna*.

I believe the species to be confined to southern New South Wales and northern Victoria so far as we know at present, but it requires to be carefully sought for in order that additional localities may be recorded.

*A. amœna* is recorded by Bailey from the Glasshouse Mountains, Queensland, in his *Queensland Flora*, p. 489, but I am of opinion that the record should be expunged. Indeed, I think it extremely unlikely that the species extends as far north as Queensland.

I have it from the following localities :—

On high banks of the Wollondilly River, Upper Burragorang (No. 1258, flowers; No. 3095, fruits. R. H. Cambage). Also on the Kowmung.

Bowral to Bullio, flowers only. (R. H. Cambage and J.H.M.)

The following specimens are most probably *A. amœna*. I speak diffidently, because the material is incomplete.

Snowy River, Victorian side (Mueller, 1854). Phyllodes only.

Tombong, N.S.W., banks of the Snowy River. Phyllodes and young flower buds. The phyllodes, though a shade smaller, are remarkably like those of Wendlan's figure.

Buffalo Mountain, Victoria (C. Walter.) In flower. The phyllodes are longer than those of the Snowy River specimens. Buffalo Mountain, so far, is the only locality from which I have obtained both *A. rubida* and *A. amœna*.

#### The Affinity of *Acacia rubida* (A. Cunn.) and *Acacia amœna* (Wendl.)

The closest affinity of *A. amœna* (Wendl.), is with *A. rubida* (A. Cunn.). Bentham's surmise that *A. rubida* may be a variety of *A. amœna* is, like so many of his guesses when he has imperfect material, very shrewd. The two species are closely related, but I do not think they are conspecific, in view of the following evidence, which I do not think a more ample acquaintance with *A. amœna* will successfully overturn.

(a) Bipinnate foliage is commonly seen in *A. rubida*, and not in *A. amœna*.

(b) There is absence of reddish or reddish-brown foliage (foliage and phyllodes) as in *A. rubida*, or it is very rare.

(c) The phyllodes of *A. rubida* are usually longer and larger, while the glands are fewer and less prominent than in *A. amœna*.

(d) The ovary is smooth in *A. rubida*, and densely tomentose in *A. amœna*.

(e) The valves of the pod are narrower and more constricted between the seeds in *A. amœna*, not rather flat as in *A. rubida*; rather shiny in *A. amœna* and often glaucous in *A. rubida*.

Mr. R. H. Cambage, speaking of *A. amœna* on the Wollondilly River, says :—

The shrubs of *A. amœna* were rather smaller than those of *A. rubida*, but otherwise somewhat similar. I did not notice any reddish-brown cast.

No pinnate leaves were seen at all, and I do not think they would have escaped me if present.

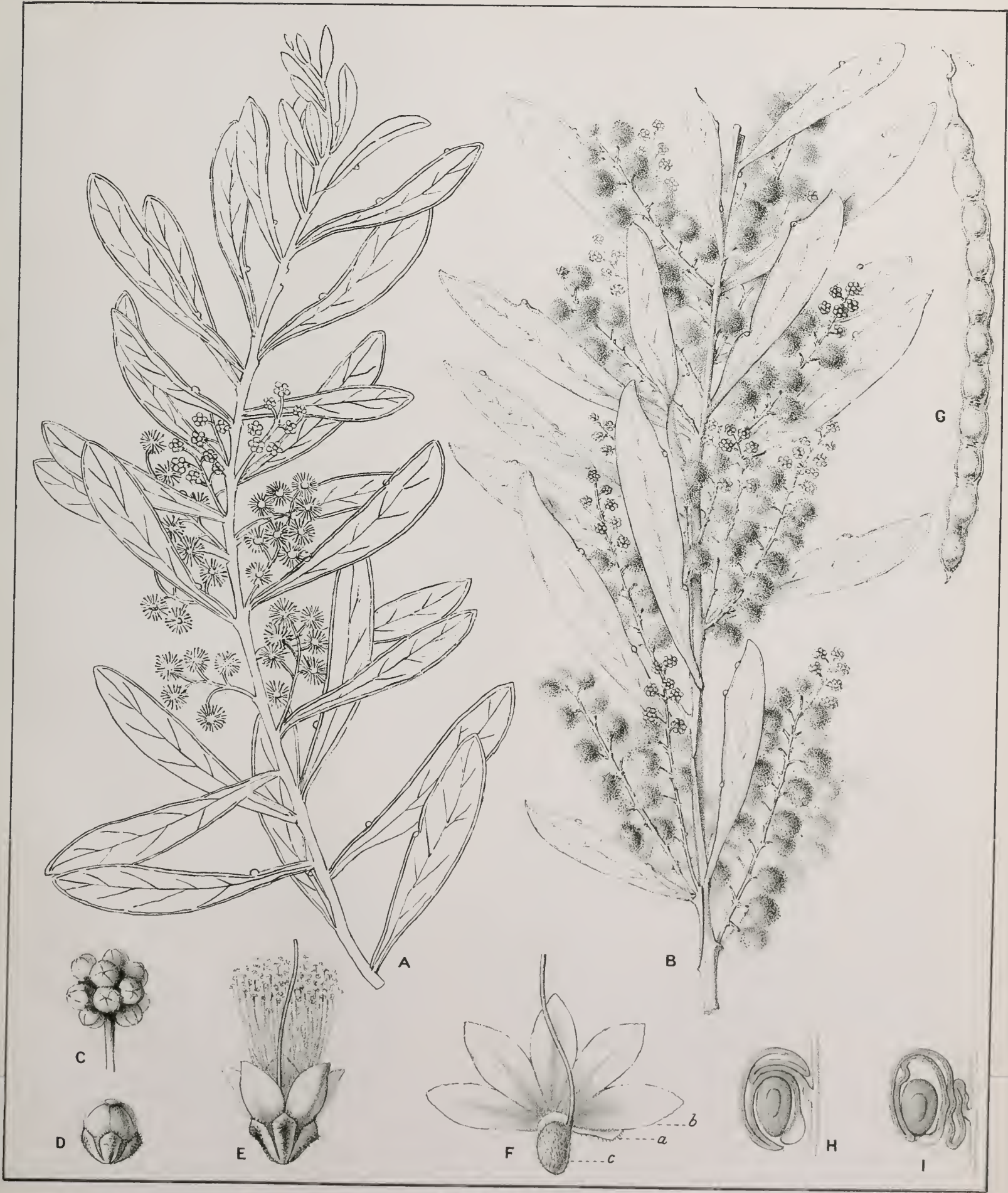
## EXPLANATION OF PLATE 188.

- A. Figure of type, being a facsimile of a plate in "Commentatio de Acaciis Aphyllis. H. L. Wendland. Hannoveræ, 1820.
- B. Twig from Wollondilly River, Burragorang, New South Wales. (R. H. Cambage, No. 1258.)
- C. Flower-head.
- D. Individual bud.
- E. Flower.
- F. Flower opened out, stamens removed, showing (a) calyx,  
(b) corolla,  
(c) pistil.
- G. Pod and seeds from Wollondilly River. (R. H. Cambage, No. 3196.)
- H. and I. Seeds.

## EXPLANATION OF PLATE 189.

This contains figures of three genera of plants, viz., *Grevillea*, *Endiandra*, *Acacia*.

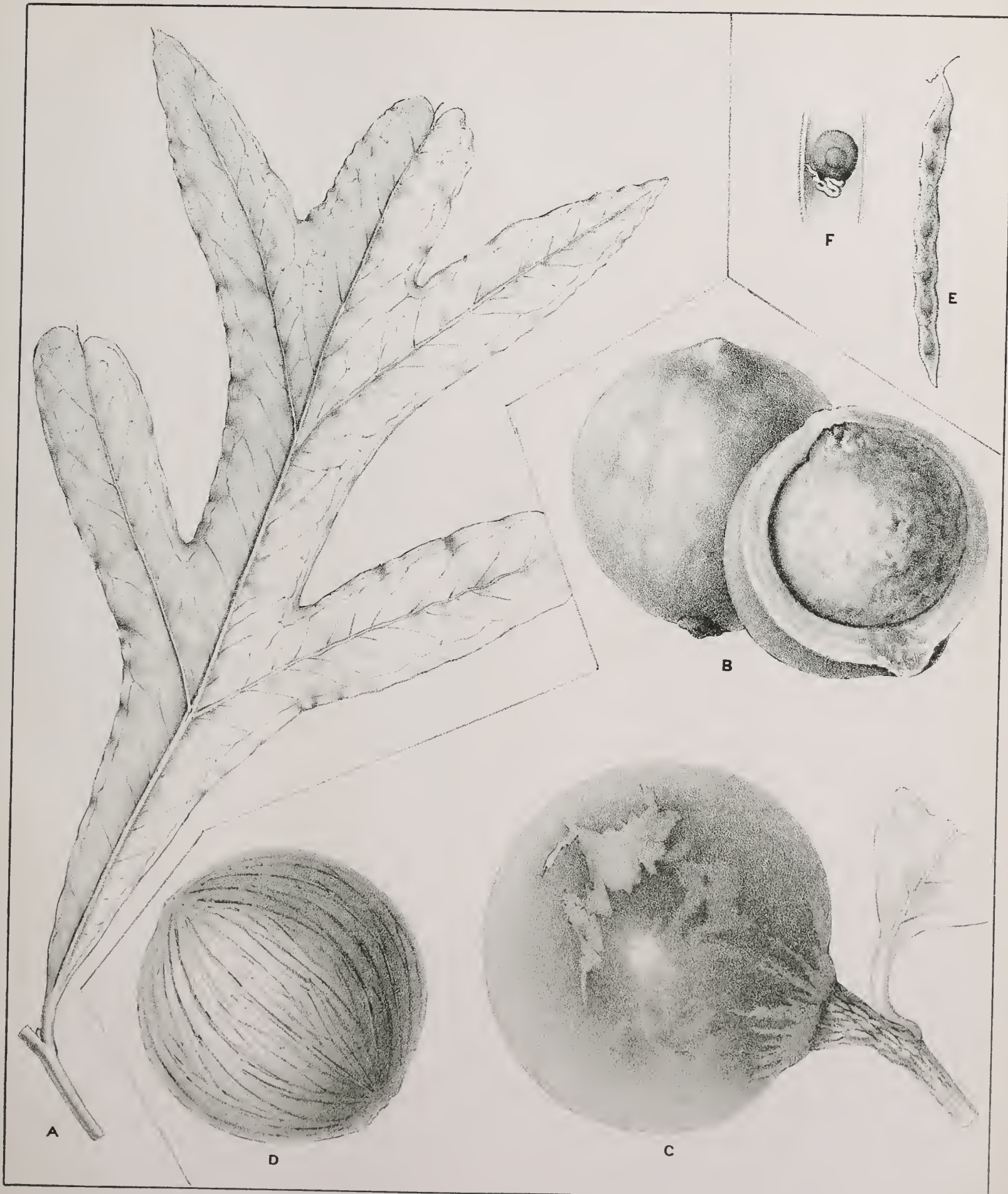
- A. Pinnatifid leaf of *Grevillea Hilliana*, bearing a label in Leichhardt's handwriting, from Dinangurumbin? B. B. (? Blackbutt) brush, Sept. 18th, '43. The specimen was named *Grevillea Hilliana* by Mueller, in his handwriting. To be compared with Plate 159, Part 43.
- B. Fruit of *Endiandra pubens* from Casino, New South Wales. The original is bright scarlet in colour, with yellow flesh. Compare with Plate 146, Part 38, where an unripe fruit is depicted.
- C. Fruit of *Endiandra globosa*, Maiden and Betehe, from Mullumbimby, New South Wales. The original is shiny black, flesh yellow.
- D. Endocarp of *E. globosa*, showing striate lines. Compare with Plate 138, Part 36, where an unripe fruit is depicted.
- E. and F. "Yarran" (*Acacia homalophylla*) pod and seed. Compare Part XXXV, Plate 133, figures G, H, K. Figure G is correct. Figures H and K are incorrect, the arillus being very different. E, the pod, and F, the seed (with arillus) of the present plate, are intended to replace the incorrect figures of Plate 133.



A WATTLE.  
(*Acacia amœna*, WENDL.)

M. FLOCHTON del. et lith.





M. Floerkhof del et lith.

A. GREVILLEA HILLIANA F.v.M. (leaf).  
 B. ENDIANDRA PUBENS, MEISSN. (fruit).  
 C and D. ENDIANDRA GLOBOSA, MAIDEN & BETCHE (fruit and endocarp).  
 E and F. ACACIA HOMALOPHYLLA, A. CUNN. (pod and seed.)



No. 1. Part I. See also vols. ii, p. 183; iv, p. 157.

*Grevillea robusta*, A. Cunn.

THE SILKY OAK.

(Family PROTEACEÆ).

In Part XX (vol. ii), p. 183, I drew attention to Leichhardt's observation of the acrid secretion from the seed-vessels of a *Grevillea* in the Northern Territory.

Dr. E. Mjoberg, the leader of the Swedish Scientific Expedition of 1910-11 to north-west Australia, informed me that the sap of two species of *Grevillea* is used by the natives to scarify their bodies, forming the scars they deem to be ornamental.

Following is an extract from a letter from Mr. Fellows, Curator of the Public Gardens, Albury, N.S.W.—

I have a man working here, who, whenever he has to work much in the trees of *Grevillea robusta*, gets inflammation of the eyelids; have you met with a similar case, or can you account for it in any way? No other tree causes him this inconvenience. I have asked our doctors about it, but none can account for it. By working in the trees I mean in the top of the tree, lopping or thinning out branches of the older trees. The sap is the trouble. We have some of these trees in the streets in this town; the trees make good growth here.

I have not heard of *Grevillea robusta* in this connection before. It is far better known as a planted tree (both in Australia and out of it) than in its native forests, and I would ask correspondents whether they have heard of its acidity.

I would invite attention to what I have said in regard to Irritant Woods in Part xlix, p. 174 of the present work.

No. 9. Part III. See also vols. ii, p. 188; iv, p. 159.

*Cedrela australis*, F.v.M.

THE RED CEDAR.

(Family MELIACEÆ.)

**Habitat.**—See vols. i, p. 59; ii, p. 189; iv, p. 160.

District Forester Swain, of Narrabri, says:—"I have found Red Cedar growing in the Parish of Vant, County Hawes. I am wondering whether this is not one of the most western localities in which it is known to grow." This is just north of the Upper Manning River.

No. 14. Part IV. See also vols. ii, p. 194; iii, p. 163; iv, p. 160.

*McLaleuca leucadendron*, L.

THE BROAD-LEAVED TEA TREE.

(Family MYRTACEÆ.)

**Timber.**—See vols. i, p. 96; ii, p. 194; iii, p. 163.

“No. 2. ‘Belbourie,’ or Broadleaf Tea-tree, makes excellent flooring and lining boards, wears well under cover and keeps white appearance; crooks made out of the roots very much used in building wooden vessels; grows to 7 or 8 feet girth, bark also in layers similar to White Prickly Tea-tree. Both kinds practically white-ant resistant.” (Forest Guard McKinnon, Gulgong.) This tree is the origin of the place-name “Belbourie,” between Gloucester and Tinonee.

No. 24. Part VII. See also vols. ii, p. 197; iv, p. 162.

*Castanospermum australe*, A. Cunn.

THE BLACK BEAN.

(Family LEGUMINOSÆ.)

There is an interesting paper entitled “The poisonous effects of the Black Bean (*Castanospermum australe*) on Cattle,” by S. T. D. Symons, M.R.C.V.S., Chief Inspector of Stock, in *Agric. Gaz. N.S.W.*, March 1911, p. 196.

No. 25. Part VII. See also vols. ii, p. 198; iv, p. 163.

*Eucalyptus maculata*, Hook.

THE SPOTTED GUM.

(Family MYRTACEÆ.)

PHOTOGRAPHIC ILLUSTRATIONS.

- (1) Giant Spotted Gum, Bodalla, South Coast, N.S.W.
  - (2) Spotted Gum Trees on the road to Bateman's Bay, South Coast.
  - (3) “Forest Twins.”—Spotted Gum (*E. maculata*) and Ironbark (*E. paniculata*). Moruya District, South Coast.
- (Photos presented by Mr. A. E. Dyer, Government Printing Office, Sydney, on behalf of the Government Printer.)

No. 28. Part VIII. See also vol. ii, p. 199.

*Eucalyptus paniculata*, Sm.

WHITE OR GREY IRONBARK.

(Family MYRTACEÆ.)

PHOTOGRAPHIC ILLUSTRATIONS.

A fine specimen of Ironbark tree, Nowra District.  
(Photo presented by Mr. A. E. Dyer, Government Printing Office, Sydney, on behalf of the Government Printer.)

“Grey Ironbark,” Wyong. Girth 12 feet, barrel 45 feet. (Photo, F. A. Kirton).

For a fuller botanical account of this species, see my *Crit. Rev. Genus Eucalyptus*, Part XIII.



No. 41. Part XI. See also vol. iii, p. 155.

*Angophora lanceolata*, Cav.  
THE SMOOTH-BARKED APPLE.  
(Family MYRTACEÆ).

PHOTOGRAPHIC ILLUSTRATIONS.

*Angophora lanceolata*, Wahroonga, near Sydney. (Photo, R. H. Cambage.)  
"Red Gum" (*Angophora lanceolata*), showing its branch used for a school bell. (Proprietors  
"Sydney Mail," Sydney.)

No. 43. Part XII. See also vol. ii, p. 203.

*Eucalyptus corymbosa*, Sm.  
THE BLOODWOOD.  
(Family MYRTACEÆ).

PHOTOGRAPHIC ILLUSTRATION.

"Red Bloodwood," near Jervis Bay, South Coast. (Photo presented by Mr. A. E. Dyer  
Government Printing Office, on behalf of the Government Printer.)

No. 62. Part XV. See also vols. ii, p. 210 ; iii, p. 169 ; iv, p. 166.

*Casuarina Cunninghamiana*, Miq.  
THE RIVER OAK.  
(Family CASUARINACEÆ).

PHOTOGRAPHIC ILLUSTRATION.

"River Oak." Wollondilly River, Burragorang Valley. (Photo, Kerry and Co.)

No. 81. Part XXII.

*Eucalyptus obliqua*, L'Herit.  
THE BROAD-LEAVED MESSMATE.  
(Family MYRTACEÆ).

PHOTOGRAPHIC ILLUSTRATION.

Stringybark forest (*E. obliqua*), Southern Tasmania. (Photo, — Beattie, Hobart.)

For a fuller botanical account of this species, see my *Crit. Rev. Genus Eucalyptus*, Part II.

No. 85. Part XXIII. See also vols. iii, p. 172; iv, p. 168.

*Acacia decurrens*, Willd.; var. *mollis*, Lindl.

(Family LEGUMINOSÆ: MIMOSÆÆ).

PHOTOGRAPHIC ILLUSTRATION.

*Acacia decurrens*, var. *mollis*, lining the banks of creek, Milton, N.S.W. Tall tree of *Eucalyptus botryoides* in the foreground. (Photo, R. H. Cambage.)

No. 88. Part XXIV. See also vol. iv, p. 168.

*Acacia penninervis*, Sieb.

THE MOUNTAIN HICKORY.

(Family LEGUMINOSÆ: MIMOSÆÆ).

PHOTOGRAPHIC ILLUSTRATION.

*Acacia penninervis*, var. *angustifolia*. "Black Wattle." Milton, N.S.W. (Photo, R. H. Cambage.)

No. 92. Part XXV. See also vol. iii, p. 173.

*Melia Azedarach*, L.; var. *australasica*, C. DC.

THE WHITE CEDAR.

(Family MELIACEÆ).

PHOTOGRAPHIC ILLUSTRATION.

A splendid "White Cedar," Cambewarra Mountain, South Coast (Photo presented by Mr. A. E. Dyer, Government Printing Office, Sydney, on behalf of the Government Printer.)

No. 112. Part XXXI. See also vol. iv, p. 170.

*Eucalyptus pilularis*, Sm.

THE BLACKBUTT.

(Family MYRTACEÆ.)

PHOTOGRAPHIC ILLUSTRATION.

"Blackbutt," Bateman's Bay, South Coast, N.S.W. (Photo presented by Mr. A. E. Dyer, Government Printing Office, Sydney, on behalf of the Government Printer.)

For a fuller botanical account of this species, see my *Crit. Rev. Genus Eucalyptus*, Part I.

No. 120. Part XXXIII.*Eucalyptus piperita*, Sm.

THE SYDNEY PEPPERMINT.

(Family MYRTACEÆ.)

PHOTOGRAPHIC ILLUSTRATION.

*Eucalyptus piperita*. Lindfield, near Sydney (Photo, R. H. Cambage).For a fuller botanical account of this species, see my *Crit. Rev. Genus Eucalyptus*, Part X.No. 155. Part XLIII.*Grevillea Hilliana*, F.v.M.

WHITE YIEL YIEL.

(Family PROTEACEÆ.)

PHOTOGRAPHIC ILLUSTRATION.

Tree in the Government Domain, Sydney, near the old Technological Museum. It is being tested as an avenue tree for the Sydney district.

Spikes of flowers cream-coloured.

No. 175. Part XLVIII.*Hakea dactyloides*, Cav.

A HAKEA.

(Family PROTEACEÆ.)

**Habitat.**—Mallacoota Inlet (C. C. Lacaita) is a Victorian locality for this species, recorded by Professor Ewart in *Proc. Roy. Soc. Vict.* xxii, 16 (1909).No. 182. Part XLIX.*Ceratopetalum gummiiferum*, Sm.

THE CHRISTMAS TREE OR BUSH.

(Family CUNONIACEÆ.)

**Habitat.**—Series of trees on the top cliff path between Echo Point, Katoomba, and the Meeting of the Waters, Leura,—about half way (T. D. Mutch).**Appendix (B) Part XXXVIII.**With reference to the Aboriginal method of producing fire (vol. 4, p. 135 of the present work), the following very early account of the method practised in using stems of *Xanthorrhœa* in Western Australia will be found interesting.“Method of getting fire from Blackboys” (Grass trees of the other States), J. Drummond in Hooker’s *Journ. of Bot.* ii, 345 (1840).

## A Critical Revision of the genus *Eucalyptus*.\*

THIS work is, like the present one, issued in Parts, and each Part also contains four plates (except Part IV, which contains twelve plates). It contains botanical details and critical observations which would be unsuitable for the present work, which is more of a popular character.

Of the New South Wales species of *Eucalyptus*, the following are dealt with in the "Critical Revision" (the number of the Part of which is given in brackets):—

<i>Eucalyptus acacioides</i> , A. Cunn. (XI). „ <i>acmenioides</i> , Schauer (IX). „ <i>affinis</i> , Deane and Maiden (XIII). „ <i>amygdalina</i> , Labillardière (VI). „ <i>Andrewsi</i> , Maiden (VII). „ <i>apiculata</i> , Baker and Smith (IX). „ <i>Baueriana</i> , Schauer (XIII). „ <i>Behriana</i> , F.v.M. (X). „ <i>bicolor</i> , A. Cunn. (XI). „ <i>Boormani</i> , Deane and Maiden (X). „ <i>Bosistoana</i> , F.v.M. (XI). „ <i>Caley</i> , Maiden (X). „ <i>calycogona</i> , Turczaninow (III). „ <i>capitellata</i> , Smith (VIII). „ <i>Consideniana</i> , Maiden (X). „ <i>coriacea</i> , A. Cunn. (V). „ <i>crebra</i> , F.v.M. (XII). „ <i>dives</i> , Schauer (VII). „ <i>eugenioides</i> , Sieber (VIII). „ <i>fruticetorum</i> , F.v.M. (XI). „ <i>Gillii</i> , Maiden (XV). „ <i>hamastoma</i> , Smith (X). „ <i>hemiphloia</i> , F.v.M. (XI). „ <i>incrassata</i> , Labillardière (IV). „ <i>leucooxylon</i> , F.v.M. (XII). „ <i>Luehmanniana</i> , F.v.M. (IX). „ <i>macrorrhyncha</i> , F.v.M. (VIII).	<i>Eucalyptus melanophloia</i> , F.v.M. (XII). „ <i>melliodora</i> , A. Cunn. (XIV). „ <i>microcorys</i> , F.v.M. (IX). „ <i>microtheca</i> , F.v.M. (XI). „ <i>Muelleriana</i> , Howitt (VIII). „ <i>obliqua</i> , L'Héritier (II). „ <i>ochrophloia</i> , F.v.M. (XI). „ <i>odorata</i> , Behr and Schlecht. (XI). „ <i>oleosa</i> , F.v.M. (XV). „ <i>paniculata</i> , Sm. (XIII). „ <i>pilularis</i> , Sm. (I). „ <i>piperita</i> , Sm. (X). „ <i>Planchoniana</i> , F.v.M. (IX). „ <i>polyanthemos</i> , Schauer (XIII). „ <i>populifolia</i> , Hooker (X). „ <i>regnans</i> , F.v.M. (VII). „ <i>Rudderi</i> , Maiden (XIII). „ <i>siderophloia</i> , Bentham (X). „ <i>sideroxylon</i> , A. Cunn. (XII). „ <i>Sieberiana</i> , F.v.M. (X). „ <i>Smithii</i> , R. T. Baker (XII). „ <i>stellulata</i> , Sieber (V). „ <i>umbra</i> , R. T. Baker (IX). „ <i>uncinata</i> , Turcz. (XIV). „ <i>virgata</i> , Sieber (IX). „ <i>vitellina</i> , Naudin (VII). „ <i>vitrea</i> , R. T. Baker (VII).
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\* Quarto. Government Printer, Sydney. Two shillings and sixpence a part (Part IV, six shillings). Part IV will be charged Two shillings and sixpence to subscribers only. For this work Mr. Maiden has received *Eucalyptus* specimens from the principal Herbaria throughout the world.



Gort, Printer, photo.

GIANT SPOTTED CUM (*Eucalyptus maculata*, Hook), BODALLA, N.S.W.



Govt. Printer, photo.

*Eucalyptus maculata*, Hook, BATEMAN'S BAY, N.S.W.



Govt. Printer, photo.

"FOREST TWINS." SPOTTED GUM (*Eucalyptus maculata*, Hook) AND IRONBARK  
(*Eucalyptus paniculata*, Sm.), MORUYA DISTRICT, N.S.W.



Gort. Printer, photo.

*Eucalyptus peniculata*, SM., NOWRA DISTRICT, N.S.W





R. H. Combage, photo.

*Angobhora lanceolata* Cav., WAHROONGA, NEAR SYDNEY.



F. A. Kirtton, photo.

"GREY IRONBARK" (*Eucalyptus paniculata*, Sm.), WYONG, N.S.W.



"RED GUM" (*Angophora lanceolata*, Cav.).  
SHOWING BRANCH USED FOR A SCHOOL BELL



Govt. Printer, photo.

"RED BLOODWOOD" (*Eucalyptus corymbosa*, SM.), JERVIS BAY, N.S.W.



Kerry & Co., photo.

"RIVER OAK" (*Casuarina Cunninghamiana*, Miq.), WOLLONDILLY RIVER, N.S.W.



Beattie, photo.

STRINGYBARK FOREST (*Eucalyptus obliqua*, L'HÉRIT), SOUTHERN TASMANIA.



R. H. Cambage, photo.

*Acacia decurrens*, VAR. *mollis*, LINING THE BANKS OF CREEK. TALL TREE OF *Eucalyptus botryoides*  
IN FOREGROUND MILTON, N.S.W.



R. H. Cambage, photo.

*Acacia penninervis*, SIEB., VAR. *angustifolia*, "BLACK WATTLE," MILTON, N.S.W.



Govt. Printer, photo.

"WHITE CEDAR" (*Melia Azedarach*, L, VAR. *australasica*, C. DC.), CAMBEWARRA MOUNTAIN,  
SOUTH COAST, N.S.W.



*Gord. Printer, photo.*

"BLACKBUTT" (*Eucalyptus pilularis*, Sm.), BATEMAN'S BAY, N.S.W.





*R. H. Cambage, photo.*

*Eucalyptus piperita*, SM., LINDFIELD, NEAR SYDNEY.



Govt. Printer, photo.

*Grevillea Hilliana*, F.V.M., GOVERNMENT DOMAIN, SYDNEY.

## Volume III (Parts XXI-XXX).

### PART XXI. (Issued August, 1906.)

- 77.—THE CROW'S ASH OR BOGUM BOGUM (*Flindersia Bennettiana*, F.v.M.). (*Two Plates*.)  
 78.—THE BLACKBUTT OR PEPPERMINT (of New England) (*Eucalyptus Andrewsii*, Maiden).  
 79.—THE THREADY-BARKED OAK (*Casuarina inophloia*, F.v.M. and Bailey).

### PART XXII. (Issued February, 1907.)

- 80.—THE HILL FLINDERSIA (*Flindersia collina*, F. M. Bailey). (*Two Plates*.)  
 81.—THE BROAD-LEAVED MESSMATE (*Eucalyptus obliqua*, L'Hérit.).  
 82.—THE CEDAR WATTLE (*Acacia elata*, A. Cunn.).

### PART XXIII. (Issued March, 1907.)

- 83.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.).  
 84.—THE WHITE-TOP MESSMATE (*Eucalyptus vitrea*, R. T. Baker).  
 85.—THE ACACIA DECURRENS GROUP OF WATTLES—BLACK, GREEN, AND SILVER WATTLES (*Acacia decurrens*, Willd.). (*Two Plates*.)

### PART XXIV. (Issued May, 1907.)

- 86.—THE BASTARD PENCIL CEDAR (*Dysoxylon rufum*, Benth.).  
 87.—BASTARD TALLOW-WOOD (*Eucalyptus Planchoniana*, F.v.M.).  
 88.—THE MOUNTAIN HICKORY (*Acacia penninervis*, Sieb.). (*Two Plates*.)

### PART XXV. (Issued June, 1907.)

- 89.—THE ROSEWOOD (*Dysoxylon Fraseranum*, Benth.), also THE APPLE-TREE OF LORD HOWE ISLAND (*D. pachyphyllum*, Hemsl.).  
 90.—A VIRGATE EUCALYPT (*Eucalyptus virgata*, Sieb.).  
 91.—THE TWO-VEINED HICKORY (*Acacia binervata*, DC.).  
 92.—THE WHITE CEDAR (*Melia Azedarach*, L., var. *australasica*, C. DC.).

### PART XXVI. (Issued September, 1907.)

- 93.—THE HAIRY DYSOXYLON (*Dysoxylon Becklerianum*, C.DC.).  
 94.—LUEHMANN'S GUM (*Eucalyptus Luehmanniana*, F.v.M.).  
 95.—THE MULGA (*Acacia aneura*, F.v.M.).  
 96.—THE RED-WOODED CRYPTOCARYA (*Cryptocarya erythroxyton*, Maiden and Bêche).

### PART XXVII. (Issued October, 1907.)

- 97.—THE RED BEAN (*Dysoxylon Muellieri*, Benth.).  
 98.—RED STRINGYBARK (*Eucalyptus macrorrhyncha*, F.v.M.).  
 99.—A BRUSH IRONBARK (*Acacia aulacocarpa*, A. Cunn.).  
 100.—A BROWN BEECH (*Cryptocarya glaucescens*, R.Br.).

### PART XXVIII. (Issued December, 1907.)

- 101.—A BOG ONION (*Amoora nitidula*, Benth.).  
 102.—THE BROWN STRINGYBARK (*Eucalyptus capitellata*, Sm.).  
 103.—THE BROAD-LEAVED WATTLE (*Acacia pycnantha*, Benth.).  
 104.—THE MURROGUN (*Cryptocarya microneura*, Meissn.).

### PART XXIX. (Issued January, 1908.)

- 105.—THE BASTARD ROSEWOOD (*Synoum glandulosum*, A. de Jussieu).  
 106.—A WHITE STRINGYBARK (*Eucalyptus eugenioides*, Sieb.).  
 107.—BAKER'S WATTLE (*Acacia Bakeri*, Maiden).  
 108.—THE STINKING CRYPTOCARYA (*Cryptocarya fætiæ*, R. T. Baker)

### PART XXX. (Issued March, 1908.)

- Recapitulatory. (Seventeen Photographic Illustrations).*
- 109.—THE YELLOW STRINGYBARK (*Eucalyptus Muellieriana*, Howitt)  
 110.—THE NEALIE (*Acacia rigens*, A. Cunn.).

## Volume IV (Parts XXXI-XL).

### PART XXXI. (Issued September, 1908.)

- 111.—THE ONION WOOD (*Owenia cepiodora*, F.v.M.).  
 112.—THE BLACKBUTT (*Eucalyptus pilularis*, Sm.).  
 113.—COOTAMUNDRA WATTLE (*Acacia Baileyana*, F.v.M.).  
 114.—GREY SASSAFRAS (*Cryptocarya australis*, Benth.).

### PART XXXII. (Issued November, 1908.)

- 115.—THE RED HONEYSUCKLE (*Banksia serrata*, L. f.).  
 116.—THE WHITE MAHOGANY (*Eucalyptus acmenioides*, Schauer).  
 117.—THE GIDGEE (*Acacia Cambagei*, R. T. Baker).  
 118.—*Cryptocarya patentinervis*, F.v.M.

### PART XXXIII. (Issued February, 1909.)

- 119.—A HONEYSUCKLE (*Banksia æmula*, R.Br.).  
 120.—THE SYDNEY PEPPERMINT (*Eucalyptus piperita*, Sm.).  
 121.—IRONWOOD (*Acacia excelsa*, Benth.).  
 122.—THE THREE-VEINED CRYPTOCARYA (*Cryptocarya triplinervis*, R.Br.).

### PART XXXIV. (Issued May, 1909.)

- 123.—THE HEATH-LEAVED HONEYSUCKLE (*Banksia ericifolia*, L.f.).  
 124.—YOWUT OR MOUNTAIN ASH (*Eucalyptus Sieberiana*, F.v.M.).  
 125.—THE BRIGALOW (*Acacia harpophylla*, F.v.M.).  
 126.—*Cryptocarya Meissneri*, F.v.M.

### PART XXXV. (Issued July, 1909.)

- 127.—RICHMOND RIVER OR HOOP PINE (*Araucaria Cunninghamii*, Ait.).  
 128.—BLACK STRINGYBARK (*Eucalyptus Baileyana*, F.v.M.).  
 129.—THE YARRAN (*Acacia homulophylla*, A. Cunn.).  
 130.—A CORK WOOD OR TILL (*Endiandra Sieberi*, Nees).

### PART XXXVI. (Issued October, 1909.)

- 131.—HONEYSUCKLE OR WARROCK (*Banksia marginata*, Cav.).  
 132.—THE YERTCHUK (*Eucalyptus Consideniana*, Maiden).  
 133.—THE BASTARD MYALL OR KURRACABAH (*Acacia Cunninghamii*, Hook.).  
 134.—THE BALL FRUIT (*Endiandra globosa*, Maiden and Bêche)

### PART XXXVII. (Issued January, 1910.)

- 135.—THE BROAD-LEAVED HONEYSUCKLE (*Banksia latifolia*, R.Br.)  
 136.—WHITE OR SCRIBBLY GUM (*Eucalyptus hamastoma*, Sm.).  
 137.—THE CURRAWANG (*Acacia doratoxylon*, A. Cunn.).  
 138.—ENDIANDRA MUELLERI, Meissn.

### PART XXXVIII. (Issued February, 1910.)

- 139.—A HONEYSUCKLE (*Banksia collina*, R.Br.).  
 140.—THE TALLOW-WOOD (*Eucalyptus microcorys*, F.v.M.).  
 141.—THE COAST MYALL (*Acacia glaucescens*, Willd.).  
 142.—*Endiandra pubens*, Meissn.

### PART XXXIX. (Issued June, 1910.)

- 143.—A HONEYSUCKLE (*Banksia spinulosa*, Sm.).  
 144.—THE BROAD-LEAVED IRONBARK (*Eucalyptus siderophloia*, Benth.).  
 145.—THE COOBA (*Acacia salicina*, Lindl.).  
 146.—TICK WOOD (*Endiandra discolor*, Benth.).

### PART XL. (Issued October, 1910.)

*Recapitulatory. (Fifty-seven Plates.)*

## Volume V (Parts XLI-L).

### PART XLI. (Issued November, 1910.)

- 147.—A HONEYSUCKLE (*Banksia paludosa*, R.Br.).  
148.—WESTERN PEPPERMINT (*Eucalyptus odorata*, Behr and Schlecht.).  
149.—A HICKORY (*Acacia implexa*, Benth.).  
150.—A WHITE APPLE (*Endiandra virens*, F.v.M.).

### PART XLII. (Issued February, 1911.)

- 151.—WESTERN BEEFWOOD (*Grevillea striata*, R.Br.).  
152.—BLUE MALLEE (*Eucalyptus fruticetorum*, F.v.M.).  
153.—THE FRINGED WATTLE (*Acacia fimbriata*, A. Cunn.).  
154.—OLIVER'S SASSAFRAS (*Cinnamomum Oliveri*, Bailey).

### PART XLIII. (Issued May, 1911.)

- 155.—WHITE YIEL YIEL (*Grevillea Hulliana*, F.v.M.).  
156.—BOSISTO'S BOX (*Eucalyptus Bosistoana*, F.v.M.).  
157.—THE PROMINENT GLANDED WATTLE (*Acacia prominens*, A. Cunn.).  
158.—NATIVE CAMPHOR LAUREL (*Cinnamomum virens*, R. T. Baker).

### PART XLIV. (Issued August, 1911.)

- 159.—GIPPSLAND WARATAH (*Telopea oreades*, F.v.M.).  
160.—BLACK OR FLOODED BOX (*Eucalyptus bicolor*, A. Cunn.).  
161.—THE BOX-LEAVED WATTLE (*Acacia buxifolia*, A. Cunn., including *A. lunata*, Sieb.).  
162.—*Litsea zeylanica*, Nees.

### PART XLV. (Issued October, 1911.)

- 163.—A RED SILKY OAK (*Embothrium Wickhami*, Hill and F.v.M., var. *pinnata*, Maiden and Betche).  
164.—A BLACK BOX (*Eucalyptus Boormani*, Deane and Maiden).  
165.—THE WESTERN SILVER WATTLE (*Acacia decora*, Reichb.).  
166.—SHE BEECH OR BOLLY GUM (*Litsea reticulata*, Benth.).

### PART XLVI. (Issued February, 1912.)

- 167.—THE WILLOW-LEAVED HAKEA (*Hakea saligna*, R.Br.).  
168.—THE BROAD-LEAF MALLEE (*Eucalyptus Behriana*, F.v.M.).  
169.—A WATTLE (*Acacia adunca*, A. Cunn.).  
170.—THE UGAULBIE (*Litsea hexanthus*, Juss.).

### PART XLVII. (Issued May, 1912.)

- 171.—A HAKEA (*Hakea eriantha*, R.Br.).  
172.—THE BIMBLE BOX (*Eucalyptus populifolia*, Hook.).  
173.—*Acacia obtusata*, Sieb.  
174.—*Litsea dealbata*, Nees.

### PART XLVIII. (Issued July, 1912.)

- 175.—A HAKEA (*Hakea dactyloides*, Cav.).  
176.—GREEN MALLEE (*Eucalyptus acacioides*, A. Cunn.).  
177.—HAMILTON'S WATTLE (*Acacia obtusata*, Sieb., var. *Hamiltoni*, Maiden).  
178.—COAST SHE-OAK (*Casuarina equisetifolia*, Forst., var. *incana*, Benth.).

### PART XLIX. (Issued August, 1912.)

- 179.—A WESTERN CORK-TREE (*Hakea lorea*, R.Br.).  
180.—THOZET'S GUM (*Eucalyptus Thozetiana*, F.v.M.).  
181.—RED-LEAVED WATTLE (*Acacia rubida*, A. Cunn.).  
182.—THE CHRISTMAS TREE OR BUSH (*Ceratopetalum gummiferum*, Sm.).







