A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

VOL. VII.
PARTS 61–70 (1923–28).

(WITH 40 PLATES.)

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

Sydney:
ALFRED JAMES KENT, I.S.O., GOVERNMENT PRINTER.
1929.
A Critical Revision of the genus Eucalyptus,

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII.

Parts 61–70 (1923–28).

(with 40 plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton"

Published by Authority of

The Government of the State of New South Wales.

Sydney:

ALFRED JAMES KENT, I.S.O., GOVERNMENT PRINTER, PHILLIP STREET.

1929.
INDEX.

[The names of Synonyms or Plants, &c., incidentally mentioned are in *italics*. The number of the page containing the description is printed in heavier type.]

<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aboriginal names</td>
<td>480</td>
</tr>
<tr>
<td>Aboriginal names, Seeds for food of</td>
<td>89</td>
</tr>
<tr>
<td>Additional descriptions of juvenile leaves</td>
<td>209</td>
</tr>
<tr>
<td>Additions to range of individual species</td>
<td>280</td>
</tr>
<tr>
<td>Aesthetic aspect of the genus Eucalyptus</td>
<td>337</td>
</tr>
<tr>
<td>Age and Area</td>
<td>351</td>
</tr>
<tr>
<td>Aid in the study of geography</td>
<td>395</td>
</tr>
<tr>
<td>Albany Blackbutt</td>
<td>374</td>
</tr>
<tr>
<td>Altitude—Distribution of species</td>
<td>337</td>
</tr>
<tr>
<td>Alveolatae Series—Seeds</td>
<td>151</td>
</tr>
<tr>
<td>Angles of secondary veins with midrib</td>
<td>204</td>
</tr>
<tr>
<td>Animals (native and other)—Enemies of Eucalyptus</td>
<td>35</td>
</tr>
<tr>
<td>Aphorisms, Some</td>
<td>445</td>
</tr>
<tr>
<td>Application of zoological tests to a botanical species</td>
<td>437</td>
</tr>
<tr>
<td>Area, Age and</td>
<td>351</td>
</tr>
<tr>
<td>Artificial production of vigorous trees by hybridisation</td>
<td>355</td>
</tr>
<tr>
<td>Australia in general—Distribution of Eucalyptists</td>
<td>318</td>
</tr>
<tr>
<td>Australian opinions on vernaculars, A few non-</td>
<td>473</td>
</tr>
<tr>
<td>Australian species cultivated abroad (Ceylon, India)</td>
<td>276</td>
</tr>
<tr>
<td>Australian species, Extra-</td>
<td>274</td>
</tr>
<tr>
<td>Bastard Gimlet</td>
<td>419</td>
</tr>
<tr>
<td>Use of the term</td>
<td>475</td>
</tr>
<tr>
<td>Blackbutt</td>
<td>404</td>
</tr>
<tr>
<td>Albany</td>
<td>374</td>
</tr>
<tr>
<td>Dundas</td>
<td>417</td>
</tr>
<tr>
<td>Black Yate</td>
<td>404</td>
</tr>
<tr>
<td>Bloodwood, Yellow</td>
<td>315</td>
</tr>
<tr>
<td>Blue-leaf Mallet</td>
<td>53</td>
</tr>
<tr>
<td>Botanical descriptions, etc., Eucalyptus schedule for</td>
<td>443</td>
</tr>
<tr>
<td>Botanical names for trade purposes, Use of the ideal, Use of</td>
<td>475</td>
</tr>
<tr>
<td>species, Application of zoological tests to a</td>
<td>437</td>
</tr>
<tr>
<td>travel, Preparation for</td>
<td>394</td>
</tr>
<tr>
<td>Botany, How to further the study of</td>
<td>400</td>
</tr>
<tr>
<td>Box</td>
<td>18</td>
</tr>
<tr>
<td>Ironbark</td>
<td>465</td>
</tr>
<tr>
<td>Grey</td>
<td>18</td>
</tr>
<tr>
<td>Gum-topped</td>
<td>462</td>
</tr>
<tr>
<td>Broad-leaf Messmate</td>
<td>2</td>
</tr>
<tr>
<td>Brown Barrel</td>
<td>2</td>
</tr>
<tr>
<td>Mallet</td>
<td>55</td>
</tr>
<tr>
<td>Bundling or tuftiness of the stamens</td>
<td>37</td>
</tr>
<tr>
<td>Chaff, Use of the term</td>
<td>90</td>
</tr>
<tr>
<td>Classical case of &quot;Splitting,&quot; A</td>
<td>437</td>
</tr>
<tr>
<td>Climate, Geological formations, soils, with incidental references to</td>
<td>340</td>
</tr>
<tr>
<td>Climographs, Definitions of Species arranged according to</td>
<td>242</td>
</tr>
<tr>
<td>Cochleatae Series—Seeds</td>
<td>168</td>
</tr>
<tr>
<td>Collecting seed of inferior species, Danger of...</td>
<td>85</td>
</tr>
<tr>
<td>Collector, Necessity for quoting the name of</td>
<td>396</td>
</tr>
<tr>
<td>Collectors of specimens, List of</td>
<td>387</td>
</tr>
<tr>
<td>Colour of the seed</td>
<td>97</td>
</tr>
<tr>
<td>Coloured Plates</td>
<td>208</td>
</tr>
<tr>
<td>Coolabah</td>
<td>18</td>
</tr>
<tr>
<td>Correlation of seedlings and juvenile leaves</td>
<td>206</td>
</tr>
<tr>
<td>Corymbosae Series—Seeds</td>
<td>108</td>
</tr>
<tr>
<td>Winged (Series Terminaliptera)</td>
<td>105</td>
</tr>
<tr>
<td>Non-winged (Series Naviculares)</td>
<td>109</td>
</tr>
<tr>
<td>Cotyledons</td>
<td>471</td>
</tr>
<tr>
<td>Curviptera Series—Seeds</td>
<td>117</td>
</tr>
<tr>
<td>Cut-tail</td>
<td>2</td>
</tr>
<tr>
<td>Cycle of intermediate leaves, A</td>
<td>307</td>
</tr>
<tr>
<td>Topic</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>D-shaped, Series Pyramidalcs</td>
<td>171</td>
</tr>
<tr>
<td>Definitions of Climographs</td>
<td>239</td>
</tr>
<tr>
<td>Demarcation between species, No fixed line of</td>
<td>434</td>
</tr>
<tr>
<td>Descriptions, etc., Eucalypts schedule for botanical</td>
<td>443</td>
</tr>
<tr>
<td>of seeds</td>
<td>105</td>
</tr>
<tr>
<td>Desirability of studying Eucalypts in the bush</td>
<td>391</td>
</tr>
<tr>
<td>Die's Law</td>
<td>386</td>
</tr>
<tr>
<td>Discal-lining</td>
<td>40</td>
</tr>
<tr>
<td>Disc of the flower</td>
<td>38</td>
</tr>
<tr>
<td>fruit</td>
<td>39</td>
</tr>
<tr>
<td>Distribution, Factors which influence Range or</td>
<td>336</td>
</tr>
<tr>
<td>of Eucalypts, Australia in general</td>
<td>318</td>
</tr>
<tr>
<td>New South Wales</td>
<td>325</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>335</td>
</tr>
<tr>
<td>Queensland</td>
<td>333</td>
</tr>
<tr>
<td>South Australia</td>
<td>322</td>
</tr>
<tr>
<td>Tasmania</td>
<td>323</td>
</tr>
<tr>
<td>Victoria</td>
<td>324</td>
</tr>
<tr>
<td>Western Australia</td>
<td>319</td>
</tr>
<tr>
<td>Effect of drought conditions on species—Altitude</td>
<td>337</td>
</tr>
<tr>
<td>Dundas Blackbutt</td>
<td>417</td>
</tr>
<tr>
<td>Ecology</td>
<td>396</td>
</tr>
<tr>
<td>Effect of rapidity of growth on timber</td>
<td>385</td>
</tr>
<tr>
<td>&quot;Eucalyptographia,&quot; Seeds figured by Mueller in</td>
<td>91</td>
</tr>
<tr>
<td>Eucalypts, Distribution of—Australia in general</td>
<td>318</td>
</tr>
<tr>
<td>New South Wales</td>
<td>325</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>335</td>
</tr>
<tr>
<td>Queensland</td>
<td>333</td>
</tr>
<tr>
<td>South Australia</td>
<td>322</td>
</tr>
<tr>
<td>Tasmania</td>
<td>323</td>
</tr>
<tr>
<td>Victoria</td>
<td>324</td>
</tr>
<tr>
<td>Western Australia</td>
<td>319</td>
</tr>
<tr>
<td>Effect of drought conditions on distribution of</td>
<td>349</td>
</tr>
<tr>
<td>Enemies of</td>
<td>23</td>
</tr>
<tr>
<td>Animals (native and other)</td>
<td>35</td>
</tr>
<tr>
<td>Epiphytes</td>
<td>28</td>
</tr>
<tr>
<td>Fungi</td>
<td>28</td>
</tr>
<tr>
<td>Hemi-epiphytes</td>
<td>28</td>
</tr>
<tr>
<td>Eucalypts, Enemies of—Meteorological (Frost, Snow, Wind)</td>
<td>23, 24</td>
</tr>
<tr>
<td>Miscellaneous (hand of man)</td>
<td>35</td>
</tr>
<tr>
<td>Parasites</td>
<td>24</td>
</tr>
<tr>
<td>Weeds</td>
<td>34</td>
</tr>
<tr>
<td>in the bush, Desirability of studying</td>
<td>394</td>
</tr>
<tr>
<td>Eucalyptus in a scheme of education, The value of the study of</td>
<td>399</td>
</tr>
<tr>
<td>schedule for botanical descriptions, &amp;c.</td>
<td>433</td>
</tr>
<tr>
<td>seeds, Vitality of</td>
<td>86</td>
</tr>
<tr>
<td>The aesthetic aspect of the genus</td>
<td>397</td>
</tr>
<tr>
<td>Eucalyptus Alcogiana (Description of seed)</td>
<td>108</td>
</tr>
<tr>
<td>acacioides A. Cunn.</td>
<td>12</td>
</tr>
<tr>
<td>accedens W. V. Fitzgerald</td>
<td>426</td>
</tr>
<tr>
<td>aconyoides (seed)</td>
<td>183</td>
</tr>
<tr>
<td>aconyoides Schauer var. tenusipes Maidan and Blakely</td>
<td>464</td>
</tr>
<tr>
<td>affinis (seed)</td>
<td>135</td>
</tr>
<tr>
<td>agglomerata Maiden</td>
<td>459, 460, 461</td>
</tr>
<tr>
<td>aggregata Dean and Maiden</td>
<td>427</td>
</tr>
<tr>
<td>aggregata (seed)</td>
<td>146</td>
</tr>
<tr>
<td>albens (seed)</td>
<td>135</td>
</tr>
<tr>
<td>albidia Maiden and Blakely</td>
<td>380</td>
</tr>
<tr>
<td>alpina Lindl.</td>
<td>459</td>
</tr>
<tr>
<td>astringens (seed)</td>
<td>174</td>
</tr>
<tr>
<td>altior (seed)</td>
<td>178</td>
</tr>
<tr>
<td>angulosa (seed)</td>
<td>184</td>
</tr>
<tr>
<td>angulosa Labill. var. nitida Benth.</td>
<td>21</td>
</tr>
<tr>
<td>angulosa Labill. var. nitida Baker and Smith, non Benth.</td>
<td>19</td>
</tr>
<tr>
<td>Andrewsii (seed)</td>
<td>188</td>
</tr>
<tr>
<td>angophoroides R. T. Baker</td>
<td>470</td>
</tr>
<tr>
<td>angustifolia (seed)</td>
<td>115</td>
</tr>
<tr>
<td>angusta Maiden</td>
<td>381, 403</td>
</tr>
<tr>
<td>Velenovsky</td>
<td>403</td>
</tr>
<tr>
<td>apiiculata Baker and Smith</td>
<td>9</td>
</tr>
<tr>
<td>aspera F.v.M.</td>
<td>432</td>
</tr>
<tr>
<td>astringens Maiden</td>
<td>54, 55, 60</td>
</tr>
<tr>
<td>Boulensis de Beuzeville and Welsh</td>
<td>376</td>
</tr>
<tr>
<td>Boulengeria (seed)</td>
<td>120</td>
</tr>
<tr>
<td>Baueriana Schauer</td>
<td>16</td>
</tr>
<tr>
<td>var. conica</td>
<td>466</td>
</tr>
<tr>
<td>Bauerleni F.v.M.</td>
<td>377</td>
</tr>
</tbody>
</table>
## INDEX

<table>
<thead>
<tr>
<th>Eucalyptus Baxteri Maiden and Blakely</th>
<th>PAGE</th>
<th>Eucalyptus corimbosa Sm.</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baxteri Maiden and Blakely var.</td>
<td>451</td>
<td>(seed)</td>
<td>66, 69</td>
</tr>
<tr>
<td>pedicellata</td>
<td>457</td>
<td>cosmophylla (seed)</td>
<td>159</td>
</tr>
<tr>
<td>Behriana (seed)</td>
<td>141</td>
<td>crebra F.v.M.</td>
<td>63, 64, 110, 370, 466</td>
</tr>
<tr>
<td>Bayeri R. T. Baker</td>
<td>64</td>
<td>crucis Maiden</td>
<td>406</td>
</tr>
<tr>
<td>biangularis Simmonds</td>
<td>382</td>
<td>(seed)</td>
<td>149</td>
</tr>
<tr>
<td>bicolor (seed)</td>
<td>111</td>
<td>Cullen R. H. Cambage</td>
<td>370</td>
</tr>
<tr>
<td>Blaxlandi Maiden and Cambage</td>
<td>458, 460</td>
<td>eugidiiflora Maiden and Blakely</td>
<td>411</td>
</tr>
<tr>
<td>(seed)</td>
<td>175</td>
<td>Dawsoni (seed)</td>
<td>139</td>
</tr>
<tr>
<td>Blaxsonci Maiden</td>
<td>315</td>
<td>dealbata A. Cunn.</td>
<td>366</td>
</tr>
<tr>
<td>(seed)</td>
<td>113</td>
<td>(seed)</td>
<td>165</td>
</tr>
<tr>
<td>Bosistoana F.v.M.</td>
<td>463</td>
<td>Deanei (seed)</td>
<td>162</td>
</tr>
<tr>
<td>Bosistoana (seed)</td>
<td>111</td>
<td>de Beauceriltei (seed)</td>
<td>177</td>
</tr>
<tr>
<td>botryoides (seed)</td>
<td>160</td>
<td>decipiens (seed)</td>
<td>150</td>
</tr>
<tr>
<td>buprestium (seed)</td>
<td>118</td>
<td>decures F.v.M.</td>
<td>17</td>
</tr>
<tr>
<td>(seed)</td>
<td>175</td>
<td>(seed)</td>
<td>121</td>
</tr>
<tr>
<td>Burracoppinis Maiden and Blakely</td>
<td>367</td>
<td>Desmondenisis Maiden and Blakely</td>
<td>425</td>
</tr>
<tr>
<td>(seed)</td>
<td>117</td>
<td>dickromaphloia (seed)</td>
<td>106</td>
</tr>
<tr>
<td>Calepyi Maiden</td>
<td>14</td>
<td>diptera Andrews</td>
<td>419</td>
</tr>
<tr>
<td>(seed)</td>
<td>138</td>
<td>diversicolor (seed)</td>
<td>121</td>
</tr>
<tr>
<td>calophylla (seed)</td>
<td>111</td>
<td>diversifolia (santalifolia F.v.M.) (seed)</td>
<td>174</td>
</tr>
<tr>
<td>var. rosea (seed)</td>
<td>110</td>
<td>dicis (seed)</td>
<td>184</td>
</tr>
<tr>
<td>Camfieldi (seed)</td>
<td>176</td>
<td>Dongerransisis Maiden and Blakely</td>
<td>371</td>
</tr>
<tr>
<td>Campaspe S. Le Moore</td>
<td>429</td>
<td>doratoxylan (seed)</td>
<td>151</td>
</tr>
<tr>
<td>canaliculata (seed)</td>
<td>159</td>
<td>Dorrienii Domini</td>
<td>17</td>
</tr>
<tr>
<td>capitellata Sm.</td>
<td>158</td>
<td>drecanopophylla F.v.M.</td>
<td>18, 379</td>
</tr>
<tr>
<td>(seed)</td>
<td>176</td>
<td>dumosa A. Cunn.</td>
<td>372, 405, 422</td>
</tr>
<tr>
<td>Sm. var. (1) latifolia Benth.</td>
<td>452</td>
<td>Dundasis Maiden</td>
<td>417, 422</td>
</tr>
<tr>
<td>Chisholmi Maiden and Blakely</td>
<td>61</td>
<td>Dunni (seed)</td>
<td>157</td>
</tr>
<tr>
<td>cinerea (seed)</td>
<td>158</td>
<td>Bayeri Maiden and Blakely</td>
<td>363</td>
</tr>
<tr>
<td>cinerea F.v.M. var. multiflora</td>
<td>467, 469</td>
<td>Ebbancensis Maiden</td>
<td>431</td>
</tr>
<tr>
<td>citriodora (seed)</td>
<td>111</td>
<td>chrophaora (seed)</td>
<td>156</td>
</tr>
<tr>
<td>cladocalyx F.v.M.</td>
<td>422</td>
<td>cremophila Maiden</td>
<td>412</td>
</tr>
<tr>
<td>(seed)</td>
<td>129</td>
<td>cremophila Maiden var. grandiflora</td>
<td>22</td>
</tr>
<tr>
<td>clavigera A. Cunn.</td>
<td>432</td>
<td>erythrocorys (seed)</td>
<td>167</td>
</tr>
<tr>
<td>(seed)</td>
<td>114</td>
<td>erythronema Turcz.</td>
<td>412</td>
</tr>
<tr>
<td>A. Cunn. var. Gilbertensis Maiden and Blakely</td>
<td>432</td>
<td>(seed)</td>
<td>122</td>
</tr>
<tr>
<td>Clelandi Maiden</td>
<td>406</td>
<td>euclideanoides F.v.M.</td>
<td>431</td>
</tr>
<tr>
<td>Cliftoniana (seed)</td>
<td>108</td>
<td>(seed)</td>
<td>116</td>
</tr>
<tr>
<td>Claziana (seed)</td>
<td>179</td>
<td>eugeniioides Sieb.</td>
<td>459</td>
</tr>
<tr>
<td>coracle Baker and Smith...</td>
<td>14</td>
<td>(seed)</td>
<td>185</td>
</tr>
<tr>
<td>corioblasta (R. Br.) Maiden</td>
<td>372, 420</td>
<td>var. (seed)</td>
<td>186</td>
</tr>
<tr>
<td>conica Deane and Maiden</td>
<td>63, 64, 466</td>
<td>eximia (seed)</td>
<td>111</td>
</tr>
<tr>
<td>Considenciaiana (seed)</td>
<td>179</td>
<td>exserta (seed)</td>
<td>165</td>
</tr>
<tr>
<td>coriacea (seed)</td>
<td>181</td>
<td>fabrum Schlecht.</td>
<td>456</td>
</tr>
<tr>
<td>coriata (seed)</td>
<td>118</td>
<td>falcat Turcz.</td>
<td>17</td>
</tr>
<tr>
<td>corrugata Lueh.</td>
<td>424</td>
<td>fuscoolosa (seed)</td>
<td>13</td>
</tr>
<tr>
<td>Eucalyptus fastigata Deane and Maiden</td>
<td>PAGE.</td>
<td>Eucalyptus ligustrina (seed)</td>
<td>PAGE.</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------</td>
<td>-----------------------------</td>
<td>------</td>
</tr>
<tr>
<td>(seed) ... ...</td>
<td>187</td>
<td>lirata (W. V. Fitzgerald) Maiden</td>
<td>186</td>
</tr>
<tr>
<td>ferruginea R. Br. ...</td>
<td>452</td>
<td>longicornis F.v.M.</td>
<td>120</td>
</tr>
<tr>
<td>(seed) ...</td>
<td>106</td>
<td>longifolia (seed)</td>
<td>...</td>
</tr>
<tr>
<td>fieifolia (seed) ...</td>
<td>106</td>
<td>var. multiforma (seed)</td>
<td>164</td>
</tr>
<tr>
<td>Fletcher R. T. Baker ...</td>
<td>16</td>
<td>Macartturi Deane and Maiden</td>
<td>427</td>
</tr>
<tr>
<td>focunda (seed) ...</td>
<td>123</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>Foelscheana F.v.M. ...</td>
<td>107</td>
<td>macrocarpa (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Forrestiana Diels ...</td>
<td>429</td>
<td>macrorrhyncha (seed)</td>
<td>...</td>
</tr>
<tr>
<td>fraxinoides (seed) ...</td>
<td>178</td>
<td>maculata Hook</td>
<td>...</td>
</tr>
<tr>
<td>Garderii Maiden ...</td>
<td>53, 57, 60</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>gigantea (seed) ...</td>
<td>172</td>
<td>maculosa R. T. Baker</td>
<td>112</td>
</tr>
<tr>
<td>Gillii (seed) ...</td>
<td>149</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>globulus (seed) ...</td>
<td>154</td>
<td>Maiden (seed)</td>
<td>...</td>
</tr>
<tr>
<td>gonophocphala (seed) ...</td>
<td>119</td>
<td>marginata Sm.</td>
<td>375</td>
</tr>
<tr>
<td>goniantha Turez. ...</td>
<td>424</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>goiocalyx (seed) ...</td>
<td>155</td>
<td>Sm. var. Serrii Maiden</td>
<td>374</td>
</tr>
<tr>
<td>gracilis (seed) ...</td>
<td>143</td>
<td>Melitrygeneis Maiden</td>
<td>...</td>
</tr>
<tr>
<td>grandifolia (seed) ...</td>
<td>113</td>
<td>megacarpa (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Gritfhisii Maiden ...</td>
<td>424</td>
<td>microcarpa (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Gullaicki Baker and Smith ...</td>
<td>373</td>
<td>microcarpa (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Gunnii (seed) ...</td>
<td>148</td>
<td>microphylla A. Cunn.</td>
<td>...</td>
</tr>
<tr>
<td>haeastoma (seed) ...</td>
<td>182</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>hemiphloia (seed) ...</td>
<td>135</td>
<td>Merrickia Maiden and Blakely</td>
<td>430</td>
</tr>
<tr>
<td>hypericifolia R. Br. ...</td>
<td>60</td>
<td>microcarpa DC.</td>
<td>...</td>
</tr>
<tr>
<td>incrassata Labill. ...</td>
<td>372</td>
<td>microcarpa (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Insizwaensis Maiden ...</td>
<td>383</td>
<td>microcarpa (seed)</td>
<td>...</td>
</tr>
<tr>
<td>intermedia R. T. Baker ...</td>
<td>66, 69</td>
<td>micronesia Maiden and Blakely</td>
<td>415</td>
</tr>
<tr>
<td>intertexta (seed) ...</td>
<td>136</td>
<td>microphylla A. Cunn.</td>
<td>...</td>
</tr>
<tr>
<td>Isingiana Maiden ...</td>
<td>410</td>
<td>microtheca F.v.M.</td>
<td>...</td>
</tr>
<tr>
<td>(seed) ...</td>
<td>115</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>Kalangadozensis Maiden and Blakely ...</td>
<td>404, 422</td>
<td>Mitchelliana (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Keselli Maiden and Blakely ...</td>
<td>423</td>
<td>Moorei (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Ksittoniana (seed) ...</td>
<td>157</td>
<td>Morrisii (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Koudinimnensis Maiden and Blakely ...</td>
<td>404, 422</td>
<td>Muelleriana (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Kruseana (seed) ...</td>
<td>147</td>
<td>Murphi Maiden and Blakely</td>
<td>466</td>
</tr>
<tr>
<td>lacopinius (seed) ...</td>
<td>177</td>
<td>Naudimiana F.v.M.</td>
<td>...</td>
</tr>
<tr>
<td>Lane-Poolci (seed) ...</td>
<td>148</td>
<td>neglecta (seed)</td>
<td>...</td>
</tr>
<tr>
<td>Laseroni (seed) ...</td>
<td>187</td>
<td>nitens (seed)</td>
<td>...</td>
</tr>
<tr>
<td>latifolia (seed) ...</td>
<td>106</td>
<td>nitida Hook. f.</td>
<td>...</td>
</tr>
<tr>
<td>Lehmanni (seed) ...</td>
<td>118</td>
<td>notabilis (seed)</td>
<td>...</td>
</tr>
<tr>
<td>leptophleba (seed) ...</td>
<td>134</td>
<td>Nueriensis Maiden</td>
<td>...</td>
</tr>
<tr>
<td>leptophyllo F.v.M. ...</td>
<td>381</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>(seed) ...</td>
<td>151</td>
<td>numerosa Maiden</td>
<td>...</td>
</tr>
<tr>
<td>leucocylou (seed) ...</td>
<td>138</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td>leucocylou F v M var. pallens Bent</td>
<td>14</td>
<td>nutans F.v.M.</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>obliqua L’Herit</td>
<td>...</td>
</tr>
<tr>
<td>Kruseana (seed) ...</td>
<td>147</td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>numerus Maiden</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(seed)</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>nutans F.v.M.</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>obliqua L’Herit</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(seed)</td>
<td>...</td>
</tr>
</tbody>
</table>
Eucalyptus obtusiflora (seed) ... ... 181
occidentalis Endl. ... ... 57
(see) ... ... 119
Endl. var. astringens
Maiden 56, 59
oxymitra
Diels ... 59
ochrophloia (seed) ... ... 124
odorata (seed) ... ... 142
var. calcicultrix (seed) ... ... 142
Oldfieldi F.v.M. ... ... 358
oleosa F.v.M. ... ... 177, 65, 418, 422
(see) ... ... 149
orbifolia F.v.M. ... ... 81
orgatophila Maiden and Blakely ... 462
ovata (seed)... ... 148
var. ovularis (seed)... ... 146
ovularis Maiden and Blakely ... 421
packyloma (seed) ... ... 169
packyphylla F.v.M. ... ... 368
paniculata (seed) ... ... 137
papuana (seed) ... ... 114
Parramattensis (seed) ... ... 165
parvifolia (seed) ... ... 147
patens (seed) ... ... 173
patellaris F.v.M. ... ... 408
patellaris (seed) ... ... 133
Peacocheana Maiden ... ... 354
pellita (seed) ... ... 163
peltata F.v.M. ... ... 316
(see) ... ... 112
Penrithensis (seed) ... ... 186
perfoliata (seed) ... ... 107
Perriniana (seed) ... ... 145
phellandria Baker and Smith ... ... 19
pilularis (seed) ... ... 180
var. pyriformis (seed) ... ... 180
Pimpiniana Maiden ... ... 410
piperita Sm. ... ... 61
(see) ... ... 179
Planchoniana (seed) ... ... 174
platypus Hooker ... ... 82
(see) ... ... 122
polyanthemos Schauer ... ... 16, 18
(see) ... ... 139
populifolia (seed) ... ... 140
Preissiana (seed) ... ... 173
propinqua (seed) ... ... 163

Eucalyptus pruinosa (seed) ... ... 134
pseudo-globulus (Hort.) Naudin ... ... 383
pychoorapu (seed) ... ... 107
pumila Cambage ... ... 366
(see) ... ... 160
punctata (seed) ... ... 159
pyriformis Turez. var. Romediano
Maiden ... ... 368
pyriformis (seed) ... ... 114
pyrophora (seed) ... ... 108
quadrangulata (seed) ... ... 150
radiata Sieb. ... ... 19, 20
radiata (seed) ... ... 184
rariflora (seed) ... ... 140
Ravertiana (seed) ... ... 143
redunca Schauer ... ... 6, 426
(see) ... ... 144
redunca Schauer var. angustisfolia
Benth. ... ... 5, 59
elata Benth. 54, 59
oxymitra
Maiden ... ... 59
regans F.v.M. ... ... 3
(see) ... ... 187
F.V.M. var. fastigata ... ... 1
resinifera (seed) ... ... 161
rigida Maiden ... ... 403
Risdoni Hook. f. var. elata Benth. ... ... 60
robusta (seed) ... ... 164
rostrata (seed) ... ... 166
rubida Deane and Maiden ... ... 379
(see) ... ... 145
rudis (see)... ... 166
Rydalensis Baker and Smith ... ... 427
saligna (seed) ... ... 161
salmonophloia (seed) ... ... 143
salubris F.v.M. ... ... 420
(see) ... ... 162
santalifolia F.v.M. var. (!) Baxter
Benth. ... ... 452
Sargentii Maiden ... ... 58
Schlechteri Diels ... ... 7
scoparia (seed) ... ... 146
sepulcralis F.v.M. ... ... 426
(see) ... ... 170
setosa (see) ... ... 105
Shirisii (see) ... ... 160
siderophloia Benth. ... ... 386
(see)... ... 138
var. (seed) ... ... 137
<p>| Eucalyptus siderophloia var. glauca (seed) | 139 |
| Eucalyptus sideroxylon (seed) | 138 |
| Eucalyptus sideroxylon A. Cunn. var. pullens Baker and Smith | 14 |
| Eucalyptus sideroxylon A. Cunn. var. pullens Benth. | 14 |
| Sieberiana F.v.M. (seed) | 10 |
| similis (seed) | 121 |
| Simmondsii (seed) | 188 |
| Smithii (seed) | 156 |
| Spathulata Hook | 6 |
| Spenceriana Maiden (seed) | 18, 1416 |
| Staigeriana F.v.M. (seed) | 317 |
| stellulata (seed) | 418 |
| stricta Sieb. (seed) | 9 |
| Sieb. var. rigida | 9 |
| Stuartiana F.v.M. (seed) | 467 |
| Studleyensis (seed) | 155 |
| taeniola (seed) | 185 |
| Taylori Maiden | 63 |
| tereticornis (seed) | 165 |
| terminalis (seed) | 108 |
| terminalis F.v.M. var. longipesfato Maiden and Blakely | 407 |
| tessellaris (seed) | 113 |
| tetragona (seed) | 116 |
| tetrapera (seed) | 116 |
| tetrodonta (seed) | 168 |
| Todtiana F.v.M. (seed) | 375 |
| torquata (seed) | 123 |
| trachyploia (seed) | 112 |
| umbra (seed) | 183 |
| unciata Turez. (seed) | 581 |
| unuiata (seed) | 154 |
| unigera Hook. | 383 |
| viminalis Labill. (seed) | 379, 414 |
| virgata Sieb. (seed) | 10, 11 |
| Eucalyptus viridis R. T. Baker | 12 |
| vitrea R. T. Baker (seed) | 4 |
| Watsoniana F.v.M. (seed) | 317 |
| Websteriana Maiden (seed) | 81 |
| Websteriana Maiden and Blakely | 413 |
| Whitei Maiden and Blakely | 369, 416 |
| Woodwardi (seed) | 152 |
| xanthomelum Turez. | 5, 59 |
| Evolution, the Leaf, with special reference to | 203 |
| Examination of organs and general appearance in the bush | 397 |
| Extra-Australian species | 274 |
| Factors which influenced range or distribution | 336 |
| Figures of intermediate leaves | 310 |
| Flimbriates, Series Lepidotae (Seeds) | 152 |
| Flower, Dis of the | 38 |
| Food of aborigines, Seeds for | 89 |
| Foveolatae Series (Seeds) | 144 |
| Fruit, Dis of the | 39 |
| Fungi—Enemies of Eucalypts | 28 |
| Geoeols | 338 |
| Geography, Aid in the study of | 395 |
| Geological formations, Soils, with some incidental references to climate | 340 |
| Genus, Variation in the | 438 |
| Gimlet | 420 |
| Bastard | 419 |
| Grey Box | 18 |
| Gum | 68 |
| Gum, Grey | 68 |
| River White | 20 |
| Spotted | 68 |
| Gum-topped Box | 462 |
| Hand-crushing of leaves for determination of species | 204 |
| Hemi-epiphytes—Enemies of Eucalypts | 28 |
| Heteroptera Series (Eudesmiae in part) (Seeds) | 115 |
| Hilum | 94 |
| How to designate the type | 440 |
| further the study of botany | 400 |
| Humanistic studies, Scientific and | 399 |
| Hybrids, Natural | 384 |
| Hybridisation, The artificial production of vigorous trees by | 385 |</p>
<table>
<thead>
<tr>
<th>INDEX.</th>
<th>PAGE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideal, Use of botanical name the</td>
<td>474</td>
</tr>
<tr>
<td>Ideal of the type, The</td>
<td>439</td>
</tr>
<tr>
<td>Individual species, Additions to range of</td>
<td>280</td>
</tr>
<tr>
<td>Industries parasitic on Science, The</td>
<td>400</td>
</tr>
<tr>
<td>Inequality of species values</td>
<td>434</td>
</tr>
<tr>
<td>Inflorescence, The</td>
<td>36</td>
</tr>
<tr>
<td>Intermediate leaf, The</td>
<td>306</td>
</tr>
<tr>
<td>leaves, a cycle of</td>
<td>307</td>
</tr>
<tr>
<td>Figures of</td>
<td>310</td>
</tr>
<tr>
<td>Ironbark</td>
<td>370</td>
</tr>
<tr>
<td>Box</td>
<td>465</td>
</tr>
<tr>
<td>Round-leaved</td>
<td>15</td>
</tr>
<tr>
<td>Stunted</td>
<td>14</td>
</tr>
<tr>
<td>Jack, Yellow</td>
<td>316</td>
</tr>
<tr>
<td>Jacket, Yellow</td>
<td>315, 316</td>
</tr>
<tr>
<td>Jordan's species</td>
<td>436</td>
</tr>
<tr>
<td>Juvenile leaves</td>
<td>205</td>
</tr>
<tr>
<td>Additional descriptions</td>
<td>209</td>
</tr>
<tr>
<td>Correlation of seedlings and</td>
<td>206</td>
</tr>
<tr>
<td>Terminology of</td>
<td>208</td>
</tr>
<tr>
<td>Kochioidea Series (Seeds)</td>
<td>114</td>
</tr>
<tr>
<td>Labels and schedules</td>
<td>443</td>
</tr>
<tr>
<td>Leaf, The</td>
<td>355</td>
</tr>
<tr>
<td>with special reference to evolution</td>
<td>203</td>
</tr>
<tr>
<td>intermediate</td>
<td>306</td>
</tr>
<tr>
<td>Leaves, intermediate, A cycle of</td>
<td>307</td>
</tr>
<tr>
<td>Figures of</td>
<td>310</td>
</tr>
<tr>
<td>Juvenile</td>
<td>205</td>
</tr>
<tr>
<td>Additional descriptions of</td>
<td>209</td>
</tr>
<tr>
<td>Correlation of seedlings and</td>
<td>206</td>
</tr>
<tr>
<td>Terminology of</td>
<td>208</td>
</tr>
<tr>
<td>Mature</td>
<td>205, 355</td>
</tr>
<tr>
<td>Levisperma Series (seeds)</td>
<td>144</td>
</tr>
<tr>
<td>List of collectors of specimens</td>
<td>387</td>
</tr>
<tr>
<td>Maiden, J. H., Obituary notice I, II, III just before 239</td>
<td></td>
</tr>
<tr>
<td>Mallee, Narrow-leaved</td>
<td>421, 430</td>
</tr>
<tr>
<td>Peeneri</td>
<td>65</td>
</tr>
<tr>
<td>White</td>
<td>411</td>
</tr>
<tr>
<td>Yellow-flowering</td>
<td>22</td>
</tr>
<tr>
<td>Mallet, Blue-leaf</td>
<td>53</td>
</tr>
<tr>
<td>Brown</td>
<td>55</td>
</tr>
<tr>
<td>Scrub</td>
<td>56</td>
</tr>
<tr>
<td>White</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INDEX.</th>
<th>PAGE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marlock</td>
<td>429</td>
</tr>
<tr>
<td>Mature leaves</td>
<td>205, 355</td>
</tr>
<tr>
<td>screw, Broad-leaf</td>
<td>2</td>
</tr>
<tr>
<td>White-top</td>
<td>2</td>
</tr>
<tr>
<td>Meteorological enemies of Eucalypts (front, snow, wind)</td>
<td>23, 24</td>
</tr>
<tr>
<td>Micromembrane Series (Seeds)</td>
<td>118</td>
</tr>
<tr>
<td>Mitrib, Angles of secondary veins with</td>
<td>204</td>
</tr>
<tr>
<td>Miscellaneous enemies of Eucalypts—hand of man</td>
<td>35</td>
</tr>
<tr>
<td>Morrel, Red</td>
<td>81</td>
</tr>
<tr>
<td>Muricatae Series</td>
<td>170</td>
</tr>
<tr>
<td>Narrow-leaved Mallee</td>
<td>431, 430</td>
</tr>
<tr>
<td>Natural hybrids</td>
<td>384</td>
</tr>
<tr>
<td>Necessity for quoting the name of a collector</td>
<td>396</td>
</tr>
<tr>
<td>New South Wales—Distribution of Eucalypts</td>
<td>325</td>
</tr>
<tr>
<td>Neuroptera Series (Seeds)</td>
<td>109</td>
</tr>
<tr>
<td>Non-Australian opinions on vernaculars</td>
<td>473</td>
</tr>
<tr>
<td>Northern Territory—Distribution of Eucalypts</td>
<td>335</td>
</tr>
<tr>
<td>Notes on species of apparently anomalous range</td>
<td>350</td>
</tr>
<tr>
<td>Obituary Notice, J. H. Maiden I, II, III just before 239</td>
<td></td>
</tr>
<tr>
<td>Old vernaculars</td>
<td>476</td>
</tr>
<tr>
<td>Pachysperma Series (Seeds)</td>
<td>167</td>
</tr>
<tr>
<td>Parasites—Enemies of Eucalypts</td>
<td>24</td>
</tr>
<tr>
<td>Peeneri Mallee</td>
<td>65</td>
</tr>
<tr>
<td>Peppermint, White Top</td>
<td>20</td>
</tr>
<tr>
<td>Poot</td>
<td>81</td>
</tr>
<tr>
<td>Preparation for botanical travel</td>
<td>394</td>
</tr>
<tr>
<td>Pyramidales-D-shaped Series (Seeds)</td>
<td>171</td>
</tr>
<tr>
<td>Queensland—Distribution of Eucalypts</td>
<td>333</td>
</tr>
<tr>
<td>Range or distribution, Factors which influence Papers on</td>
<td>318</td>
</tr>
<tr>
<td>Range. Notes on species of apparently anomalous</td>
<td>350</td>
</tr>
<tr>
<td>of individual species</td>
<td>280</td>
</tr>
<tr>
<td>Rapidity of growth on timber, Effect of</td>
<td>385</td>
</tr>
<tr>
<td>Red Morrel</td>
<td>81</td>
</tr>
<tr>
<td>River White Gum</td>
<td>20</td>
</tr>
<tr>
<td>Round-leaved Ironbark</td>
<td>15</td>
</tr>
<tr>
<td>Rufisperma Series (Seeds)</td>
<td>152</td>
</tr>
</tbody>
</table>
INDEX.

Schedules, Labels and ... ... ... 443
Science, The industries parasitic on ... ... ... 400
Scientific and humanistic studies ... ... ... 399
Scrub, Mallet ... ... ... 56
Sculture ... ... ... ... 95
Secondary veins with midrib, Angles of ... ... ... 204
Seed, The ... ... ... ... 84
Colour of ... ... ... ... 97
Size of ... ... ... ... 100
Wing of ... ... ... ... 92

Seeds, Description of ... ... ... ... 105
figured by Mueller in "Eucalyptographia" ... ... ... 91
for food of aborigines ... ... ... 89
of species not seen ... ... ... 104
Sterile ... ... ... ... 90

Seedlings and juvenile leaves, Correlation of ... ... ... 206

Series Alveolatae (Seeds) ... ... ... ... 151
Cochleatae ... ... ... ... 168
Corymbosa ... ... ... ... 108
Curviptera ... ... ... ... 117
Foveolatae ... ... ... ... 144
Heteroptera (Eudesmiæ in part) ... ... ... 115
Kochioideae ... ... ... ... 114
Lepidotaæ-Fimbriatae ... ... ... 152
Levispermae ... ... ... ... 144
Micromembranae ... ... ... ... 118
Muricatae ... ... ... ... 170
Naviculares (Non-winged Corymbosa) ... ... ... 109
Neuroptera ... ... ... ... 169
Pachysperme ... ... ... ... 167
Pyramidales-D-shaped ... ... ... 171
Rufisperme ... ... ... ... 152
Scutelliformes ... ... ... ... 119
Scutiformes ... ... ... ... 113
Striolatae ... ... ... ... 121, 133
Terminaliptera (Winged Corymbosa) ... ... ... 105

South Australia, Distribution of Eucalypts ... ... ... 322
Silver Top ... ... ... ... 2

Species arranged according to climographs ... ... ... 242
States ... ... ... 264
Additions to range of individual ... ... ... 280
Application of zoological tests to a botanical ... ... ... 437
Danger of collecting seed of an inferior ... 85
Distribution of —Altitude ... ... ... 337
Extra-Australian ... ... ... 274

Species Hand-crushing of leaves for determination of ... ... ... 204
Jordan's ... ... ... 436
No fixed line of demarcation between ... ... ... 434
of apparently anomalous range, Notes on ... ... 350
not seen, Seeds of ... ... ... 104
Question, The ... ... ... 433
Tropical ... ... ... ... 271
Values, Inequality of ... ... ... 454
Variety or ... ... ... ... 433
What is a ... ... ... 433

Specimens, List of collectors of "Splitting," A classical case of ... ... ... 437
Spotted Gum ... ... ... ... 68
Stamens, Bundling or tuftiness of the ... ... ... 37
Stocking Tree ... ... ... ... 404
Stringybark ... ... ... ... 3
Struggle for taxonomic definiteness, The ... ... ... 439
Stunted Ironbark ... ... ... ... 14

Tasmania—Distribution of Eucalypts ... ... ... 323
Taxonomic definiteness, The struggle for ... ... ... 439
Terminology of juvenile leaves ... ... ... 208
Testa ... ... ... ... 96
Timber, Effect of rapidity of growth on ... ... ... 385
Timbers, Vernacular names for ... ... ... 477
Tuftiness of the stamens, Bundling or ... ... ... 37
Type, How to designate the ... ... ... 440
The ideal of the ... ... ... 439

Use of botanical names for trade purposes ... ... ... 475
the ideal ... ... ... 474
the term "Bastard" ... ... ... 475
"Chaff" ... ... ... 90

Variation in the genus ... ... ... 438
Variety or species ... ... ... 433
Vernacular names ... ... ... 472
for timbers ... ... ... 477
Vernaculars, A few non-Australian opinions on Old ... ... ... 476
Victoria—Distribution of Eucalypts ... ... ... 324
Vitality of Eucalyptus seeds ... ... ... 86
<table>
<thead>
<tr>
<th>INDEX.</th>
<th>PAGE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeds—Enemies of Eucalypts</td>
<td>34</td>
</tr>
<tr>
<td>Western Australia—Distribution of Eucalypts</td>
<td>319</td>
</tr>
<tr>
<td>What is a species</td>
<td>433</td>
</tr>
<tr>
<td>White Gum, River</td>
<td>20</td>
</tr>
<tr>
<td>Mallee</td>
<td>411</td>
</tr>
<tr>
<td>Mallet</td>
<td>17</td>
</tr>
<tr>
<td>Top</td>
<td>2</td>
</tr>
<tr>
<td>Messmate</td>
<td>2</td>
</tr>
<tr>
<td>Peppermint</td>
<td>20</td>
</tr>
<tr>
<td>Wing of the Seed, The</td>
<td>92</td>
</tr>
<tr>
<td>Woolly Butt</td>
<td>2</td>
</tr>
<tr>
<td>Yate, Black</td>
<td>404</td>
</tr>
<tr>
<td>Yellow Bloodwood</td>
<td>315</td>
</tr>
<tr>
<td>flowering Mallee</td>
<td>22</td>
</tr>
<tr>
<td>Jack</td>
<td>316</td>
</tr>
<tr>
<td>Jacket</td>
<td>315, 316</td>
</tr>
<tr>
<td>Zoological tests to a botanical species, Application of</td>
<td>437</td>
</tr>
</tbody>
</table>

A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part I.

Part LXI of the complete work.

(WITH FOUR PLATES.)

Price Three Shillings and Sixpence.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER.

1923.
INDEX OF PARTS PUBLISHED.

| PART I | 1. E. pilularis Sm., and var. Muellerana Maiden. Plates, 1-4. (Issued March, 1903.) |
| PART II | 2. E. obliqua L. Heritier. Plates, 5-8. (Issued May, 1903.) |
| PART VI | 6. E. stellulata Seber. Plates, 29-32. (Issued April, 1905.) |
| PART IX | 9. E. capitellata Sm. Plates, 41-44. (Issued November, 1906.) |
| PART X | 10. E. piperita Sm. Plates, 45-48. (Issued December, 1908.) |

| PART XI | 11. E. bovinotoma E. F. M. Plates, 49-52. (Issued February, 1910.) |

| PART XII | 50. E. Ravehiana F. M. Plates, 53-56. (Issued November, 1910.) |
| PART XIII | 51. E. crebra F. M. Plates, 57-60. (Issued July, 1911.) |
| PART XIV | 52. E. stelligera F. M. Plates, 61-64. (Issued March, 1912.) |
| PART XVI | 54. E. dactylos Sm., var. floccosata Maiden. Plates, 69-72. (Issued September, 1912.) |

| PART XVII | 55. E. longifolia Hook. f. Plates, 73-76. (Issued February, 1913.) |
| PART XVIII | 56. E. macarthuriana Hook. f. Plates, 77-80. (Issued July, 1913.) |

| PART XIX | 101. E. gigantere Hook. f. Plates, 81-84. (Issued December, 1913.) |
| PART XX | 102. E. longifolia Link and Otto. Plates, 85-88. (Issued March, 1914.) |
| PART XXI | 103. E. diversicolor F. M. Plates, 89-92. (Issued March, 1914.) |
| PART XXII | 104. E. gigantea Maiden. Plates, 93-96. (Issued April, 1915.) |
| PART XXIII | 105. E. ovatifolia Hook. f. Plates, 97-100. (Issued May, 1915.) |
| PART XXIV | 106. E. ovatifolia Sm. Plates, 101-104. (Issued November, 1915.) |
| PART XXVI | 108. E. ovatifolia Sm. Plates, 109-112. (Issued April, 1916.) |
| PART XXVIII | 110. E. ovatifolia Sm. Plates, 116-119. (Issued December, 1916.) |
| PART XXIX | 111. E. ovatifolia Hook. f. Plates, 120-123. (Issued February, 1917.) |
| PART XXX | 112. E. ovatifolia Sm. Plates, 124-127. (Issued April, 1917.) |
A Critical Revision of the genus Eucalyptus

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Part LXI of the Complete Work.
(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

PRICE THREE SHILLINGS AND SIXPENCE.

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

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1923
**CCCLII. Eucalyptus fastigata** Deane and Maiden.

<table>
<thead>
<tr>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CCCLIII. Eucalyptus xanthonea** Turczaninow.

<table>
<thead>
<tr>
<th>Description</th>
<th>Synonym</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CCCLIV. Eucalyptus Schlechteri** Diels.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**XXIX. Eucalyptus apiculata** Baker and Smith.

<table>
<thead>
<tr>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**XXXIII. Eucalyptus Sieberiana** F.v.M.

|       |       |

**XXVIII. Eucalyptus virgata** Sieb.

|       |       |

**XLVI. Eucalyptus acacioides** A. Cunn.

|       |       |

**LVI. Eucalyptus Naudiniana** F.v.M.

<table>
<thead>
<tr>
<th>Range</th>
<th></th>
</tr>
</thead>
</table>

**LIX. Eucalyptus Caley** Maiden.

<table>
<thead>
<tr>
<th>Synonyms</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td></td>
</tr>
<tr>
<td>LXIV. Eucalyptus Baueriana Schauer</td>
<td>16</td>
</tr>
<tr>
<td>LXXV. Eucalyptus faleata Turcz</td>
<td>17</td>
</tr>
<tr>
<td>CXCIV. Eucalyptus Spenceriana Maiden</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>18</td>
</tr>
<tr>
<td>CCI. Eucalyptus radiata Sieb</td>
<td></td>
</tr>
<tr>
<td>Synonyms</td>
<td>19</td>
</tr>
<tr>
<td>CCII. Eucalyptus numerosa Maiden</td>
<td></td>
</tr>
<tr>
<td>CCIII. Eucalyptus nitida Hook. f</td>
<td>21</td>
</tr>
<tr>
<td>CCLII. Eucalyptus eremophila Maiden, var. grandiflora n. var</td>
<td></td>
</tr>
<tr>
<td>Synonym</td>
<td>22</td>
</tr>
</tbody>
</table>

ENEMIES OF EUCALYPTS.

| Meteorological | 23 |
| Parasites— |
| Mistletoes (Loranths) | 24 |
| Fungi | 28 |
| Weeds | 34 |
| Animals (Native and other) | 35 |
| Hand of Man | 35 |
VII. The Inflorescence, and

VIII. The Fruit—(continued).

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deciduous Staminiferous Ring</td>
<td>36</td>
</tr>
<tr>
<td>(a) Continuous</td>
<td>36</td>
</tr>
<tr>
<td>(b) Discontinuous (Eudesmieæ)</td>
<td>37</td>
</tr>
<tr>
<td>Disc of the Flower</td>
<td></td>
</tr>
<tr>
<td>Historical</td>
<td>38</td>
</tr>
<tr>
<td>Disc of the Fruit</td>
<td>39</td>
</tr>
<tr>
<td>Disc or Discal lining</td>
<td>40</td>
</tr>
<tr>
<td>Explanation of Plates (248-251)</td>
<td>41</td>
</tr>
</tbody>
</table>
DESCRIPTION.

CCCLII. *E. fastigata* Deane and Maiden.

In *Proc. Linn. Soc. N.S.W.*, xxx, 809, with Plate lxi (1896).

See also Part VII, p. 185, of the present work, where the description is printed, and where the species is looked upon as a form of *E. regnans* F.v.M., but not described as a variety. At the same time, some specimens have been issued from the National Herbarium, Sydney, under the name of *E. regnans* var. *fastigata*, in the ordinary way of exchange.

I for a long time looked upon *E. fastigata* as an environmental form of *E. regnans*, but after further travel and examination of specimens, and consultation with other botanists, I have come to the conclusion that they are distinct species. See " Affinities."

Mr. Harry Hopkins, speaking of the jungle near Bendoc, north-eastern Gippsland, says this species has leaves the thinnest, most translucent and of the palest green that he has found in the district. The leaves of both it and *E. regnans* are always thin.

Illustrations.—It seems to have been sufficiently figured in Part VII, Plate 33, as follows:—Figures 3, 6, 6a (exceptionally flat-topped), 7, 8, 9. In addition, the buds 1b, and the fruits 1c, belong to *E. fastigata*. They were collected at Monga, near Braidwood (W. Baeuerlen), but were in error cited as from the Dandenong, Victoria, where Figs. 1 and 1a, type of *E. regnans*, came from. All the rest of the figures on this Plate belong to *E. regnans*, and it will be observed that while (see below) a general character of the fruit of *E. fastigata* is domedness, in comparison with the truncateness of that of *E. regnans*, specimens occasionally occur which render this differentiation exceedingly difficult.

RANGE.

It is a tree of comparatively cool, mountain localities, and appears to be confined to eastern Gippsland (Victoria) and to the tablelands of New South Wales. The type comes from Tantawanglo Mountain, near Cathcart, Bombala district, N.S.W.
The following localities may be added to those given in Part VII, p. 187.

**VICTORIA.**

I cannot do better than cite the remarks of Mr. Harry Hopkins of Bairnsdale, a careful student of the genus:—

It is known as "Cut-tail." I have found it in some of the jungle gullies between the Benun River and the Cann River in East Gippsland, also in the jungles on the north-east side of the Drummer Range where the Orbost-Genoa road crosses the range. It occurs only, so far as I know, on the red-coloured jungle soils (which I think are probably of volcanic origin). This is very noticeable at the Drummer Range, where, as soon as the red clayey jungle soil is left and the granitic formation entered upon, it ceases altogether. I noted the same thing at Bendoc, and other places. *E. obliqua* grows freely in these localities on the poorer granitic soils, and overflows on the "jungle soil" country, but *E. fastigata* never crosses the border line between the two soils.

**NEW SOUTH WALES.**

*Southern Localities.—* "Stem up to first branches covered with thick fibrous bark, like *E. eugeniodes*, branches quite smooth, clean and almost white, like the branches of a very clean Gum." Half way up the cutting, Big Jack Mountain, Eden-Bombala Road (H. Hopkins). "Woolly Butt, a large tree, something like *E. gigantea* in appearance, shows a rough stringy bark, but cleans at the limbs. Timber in good demand for milling." Parker's Gap, Parish of Ollabulla, between Queanbeyan and Braidwood (W. A. W. de Beuzeville, No. 1). "White Top. Very like No. 1, but has a comparatively smooth bark, more like a Messmate, but cleans up well at the large limbs. A large tree. Timber in demand for sawmill work." Parker's Gap (W. A. W. de Beuzeville, No. 2). "Broad-leaf Messmate. A large Messmate-looking tree, esteemed for milling." Parker's Gap (W. A. W. de Beuzeville, No. 3). State Forest No. 577, Tallaganda, Braidwood district (C. J. Weston, No. 55). Clyde Mountain, near Nelligen (J. L. Boorman). "Fibrous bark to branches, Nelligen Road, 6 miles from Braidwood (R. H. Cambage, No. 2067). "White Top Messmate." Fern Gully, Reidsdale-Braidwood district (F. W. Wakefield, No. 20). "Tree of 60 feet, 2 feet in diameter. Bark persistent to the uppermost branches and fibrous." Reidsdale (F. W. Wakefield, No. 26). Currockbilly, Wog Wog district (J. L. Boorman). Close to summit of Mount Dromedary (Forest Guard William Dunn, No. 139). "Called 'Silver Top' on Tantawangalo Mountain at Montgomery's Mill. Also 'Cut Tail' in Coast Range. (Both names used by timber inspector of Railway Construction Department.) 'Brown Barrel.'" Rossi, near Bungendore (Forest Guard Boyd). "Affinity to a Messmate. Large tree on the red soil near Robertson." (Forest Guard W. Dunn, No. 50).

*Western Localities.—* "Tall tree of the Stringybark character." Marrangaroo (Dr. E. C. Chisholm). "Top of Mount Werong, 30 miles south of Oberon, basalt formation, 3,900 feet above sea-level." (R. H. Cambage, No. 2257). Jenolan Caves-Oberon Road (F. W. Wakefield, No. 20). "Blackbutt, 80 feet, bark at butt of a blackish colour, varying to a reddish brown, extending to the branches."—Oberon (Assistant Forester H. W. Garling). "Blackbutt, one tree measured 83 feet to the
first limb, others measured from 50 to 60 feet. Considered a useful timber. Grows in deep gullies in the mountains.” Forest Reserve 43,276, Parish Turon, County of Roxburgh (District Forester A. R. Samuels).

Northern Locality.—“Stringybark, has a rough bark on the barrel, with smooth limbs.” On the Tomalla Tablelands, Hunter River Watershed (H. L. White, of Belltrees).

AFFINITIES.

1. With E. regnans F.v.M.

This is the species to which it is closest allied, and I will contrast both species under the headings of Bark and Fruits, the most obvious characters. (I may remark that there are some differences in the seedlings, but this is not the proper place to go into particulars.)

Bark (E. regnans).—The following detailed description is from the pen of Mr. Harry Hopkins, and will appeal to everyone who has travelled amongst the Big Trees of Victoria.

The amount of variation in the bark, so far as I know it in Gippsland, is very slight. The bunts of large (and medium-sized) trees are usually clothed with a moderately thick coat of persistent old bark, not at all “stringy,” but more like the base of large Peppermint (radiata), or even White Gum (viminalis), quickly tapering into a moderately rough softish bark, like that on the upper bole of most Peppermint trees, which again taper (or “fine”) off into a quite smooth bark at a few feet to, say, 8 or 12 feet from the ground. Above that the bark is quite smooth, whitish or tinted with green, and the old bark peels off in very long narrow ribbons, which often hang loosely on the tree, fast at the upper end, sometimes at both ends, and make a considerable noise in windy weather flapping against the tree trunks until they become further loosened and blow off. As a rule, the tree trunks above the first 5 to 10 feet are remarkably clean.

The trees, where well grown, have, as a rule, small or scanty tops or heads, and there is very little loose ribbony bark hanging from the branches. In the Warragul district, where, on the lands cleared of the original forests, there are a good many young trees of E. regnans, growing by the road sides or in waste places, the tree develops quite differently. It usually branches at a low height from the ground, say, generally 10 to 20 feet, with, proportionately, fairly large branches, and a rough scaly or flaky bark persists on the bole and to the basal parts of the large branches, and the upper part is less “clean”; a good deal of the smaller “ribbons” of old bark clings to the branches, or is caught in the forks of the branches, and the tree often resembles a somewhat ragged specimen of E. viminalis much more than it does the noble regnans, as seen in the primeval forest. So much do the local conditions and environment alter the appearance and character of a tree.

In answer to a specific question as to any exceptional amount and character of rough bark in E. regnans, I received the following reply:—“I do not know of anything that could be called Stringybark regnans or anything resembling a Stringybark form in E. regnans.

B
Bark (E. fastigata).—In defining the type it was stated to be to all intents and purposes a Stringybark. The tops of the trunks, and also, as a rule, the branches, are smooth.

Fruits (E. regnans).—Pear-shaped, truncate, valves not exsert. The fruit has a somewhat broad reddish disc, resembling that of E. haemastoma. Sometimes the disc is oblique, and when the fruit is not contracted at the orifice, it bears a striking resemblance to E. obliqua, but it is smaller.

Fruits (E. fastigata).—Pear-shaped, domed, valves sometimes much exsert. The rather prominent domed disc with the exsert valves appears to be a fairly constant character of the species. It appears to be the only character which can be safely used to separate it from E. regnans on herbarium specimens. But see the remarks at p. II, under “Illustrations.” The domed character of the fruit is constant in cultivated specimens.

E. regnans is by far the commoner species in Victoria, and E. fastigata in New South Wales. The latter species also occurs in north-eastern Victoria, and I strongly suspect that E. regnans will be found in the extreme south of New South Wales, e.g., in the Delegate district. I have some specimens attributed to this species, but they are not satisfactory.

2. With E. obliqua L’Herit.

The two species closely resemble each other in their fibrous barks, and they often occur in similar localities. In E. fastigata the branches are smooth, and in E. obliqua the reverse is the case. Mr. Hopkins, speaking of north-eastern Victoria, says that the timber of E. fastigata resembles that of the mountain or highland variety of Messmate (E. obliqua) (this has already been stated in describing the type), but is more free from gum-veins, and that it is a very useful timber for all builders’ works. E. obliqua is figured at Plate 6, Part II, and in the coarseness of the juvenile foliage and in its leaf-obliquity generally, and in its fruits, it can be readily seen that the two species are very different.


E. fastigata is a Stringybark, while E. vitrea has the thinner Peppermint class of bark. As regards botanical details, Plates 33 and 34 may be compared, thus it is closely allied to E. vitrea in the buds, fruits and venation. Of the fruits of E. vitrea, some show a rather well-marked disc, but they are flat-topped as a rule with enclosed valves, not domed with exsert valves as in E. fastigata. The leaves of E. vitrea are thicker, and on the whole narrower, and the venation more longitudinal than those of E. fastigata.
DESCRIPTION.

CCCLIII. E. xanthonema Turczanianow.

In Bull. Moscow, xx, Part I, 163 (1847).

Following is the original description:

Eucalyptus xanthonema ramis teretibus a basi ad inflorescentiam nudis; foliis super flores sitis alternis anguste linear-lanceolatis, utrinque acuminatis, viridibus, pellucido-punctatis, subfalcatis; umbellis axillaribus 5 floribus in particularum contractum collectis; pedunculis erectis (demum forte deflexis) compressis, petiolo pedicellisque multo longioribus; pedicellis cupulam turbinatum aequantibus; operculo (inmaturo) conico cupulam subacquante. Filamentis rufo aurantiaci insigne; habitus singularis. Nova Hollandia. Drum. Coll. X. 67.

A translation of the above will be found at Part XXXIV. p. 97, of the present work. It will be observed that the type is No. 67 of Drummond's third collection. The type is figured at Part XXXIV, Plate 140, fig. 8, and at figs 9a and 9b, Drummond's 5th Collection. No. 187 is also figured, the two numbers forming the co-types of E. redunca Schauer var. angustifolia Benth. As I am satisfied that it does not belong to E. redunca, the original name of E. xanthonema should be restored. When the ampiest material is collected, the position can be reconsidered. If it be not a distinct species, we cannot say to what species it belongs. My present suggestion will best secure the interests of science.

SYNONYM.

E. redunca Schauer, var. angustifolia Benth. (in part).

"Leaves linear or linear-lanceolate. E. xanthonema Turcz. in Bull. Mosc. 1847, 1, 163: W. Australia, Drummond 3rd Coll. n. 67, 5th Coll. n. 187 (Drummond's No. 187 had better be kept separate for the present); S. side of Stirling Ranges and eastward to Phillips Ranges, Maxwell." B.Fl. iii, 253. It has been already figured, as stated. In the absence of complete material, I provisionally label Drummond's No. 187 E. xanthonema aff.
RANGE.

It is confined to Western Australia so far as we know at present. No. 67 was collected with James Drummond's 3rd Collection, which was made in a somewhat indefinite part of the south of the then colony. I have not seen Maxwell's specimens, which Bentham quotes under his *E. redunca* var. *angustifolia*. See Part XXXIV, p. 97.

---

AFFINITIES.

1. With *E. spathulata* Hook.

This has been already seen by Bentham (*B. Fl.* iii, 253; quoted in the present work, Part XXXIV, p. 98), but it has not the spathulate leaves of that species.

2. With *E. redunca* Schauer.

We have already seen that Bentham looks upon this as a narrow-leaved form of *E. redunca*, and simply says "Leaves linear or linear-lanceolate." We have not good fruiting specimens of *E. xanthonema*, but the obvious differences from *E. redunca* are the thicker, paler, more falcate lanceolate leaves of the latter.

In Part XXXIV, p. 97, while pointing out that *E. redunca* var. *angustifolia* is not an entirely satisfactory variety, I quote some specimens from Cunderdin and near Knutsford which should be further investigated, with complete material. They are figured at Plate 140, figs. 6a, 6b, and may be referable to *E. redunca*, but it is not probable that they belong to *E. xanthonema*. 
DESCRIPTION.

CCCLIV. E. Schlechteri Diels.

In "Beiträge zur Flora von Pапuasien viii," 423, (1922).

I have not seen a specimen of the plant, nor a figure of it. Following is the original description:


A tree only about 10 m. high (according to Schlechter). Petiole 5-8 mm. long, blade 9-10 cm. long, 6-7-5 cm. in width. Panicle 15-18 cm. long, and just about as broad at the base. Flower peduncle 2-3 mm. long, receptacle 2 mm. long, 2-5 mm. broad. Stamens (dried) about 4 mm. long. Fruit, including the operculum, about 3 mm. long and just as broad.

RANGE.

Confined to Papua, so far as we know at present. North Eastern Papua (New Guinea); at Waria, near Jaduna, 50 m. above sea-level (Schlechter, n. 17398—fruiting 3rd March, 1908!): Forests of the mountains near Jaduna, about 200 m. above sea-level (Schlechter, n. 19242—flowering 15th April, 1909—type of species). . . . E. Schlechteri is the first forest Eucalypt which has been shown from the New Guinea mainland. Species previously recognised from there are all elements of the Savanna flora (Diels, 1c.).
AFFINITIES.

With *E. Naudiniana* F.v.M.

The species is allied to *E. Naudiniana*, but has broader leaves, not so tapering towards the apex, and almost obtuse, as well as distinctly smaller flowers and fruits. Moreover, according to Schlechter, it is not so tall as *E. Naudiniana*, which very frequently forms very tall trees (Diels, *l.c.*).

In the same work Dr. Diels gives a Review of the Papuan species, and this may be a convenient place to give his comparison with the three other species from that territory.

A. Leaves narrow-lanceolate, sickle-shaped. Inflorescence few flowered on a short peduncle. Flowers with pedicels . . . . 1 *E. papuana*.

B. Leaves broad lanceolate to ovate or broad elliptical.

a. Leaf stalk thin, up to 3 cm. long. Inflorescence axillary with a short broad peduncle. Flowers sessile . . . . 2 *E. alba*.

b. Leaf stalk thick, at the most 1 cm. long. Inflorescence a terminal, many-flowered panicle. Flowers stalked.

i. Leaves gradually tapering towards the apex, acute. Receptacle about 2 mm. long . . . . 3 *E. Naudiniana*.

ii. Leaves slightly tapering towards the apex, obtuse. Receptacle about 1 mm. long . . . . 4 *E. Schlechteri*. 


XXIX. *E. apiculata* Baker and Smith.


**RANGE.**

Wentworth Falls, N.S.W. (in fruit, Henry Deane, about 1886); Leura (shrub 3–5 feet, December, 1907); Wentworth Falls (Dr. E. C. Chisholm, January and February, 1923). Hitherto the species has only been recorded from a southern locality (Berrima), while Wentworth Falls and Leura are westerly (Blue Mountains). Mittagong (see under Affinities) is at no great distance from Berrima. I expect to see the species from various localities connecting the southern and western records.

**AFFINITIES.**

1. With *E. stricta* Sieb.

In "Some Eucalypts about Mittagong" (*Aust. Nat.*, v, 98, 1923), Mr. D. W. C. Shiress refers to "... a single tree with every appearance of *E. stricta*, a Gum with scribbly bark, just before the turn off to Joadja." Mr. W. F. Blakely has since visited the district, in company with Mr. Shiress, and has brought back additional specimens. He says:

It is a slender tree 20 to 30 feet high and about 9 inches in diameter at 2 feet from the ground, growing in association with *E. radiata* and *E. maculosa*. Viewed from a short distance, it has the general appearance of a young sapling of *E. altior*, i.e., a smooth powdery white-barked Gum, with the old bark slightly adherent at the base in long broad strips. It has, however, the narrow rigid leaves of *E. stricta*, and when this character is taken into consideration, the thought of connecting it with *E. altior* (other than in the nature of the bark) is dismissed from the mind, and one wonders whether it is, after all, only a white-barked form of *E. stricta*. This idea is also dispensed with, for not more than 150 yards away, fringing Joadja Creek, *E. stricta* is seen in profusion, and when a comparison is made, both species of *E. stricta* and *E. apiculata* are found to be very dissimilar in habit and bark, and to some extent in the leaves. A branch, 3 inches in diameter, was cut and showed a white timber throughout.

Some of these specimens show the extreme difficulty, and perhaps impossibility, of separating *E. apiculata* from *E. stricta*, except perhaps as a variety, owing to the slightly greater width of the leaves in the Blue Mountains form. I have already (this work, Part IX, p. 286) alluded to the difficulty of separating the two species. But the Mittagong specimens indicate that *E. apiculata* and *E. stricta* may be a small-sized tree and a tall shrub respectively in the same locality. At the same time, e.g., Blackheath, I have seen *E. stricta* exceptionally attain the size of a small tree. The broken country in the vicinity of the Berrima Coal Mine (type locality of *E. apiculata*) should also be searched for the tree-form of *E. apiculata*, for only bushy shrubs have been found there hitherto. The relations of *E. apiculata* and *E. stricta* are not yet settled.
XXXIII. *E. Sieberiana* F.v.M.

At p. 194, *Proc. Roy. Soc., Tas.*, 1912, Messrs. Baker and Smith attempt to prove that *E. virgata* Sieb. is identical with *E. Sieberiana* F.v.M. At Parts IX and X of the present work, I have very carefully gone into the subject, quoting my authorities. At p. 307 of Part X (1908) I said:—

In "Eucalyptographia," under *E. Sieberiana* F.v.M., Mueller gives *E. virgata* Sieb., as a synonym. It is not proper to state it so. Mueller thought, when describing it, he was suppressing the "misleading" name *virgata* for it. The explanation is that *E. virgata* Sieber, was for many years confused by Bentham, by Mueller, and other botanists with the tree Mueller, in spite of himself, properly separated from *virgata* under the name *Sieberiana*. I have explained the situation under *E. virgata* at Part IX, p. 275 of this work, and need not repeat myself here.

I know no true synonyms of *E. Sieberiana* F.v.M.

Now Messrs. Baker and Smith, by an argument that is not clear to me, completely reverse my conclusions, returning, as I maintain, to the old confusion I had cleared up. This is part of their argument:—

It seems hardly likely either that Sieber, having himself collected his two species in the field, should have given separate names to one and the same tree, for he was thus able to speak from actual acquaintance with their field characters, an experience that is invaluable as regards a knowledge of the Eucalypts.

In regard to this remark, I can say that, having examined every one of Sieber's numbered Eucalypts in the great herbaria of Europe, he is not always infallible in regard to this difficult genus, and little blame to him, while, as regards the reference to actual acquaintance with their field characters, the present writer speaks with infinitely greater experience that this old worthy could have possibly obtained during his rapid and brief collecting tours in New South Wales in the year 1822.

Messrs. Baker and Smith's cancelling of *E. Sieberiana* F.v.M. for the Tasmanian "Ironbark" after it has been adopted by Mueller ("Eucalyptographia" and "Second Census"), Rodway ("The Tasmanian Flora") and myself, seems to be one of the most unfortunate confusions of nomenclature they have introduced into their paper. (Maiden in *Journ. Roy. Soc., Tas.*, p. 30, 1914.)
XXVIII. *E. virgata* Sieb.

In Part XXXIX, p. 283, I have given a résumé of the facts concerning the identification of *E. virgata* Sieb., which makes the position perfectly clear. We have had specimens of the type of *E. Sieberiana*, distributed by Mueller himself for very many years, besides which, correspondence with him has made it clear (if any doubt existed, of which I am not aware) as to what he meant. As regards Sieber's type of *E. virgata*, specimens have been in existence in herbaria for a century; they consist of leafy twigs bearing buds. It was therefore obvious that it would be only a matter of time when these specimens would be fully interpreted. I have explained my successful labours in the identification of the type, which are available for everyone to check.

In "Research on the Eucalypts," Ed. II, p. 310 (1920) Baker and Smith give a figure of two fruits of an imaginary *E. virgata*, with the localities Springwood, Lawson and Mount Victoria, all in the Blue Mountains, New South Wales; also Tasmania, in which the species does not occur.

Then follow the *ad captandum* arguments which in critical matters of taxonomy we are not unaccustomed to get from Mr. Baker's pen. At p. 310 he says:—"Our (Mr. Smith's and his own, but Mr. Smith is a chemist) action in regard to this species will no doubt be thought to be arbitrary, but we, on our part think that Oldfield, Woolls, Mueller and others, when dealing with type herbarium specimens, were in error in supposing that Sieber's specimens and specific name belonged to the "Mountain Ash" (*E. Sieberiana*). Sieber must have collected from a 'Mallee' when he bestowed the name *E. virgata* on his species." And so on. Mr. Baker has not fully figured *E. virgata*, and insists on not knowing what that species is. He therefore is incapable of understanding the position of the botanists (three named, "others" unnamed) he has quoted. I am content to leave it at that.
XLVI. E. acacioides A. Cunn.


I have received specimens of the above from the British Museum (through Dr. A. B. Rendle, F.R.S.) "near Peele's Range, N.S.W. (Oxley's 1st Exped., 1817), No. 203." Two of them were inadvertently labelled E. stricta by the British Museum. Peele's Range is in the neighbourhood of Rankin's Springs, 50 miles westerly of Wyalong, and was first named by Oxley (p. 45). The "Euryalean" brush, near the Range, was named at p. 50. "Mr. Cunningham went up Peele's Range in search of plants and found a few new ones" (p. 66). Peele's Range is different from Peel's Range, Liverpool Plains.

Allan Cunningham (Barron Field's Geog. Mem., p. 350) named one of his Blue Mountain plants E. microphylla, and he cannot be held responsible for the act of someone who subsequently mislabelled it E. acacioides in the Hookerian herbarium in the year 1835. His E. acacioides was subsequently named E. viridis by Mr. Baker. I have already pointed out that that gentleman first amply described the plant as E. viridis, but I have no power to suppress E. acacioides.
LVI. E. Naudiniana F.v.M.

The following notes by Dr. L. Diels are taken from "Beitrage zur Flora von Papuasienvi.," 422. 1922. edited by Dr. C. Lauterbach, and somewhat supplement those in Part XII, p. 79. of the present work.


RANGE.

Philippines. Bismarck Archipelago, New Britain: Spacious Bay, J. Turner, following F. v. Mueller. (Type of the species.) Baining Mountains, Matava, twig of a young tree, as well as a flowering branch of an old one, January, 1894 (Anonymous in Herb. Berol!): the same locality (Rechinger, n. 5347); Gazelle Peninsula (sent by Schmiele to F. v. Mueller, in Herb. Berol!). Without more definite locality (Parkinson!). New Ireland: Namatanai, on the Ouna, a tree 70 m. high in damp forests. Native name "Kumurere" (Peckel, n. 768—with young buds and young fruits, on the 19th November, 1910). This reference confirms the record of the Rev. G. Brown mentioned by F. v. Mueller as the first record of a Eucalypt for the Papuan country. He had noticed Eucalypts on his missionary travels in New Ireland. The young leaves (from a tree from Baining Peninsula about 1–3 years old) are somewhat narrower and thinner than those of the old tree, besides being all opposite. (Dr. L. Diels, i.e.)
LIIX. *E. Caleyi* Maiden.

See Part XII, p. 95.

Synonyms.

1. *E leucoxyylon* F.v.M. var. *pallens* Benth. (B.Fl. iii, 210), through Mueller's confusion of his *E. leucoxyylon* with *E. sideroxyylon* A. Cunn. This is explained in Part XII, pp. 84, 88, 91, 96.

2. The above is quoted without reservation as *E. sideroxyylon* A. Cunn., var. *pallens* Benth., by Baker and Smith in "Research on the Eucalypts," Ed. I, p. 161, but Bentham never said so, so far as I am aware, and therefore the correct citation involving *E. sideroxyylon* should be *E. sideroxyylon* var. *pallens* Baker and Smith.


Some statements with the object of proving that *E. caerulea* is not *E. Caleyi* will be found at pp. 271 and 272, *op. cit.*, but I have for many years endeavoured to find a difference and have failed. These authors, it seems to me, make insufficient allowance for variation from type through changed environment in the case of *E. Caleyi*. I have had careful drawings made of the type of *E. caerulea*, but as I have been unable to show any essential difference between them and those of *E. Caleyi* in Plate 56, I could find no justification in publishing them. Some day oils of *E. Caleyi* from different sources will be obtained, and they will be compared with various oils from reputed *E. caerulea*.

---

RANGE.

See Part XII, p. 95. "Stunted Ironbark," Murrumbo, Rylstone (R. T. Baker, December, 1893), is at p. 96 quoted by me, and this is the plant which forms the type of *E. caerulea*. It extends from the Upper Hunter, N.S.W., to southern Queensland; the range in the latter State requires further investigation.
Following are additional localities for *E. Caleyi*:

**New South Wales.**—Baerami. 14 miles west of Denman (R. H. Cambage, No. 2670); height 60–80 feet, diameter at 4 feet from the ground 2–4 feet. Sometimes stunted in growth, short bole. Used for fencing, building and fuel. Attunga State Forest, County Inglis, mountain slopes on the western side of the New England Range, altitude above sea-level 1,200–2,500 feet. (Assistant Forester T. W. Taylor); Bundarra (Assistant Forester A. Julius); Round-leaved Ironbark, a large tree with straight barrel; girth 10 feet. Bark dull grey, not deeply furrowed. Forest Reserve 35664, Parish Ironbark, County Darling, Barraba district. (Forest Assessor W. A. W. de Beuzeville); Parish of Dungowan, County Parry (District Forester Gordon Burrow); New England Ironbark. Trees of stunted growth, 20–30 feet high being a maximum growth, generally below 20 feet, with a girth of 2–4 feet, growing under similar conditions as *E. sideroxylon*, but inferior in quality, makes excellent fuel, Tent Hill, Emmaville district (J. L. Boorman); Westphalen’s Lease, Parish of Elsmore, Inverell district (Forest Guard L. B. Peacocke); Road to Wallangarra-Ashford, 7 miles from the latter (Assistant Forester T. W. Taylor); Fraser’s Creek, Ashford (J. L. Boorman).

**Queensland.**—Blackdown (R. N. Jolly); Brush Creek, Inglewood (J. L. Boorman).
LXIV. E. Baueriana Schauer.


"Maiden places this species under E. Baueriana, which was founded on an imperfect description and specimen 'in plump bud and an expanded flower' [Mr. Baker omits that the type specimens are branchlets 9 inches long.—J.H.M.], surely worthless data on which to perpetuate a systematic name. E. Baueriana is a tropical species."

It is not tropical, although Bentham (B.Fl. iii. 214) says so in the following passage, and Baker and Smith follow his error. Under E. polygonanthemos Schauer he says—"The tropical specimens to which, from the character given, belong to E. Baueriana Schauer, in Walp. Rep. ii, 924, have generally smaller flowers and fruits than the southern ones, but do not otherwise differ." (B.Fl. iii. 214, 1866.)

Mueller ("Eucahptographia" under E. polygonanthemos, 1879-84), as quoted by me in the present work, Part XIII, p. 120 (1911) says—"Bauer most probably obtained his specimens from the vicinity of Sydney, and not from the tropical regions of Australia."

Nor did Schauer, the author of the species, 1843, say that E. Baueriana is tropical. He simply says "In Nova Hollandia legit F. Bauer" (see my quotation of the original description in this work, Part XIII, p. 120). If Mr. Baker has got evidence to modify or contradict Schauer, Mueller and myself, he should produce it.

I have seen the type, and it is imperfect to the extent that it only consists of mature leaves, plump buds and flowers. I only wish that all herbarium specimens of Eucalyptus were equally well furnished.

Mr. Baker repeats his depreciatory remarks as to the type specimens, and his observation as to "tropical origin" of E. Baueriana under E. conica, p. 95 ("Research, &c."). Besides Part XIII, p. 120, of the present work, see Part XLIII, pp. 62 and 64.

Ettingshausen ("Die Blatt-Skelete der Dikotyledonen," p. 204, 1861) figures a leaf of E. Baueriana.
LXXV. *E. falcata* Turcz.

(Syn. *E. Dorrienii* Domin in Fedde's "Repertorium specierum nov. reg. veget.," xii, 388, 1913.)

The author says that in his opinion it is nearest to *E. decurrea* F.v.M., and also compares it with *E. oleosa* F.v.M., and *E. falcata* Turcz. In comparing it with the last species, he says "*E. falcata* reminds us of it in the ribbed calyx-tube, but differs from it greatly in the operculum."

I am in possession of a quarto drawing of the type in the Kew Herbarium done by Miss M. Smith, and also of a fragment of the type. I fail to see in what way *E. Dorrienii* differs from *E. falcata*. The opercula of the two species are similar. See Plate 68. Part XV of the present work. The suggestion of the affinity of *E. Dorrienii* (*falcata*) with *E. decurrea* is doubtless founded on the same error that I have pointed out in the present work. Part XVI, p. 193. The above note is taken from a paper by myself in *Journ. Roy. Soc. N.S.W.*, xliv, 328, 1915.

Mr. C. A. Gardner says this species is known as "White Mallet." It is a tree of 20-30 feet. with erect, or scarcely spreading branches; trunk to 12 feet high, and 12 inches in diameter; bark about ¼ inch thick, of a yellowish silver-grey colour in the summer when the outer layers have recently decorticated, almost pure white in the winter and blotched with large or smaller grey patches. Bark pink in fracture, the deepest colour near the external layers, the innermost almost white; timber light yellowish-brown, dense and very hard. Leaves thick, drooping, dull green, but shining. On laterite hills, 10 miles north-east of Wagin, in gravelly soil (shallow), forming open forests with *E. reduncia* var. *elata*, and with a dense thicket-like undergrowth of *Dryandra.*
CXCV. *E. Spenceriana* Maiden.

Height 20 to 35 feet, but occasionally attaining a height of 50 feet. Trunk to 20 feet and 18 inches diameter. Branches spreading or erect, few, and sparsely foliaged. Bark light grey, persistent and flaky, rugged or almost smooth, and very similar in texture to that of the Tuart (*E. gomphocephala*). Timber dark reddish-brown, dense with an interlocked grain. Sapwood thin, light yellow. The timber is termite-resisting. Leaves alternate, narrow lanceolate, drooping vertically, of a glaucous green, flat; the midrib prominent, but the veins inconspicuous, the intramarginal close to the edge. Veins at an angle of about 45 degrees to the midrib. Flowers not seen, but small and apparently white, in loose slender panicles, terminal or inserted just above the axils, not exceeding the leaves in length. Pedicels slender, slightly flattened. Calyx-tube turbinate, slightly compressed, tapering into the slender pedicel. Operculum depressed-conical, the line of separation fairly distinct. Stamens inflected in the bud. Style short, straight and thick. Fruits thin, ovoid, 3- or 4-valved, the rim thin and truncate, the obtuse points of the valves sunk.

(The above notes are by C. A. Gardner, and refer to Kimberley trees.)

---

**RANGE.**

*Western Australia.*—The common Grey Box of the basaltic areas of the Kimberleys, and the commonest Eucalypt of the district, and known as "Box" or "Coolabah." (I have seen a specimen from Walcott Inlet, Calder River, C. A. Gardner, No. 1589). The following are Mr. Gardner’s notes:

Extending from the Lennard River in the south to Napier, Broome Bay, in the north, west to Camden Sound and Walcott Inlet, and indefinitely eastwards. The species covers the granite and basaltic areas of Kimberley, being restricted to this formation. It often forms pure savannah forests, but its most frequent associate is *E. daviciara*, a tree common to both igneous and sedimentary rocks. The foliage is never a bright green, and from a distance the trees indicate the best pasture land, their undergrowth being almost entirely Gramineae, with larger shrubs. I have not seen a tree other than on basaltic or granite country. It was undoubtedly the tree mentioned in Fitzgerald’s Kimberley Report (1907) under the name of *E. microtheca*, when he stated “On the plains and frequently sparsely covering the basaltic hills, Coolibah or Box (*E. microtheca*) and Bloodwoods (*E. terminalis* and *E. pyrophora*) prevail, often forming open forests of fair extent, the species ultimately extending to the coast. (I have not seen either *E. terminalis* or *E. pyrophora* on the basaltic country).”

*Northern Territory.*—I provisionally refer the following specimens, received from the Melbourne Herbarium before 1900, to this little-known species. They are quite small, and in mature leaf and flower bud.

1. “North Coast and Bay 3” [Northern Territory.—J.H.M.], Robert Brown, 1802-5. Sent from the British Museum by direction of J. J. Bennett in 1876 as *E. polyanthemos* Schauer, and labelled by Mueller *E. drepanophylla* (?).

2. “Cape River” (Northern Queensland) “*E. polyanthemos*, petioles short.” This is a modern specimen (? Stephen Johnson, Mueller’s collector), and is in flower as well as bud.
CGI. *E. radiata* Si.eb

See Part XXXVIII, p. 229, where its description, synonymy and range are set out.

**SYNONYMS.**

1. *E. phellandra* Baker and Smith, "Research on the Eucalypts," 2nd Edn., p. 280, as follows, with a figure of an umbel of fruits.

   Narrow-leaf Peppermint. A medium-sized tree, with a typical "Peppermint" bark. Abnormal leaves lanceolate, cordate, sessile, usually under 5 inches long and ¾ inch broad, upper surface darker in colour, branchlets scabrous, particularly so when young. Normal leaves thin, lanceolate or narrow lanceolate, sometimes falcate, up to 7 inches in length and 1 inch broad, on slender pedicels; venation distinct, intramarginal vein looped and well removed from the edge; a secondary less prominent vein often occurring nearer the margin, lateral veins very oblique, occasionally almost parallel to the midrib, distant and spreading. Peduncles usually axillary, 2 to 3 lines long, bearing umbels of ten or more flowers. Buds clavate: calyx-tube tapering into a slender pedicel: operculum hemispherical, umboate. Fruit pyriform, sometimes hemispherical, more or less shining, on a pedicel 1 line in length; rim reddish, truncate, somewhat countersunk or even slightly convex; valves not or only slightly exserted; 3 lines long and under 3 lines in diameter.

   Mr. Baker's figure is of seven fruits (with scars of a few more) in the umbel. They are not pyriform, but hemispherical; their comparative fewness and shape indicate *E. radiata*. It is quite evident that Mr. Baker has confused *E. radiata*, redescribing it under the name of *E. phellandra*.


Under this name Messrs. Baker and Smith, "Research on the Eucalypts," 2nd Edn., p. 278, have included two species. Specimens from Blackheath, N.S.W., September, 1919 (C. F. Laseron), furnished by the present Curator of the Technological Museum (Mr. George Hooper) are the common *E. radiata* of the Blue Mountains. No wonder the authors write, a little higher up the page, "The data given under *E. phellandra* applies (sic) in almost every particular to this species, so that no systematic description is required" ! ! ! Material was distilled from Blackheath. In "Research on the Eucalypts," 2nd Edn., Messrs. Baker and Smith say "As illustrating the comparative constancy in results with the products of individual species, it may be mentioned that the above localities are over 600 miles apart." The two trees so many miles apart, with the same oils, are, however, not the same species, but two, viz., *E. radiata* and *E. nitida*, and this is not the only case of two different species yielding similar oils.
CCII. *E. numerosa* Maiden.

See Part XXXVIII, p. 233, where the synonomy is set out.

The plant noted as *E. radiata* Sieb., by Messrs. Baker and Smith ("Research," 2nd Edn., p. 306), with a figure of an umbel of pyriform fruits and called "White Top Peppermint or River White Gum" is *E. numerosa*, a very characteristic graceful tree, with ribbony bark used as tying material by the blacks. It is found on river banks and hill-sides. It has fruits more numerous and more pyriform than *E. radiata*. I have sufficiently characterised *E. numerosa*, where quoted above, and well know my own species both in the bush and in the herbarium. It is quite obvious that Mr. Baker has confused my *E. numerosa* with the older *E. radiata*. 
CCIII. *E. nitida* Hook. f.

Syn. *E. amygdalina* Labill., var. *nitida* Benth. See Part XXXVIII, p. 235, of the present work. See also Part XXXIX, p. 302, for a note, and at fig. 1, Plate 160, the broad juvenile foliage of this species (reproduced from the figure accompanying my paper in *Proc. Roy. Soc. Tas.*., 1918) will be found.

The specimens labelled *E. amygdalina* var. *nitida*, Guildford Junction, Tasmania (L. G. Irby, September, 1918—specimens received from Mr. George Hooper, the present Curator), referred to by Messrs. Baker and Smith in "Research on the Eucalypts," 2nd Edn., p. 279, are *E. nitida*. Messrs. Baker and Smith include *E. radiata* and *E. nitida* under the one name of *E. amygdalina* var. *nitida*, and I have drawn attention to the matter under *E. radiata* at p. 19.

In the absence of complete material, the Mount Victoria specimens (Maiden and Cambage, *Journ. Roy. Soc. N.S.W.*., xlvi, 415 (1914, Kydra Trig. Station, ib. 416), and certain anomalous specimens from Blackheath (Maiden, *Paper and Proc. Roy. Soc. Tas.*., p. 84, 1918) should be eliminated from *E. nitida*. *E. nitida* has only been proved to occur in Tasmania up to the present time.
**CCLII. E. eremophila** Maiden, var. *grandiflora* n. var.

*Synonym.*

*E. occidentalis* var. *grandiflora* Maiden, Part XXXVI, p. 149, and figs. 1–2. Plate 150.

The Kurrawang specimen (J. B. Cleland) there quoted is the type, and I look upon the Elder Exploring Expedition specimen, Camp 63 (R. Helms), as also belonging to this variety. The variety *grandiflora* differs from normal *E. eremophila* in the longer calyx and in the larger fruits. The calyx is remarkably long and cylindrical, being nearly twice as long as that of the normal form. It also appears to be much thinner in texture, the normal form being more cupular and thicker.

Concerning this little known species, Mr. James Richardson of Parker's Road, E. Goldfields Railway (through Mr. E. Le Souef), writes:

"Yellow flowering Mallee. The flowers sent (3.11.21) were the top of Mallee shoots 7 feet in height, and had previously bloomed. The butt of the suckers was no larger than a walking stick. These are the first to bloom, others will be in during the next two weeks. I have found about fifty clumps of it, and it certainly deserves a place in every public garden."

A week later (letter of 10.11.21) he sends more, under the name of "A large flowered Mallee, colour canary-yellow. It grows about 7 miles west of Parker's Road on the old Merredin to Southern Cross Road near iron telegraph pole No. 2804, and near the railway at 217½ miles, near telephone pole No. 4322. It is quite distinct from the red-flowering Mallee, and not a colour sport. The late Mr. E. Simpson, manager of Jones' Station, 30 miles north of Nungarin, reported to me over twelve months ago that he discovered a yellow Mallee on Jones' Station; it is probably the same."
ENEMIES OF EUCALYPTS.

This subject is dealt with, as regards trees in general, at Part LVIII, p. 209, of my "Forest Flora of New South Wales." The Synopsis is as follows, and as the details there given refer to Eucalypts, amongst others, I refer my readers to the paper, and will content myself with some supplementary notes.

I. Meteorological.
   (a) Frost.
   (b) Snow.
   (c) Wind. Twist in Timber.
   (d) Lightning.
   (e) Drought.
   (f) Rain.

II. Fires.

III. Soil.
   (a) Unsuitable soil. Alkali.
   (b) Sand encroachment.

IV. Parasites
   (a) True Parasites. (Mistletoe, &c.).
   (b) Hemi-epiphytes. (Strangling Figs).
   (c) Fungi.
   (d) Weeds.

V. Animals.
   (a) Grazing.
   (b) Native animals.
   (c) Birds.
   (d) Insects.

VI. Miscellaneous.
   (a) Fumes from furnaces, &c.
   (b) Artificial lighting.
   (c) Destruction by aborigines.

1. Meteorological.

   (a) Frost.

1. Graham Officer (Proc. Roy. Soc., Tas., 1892, p. 155) referring to the Nive Plains near Lake St. Clair, speaks of them being "covered with dead and fallen trees, the result of a severe frost 50 or 60 years ago."
2. "Relative Frost Resistance of Eucalyptus in Southern California," by E. N. Munns, *Journ. of Forestry*, XVI, 412 (April, 1918). In this paper twenty-six species are dealt with. A few of the vernaculars are open to possible correction, e.g., *E. polyanthema*, which is called "Australian Beech," perhaps a misplaced label, for such a name is quite unknown in Australia. *E. amygdalina* is called "Giant Eucalypt." Perhaps *E. amygdalina* var. *regnans*—*E. regnans*—is meant. *E. leucoxylon*, "White Wood." This is a mistake, although it is sometimes called "White Ironbark." The author of the specific name *regnans* (p. 422) is Mueller. *E. goniocalyx*, "Box-wood." Box-wood is not an Australian wood, though "Box" is. *E. calophylla*, "Feather-veined Gum." This is evidently a Californian name for the "W.A. Red Gum," but it is descriptive of all the Corymbose.

One of the conclusions in a useful paper is that *E. viminalis* is the most frosthardy species of the genus that has so far been planted in Southern California, followed by *E. polyanthemos*, *E. Gunnii*, *E. bicolor*, and *E. regnans*. It is quite evident, however, that the original seeds were not obtained from the most frost-resistant localities in all cases.

(b) Snow.


(c) Wind.


See my "Forest Flora of New South Wales," Part LX, for two remarkable photographs showing:—

(a) "Wind-blown trees, Stanley, North-west Coast, Tasmania. (These illustrate the dwarfing or nanism caused by strong sea breezes in exposed situations.)

(b) "A Cypress Pine (*Callitris robusta*, R.Br.) after a Cyclone, Cambo Cambo Station, Collarenebri district, N.S.W." This shows the devastation in a forest, including the cyclonic or twisting force, and the disintegration of the timber into long splintery masses.

IV. Parasites.

(a) True Parasites (Mistletoes).

I am indebted to Mr. W. F. Blakely, my Botanical Assistant, for the following lists, and hope the publication of them will lead to much fuller interest being taken in the subject. (Suggestions as to dealing with Australian Mistletoes have been scanty.) See the non-Australian reference, "Some Suggestions on the Control of Mistletoe in the National forests of the North West" (U.S.A). (*Forestry Quarterly*, XIV, 567 December, 1916) [See also Schlich's "Manual of Forestry," IV, 366.]
Phrygilanthus eucalyptifolius (Sieber) Engler, has been found on the following species:

- E. acmenioides
- E. amplifolia
- E. Baererleni
- E. Bancrofti
- E. capiteUata
- E. cinerea
- E. corymbosa
- E. crebra
- E. eugenioides
- E. eximia
- E. ficifolia
- E. haemastoma
- E. hemiphloia
- E. longifolia
- E. melanophloia
- E. microtheca.
- E. ochrophloia.
- E. ovata.
- E. paniculata.
- E. Parramattensis.
- E. pilularis.
- E. piperita.
- E. punctata.
- E. radiata.
- E. resinifera.
- E. saligna.
- E. Shiressii.
- E. siderophloia.
- E. sideroxylon.
- E. Sieberiana.
- E. squamosa.
- E. tereticornis.
- E. umbra.
- E. viminalis.
- E. Watsoniana.

P. celastroides (Sieb.) Eichl., on E. tereticornis.

Loranthus sanguineus F.v.M. on

- E. grandifolia.
- E. microtheca.

L. bifurcatus Benth. on

- E. clavigera.
- E. dichromophloia.
- E. terminalis.
- E. transcontinentalis.

L. Miquelii Lehm. on

- E. acmenioides.
- E. albens.
- E. Baileyana.
- E. Bancrofti.
- E. Baueriana.
- E. bicolor.
- E. Blakelyi.
- E. Caleyi.
- E. calophylla.
- E. dealbata.
- E. dumosa.
- E. elaeophora.
- E. eugenioides.
- E. fasciculosa.
- E. gomphocephala.
- E. hemiphloia.

(Common host, Northern Rivers of N.S.W.)
L. Miquelli—continued.

E. leucoxylon.
E. macrorrhyncha.
E. maculata. (Common host, Northern Rivers of N.S.W.)
E. melliodora.
E. microcarpa.
E. odorata.
E. Oldfieldii.
E. paniculata.
E. Pilligaensis.
E. pilularis.
E. piperita.
E. propinqua.
E. punctata.
E. radunca.
E. resinifera.
E. rostrata.
E. saligna.
E. Seeana.
E. Shiressii.
E. siderocephala.
E. sideroxylon.
E. tereticornis. (Common host, Northern Rivers of N.S.W.)
E. umbra.
E. viminalis.

L. pendulus Sieber on

E. acaciaeformis.
E. albicans.
E. Bancrofti.
E. Baueriana.
E. Blazlandii.
E. conica.
E. crebra. (On trunk.)
E. dealbata.
E. dives.
E. elaeophora.
E. eugenioides.
E. haemastoma.
E. hemiphloia.
E. ligustrina.
E. macrorrhyncha.
E. maculosa.
E. micrantha.
E. Moorei.
E. Muelleriana.
E. pilularis.
E. piperita.
E. polyanthemos.
E. radiata.
E. rostrata.
E. rubida.
E. Sieberiana.
E. striata.
E. Stuartiana.
E. viminalis.

L. ferruginiflorus W. V. Fitzgerald on—

E. acmenioides.
E. Baileyana.
E. Bancrofti.
E. clavigera.
E. corymbosa. (Common host.)
E. eugenioides.
E. hemiphloia.
E. macrorrhyncha. (Common host.)
E. microcorys.
E. pilularis.
E. propinqua.
E. Seeana.
E. tereticornis.
E. tessellaris.
E. trachyphloia.
L. Quandang Lindl. on
E. bicolor.
E. crebra.

E. melanophloia.

L. grandibracteus F.v.M. on
E. bicolor.
E. microtheca.

E. Normantonensis.
E. populifolia.

L. congener Sieber on E. obtusiflora.

L. miraculosus Miq. on
E. gomphoccephala.
E. conica.

E. Baucriana.

L. miraculosus Miq. var. Boormani n. var. on E. bicolor.

L. Exocarpi Behr. on
E. populifolia.

E. rostrata.

L. Exocarpi Behr. var. spathulata Blakely on E. pyrophora var. polycarpa.

L. homoplasticus Blakely n. sp. on E. alba.

L. odontocalyx F.v.M. on E. sp. Probably one of the Corymbosae.

L. vitellinus F.v.M. on
E. acmenioiides
E. Baileyanas.
E. calophylla.
E. corymbosa. (The most common host.)
E. eugenioiides.
E. eximia. (Also a common host.)
E. haemastoma.
E. maculata.

E. micrantha.
E. notabilis.
E. obtusiflora.
E. piperita.
E. punctata.
E. rubida.
E. Shiressii.
E. viminalis.

L. vitellinus F.v.M. var. glabrescens n. var. on
E. alba.
E. melanophloia.

E. microtheca.
E. terminalis.
See Mr. Blakely’s papers on Loranthaceae in *Proc. Linn. Soc., N.S.W.*, XLVII. They include a very large number of references to species parasitic on Eucalyptus, together with excellent drawings of the parasites themselves.

Following is a note on a parasite allied to the Sandalwood, which is worth emphasising, as we have notes on so few parasites other than the Mistletoes.

Speaking of *E. calycogona* Turecz., at Pinnaroo (J. M. Black, *Journ. Roy. Soc., S.A.*, XLIII, 39, 1919) "In many instances specimens of *Fusanus acauminatus* (‘Native Peach’) were growing—probably parasitically—so close to these trees that the stem of the *Fusanus* was impressed into that of the *Eucalyptus*, forming a deep channel along one side.

*(b) Hemi-epiphytes (Strangling Figs).*

"Effects of growing cells on Environment," and "Disruptive Force of Fungi, Roots, &c." (Kerner and Oliver, I, 513) may be referred to. Fig. 130 shows elevation of a block of stone in consequence of the growth in thickness of a Larch root. Its weight is estimated at 1,400 kg., and the root concerned is only 30 cm. in thickest diameter. "An instance is also known in which a stone of 160 kg. (352 lb.) was raised and shifted by the growing fructification of a fungus of the mushroom tribe" (p. 514).

Other trees are quoted, but they all dwarf into insignificance in their effects as compared with the devastation caused by tropical Figs (*Ficus*). I have no illustrations of Eucalypts, but observers have often noticed what great disruptive force they are capable of exercising.

**Epiphytes.**

One of the most charming sights I have ever seen was that of huge masses of *Dendrobium aemulum* R.Br., flowering on the trunks of *E. paniculata* at Wyong, N.S.W.

*Cymbidium canaliculatum* R.Br., is epiphytal on spp. of Eucalyptus in New South Wales, but especially on *E. clavigera* A. Cunn. in N. W. Australia (W. V. Fitzgerald). It is common on Box trees, resting in the forks. These epiphytes do not injure the trees, so far as I know. The subject of epiphytes on our Eucalypts may well be taken up by an observer.

*(c) Fungi.*

I am much indebted to Mr. Edwin Chel, my chief Botanical Assistant, who has favoured me with the following valuable list and notes of fungi recorded as having been found on various species of Eucalyptus. Unfortunately, the particular Eucalypt is not mentioned in very many cases. It is obvious that there is still a wide field of research indicated by Mr. Chel.

The list includes 113 species, representing 31 families and 71 genera of fungi, found on 35 species of Eucalyptus. Cooke and Harkness (2) have recorded 42 species,
representing 32 genera, found on *E. globulus* cultivated in California. Themen has also recorded a species of *Eucalyptus* cultivated in Portugal. Six species of those enumerated in Cooke and Harkness (2) have also been definitely recorded as having been found in Australia, and are accordingly included in the list herewith.

It is interesting to note that of the 35 species of *Eucalyptus* specifically mentioned, *E. globulus* is the host of the largest number of species of fungi in Australia, as well as in California. 12 species having been actually recorded on this host. This is owing to the circumstance that this species was for many years the commonest species cultivated abroad. *E. viminalis* comes next with 7 species and *E. amygdalina* with 4. The various species of *Polyporaceae* are the most numerous and worst foes of *Eucalypts*, as they attack the living trees as well as the dead wood. Even fence-rails and building material after it has been dressed is frequently attacked by the *Polyporaceae*, and many thousands of pounds' worth of timber are destroyed in the course of a few years by the ravages of this group alone.

Family Pezizaceae.

*Lachnum atro-purpureum* Durant on bark (12). (These numbers refer to "Bibliography." see p. 33.)

Family Heliotiaceae.

*Phialea ceratina* Berk. on leaves (Tas.) (7).

*Dasycypha eucalypti* (Berk.) Sacc. on leaves and so on (Tas. and Vict.) (13).

Family Stictidaceae.

*Stictis radiata* Fr. on bark of *E. globulus* (Tas.) (13) and (2).

*S. emarginata* Cke. et Mass. on leaves (Vict.) (13).

Family Phacidiaceae.

*Coccomyces delta* Kunze on leaves (7) and (13).

Family Hysteriaceae.

*Hysteria in pulicare* Fr. on bark of *E. globulus* (2).

*Lembosa orbicularis* Winter on leaves of *E. pilularis* (13).

*Autographum eucalypti* Cke. et Mass. on dead leaves (Vict.) (13).

Family Patellariaceae.

*Patinella Adamsii* Sacc. on branches (Vict.) (13).

Family Perisporiaceae.

*Melioia amphitricha* Fr. on leaves (Vict. and Qld.) (13).

*M. densa* Cke. on leaves. Herbert River, North Queensland (13).

Family Microthyrlaceae.


*Micropenis applanatus* var. *depanperata* Sacc. on leaves of *E. tereticornis*, Queensland (14) and (13).

*Asteridium eucalypti* Cke. et Mass. on leaves of *E. amygdalina* (Vict.) (7) (12) (14).
Family Dothidiaceae.

*Dothidella inequalis* Cke. on dead leaves (Vic.) (13).

*Phyllachora maculata* Cke. on leaves (Vic.) (13).

*Baguisiella rugulosa* Cke. on leaves (Vic.) (13).

Family Mycosphærellaceae.

*Mycosphærella (Sphaerella) cryptia* Cke. on fading leaves (Vic.) (7).

*Mycosphærella (Sphaerella) nubillosa* Cke. on living leaves (Vic.) (7).

Family Pleosporaceae.

*Montaguella rugulosa* Cke. on leaves (Vic.) (13).

*Montaguella eucalypti* Cke. et Mass. on dead leaves (Vic.) (13).

Family Massariaceae.


*Massaria eucalypti* Fl. Tass. on *E. Watsoniana* F.v.M., Queensland (17).

Family Clypeosphaeriaceae.

*Trabutia eucalypti* Cke. et Mass. on leaves, Tas. and Vic. (13).

Family Obtectaceae.

*Rhamphora tenella* Sacc. on leaves of *E. viminalis*, Mariatta, S.A. (7) and (13).

Family Thelephoraceae.

*Stereum hirsutum* Willd. on *E. tereticornis*, Bumbery; *E. Stuartiana*, Orange (11); *E. globulus* (18).

*Stereum fasciatum* Frier, on trunks, S.A., Vic. and Qld. (13).

*Hymenochete Kalchbrenneri* Mass. on trunks, Vic. and Qld. (13).

Family Polyporaceae.


*Polyporus eucalyptorum* Fr. on trunks of *E. resinifera*, *E. tereticornis*, *E. corymbosa*, *E. nova-anglica*, *E. pilularis*, *E. eugenioides*, *E. capitellata*, *E. Caleyi*, *E. maculata*, *E. Sieberiana*, and *E. sideroxylon* (10) and (13).

*Xylostroma giganteum* Tode. (This is the sterile mycelium in part of Polyporus eucalyptorum, and probably other species of Polyporacee commonly found in the hollow trunks of Eucalyptus spp. See (10), pp. 505, 506, 510, 511, 514, 515, 517, 522, and 523.

*Polyporus sulphureus* (Bull.) Fr. (18).

*P. Hartmanni* Cke. on *E. quadrangulata*, Jellore Creek, via Mittagong, N.S.W. (10).

*P. pociula* (Schw.) Berk. et Cart. on bark (18).

*P. ochroleuca* Berk., Lilyvale (10).

*P. phlebosporus* Berk. on trunk of *E. hemipholia*, Queensland (13).

*P. subradiatus* Lloyd (18).
Family Polyporacese—continued.

P. spumens Frier., Vict. (13).

P. (Lentus) arcularius Batsch. on E. rostrata, Moree, N.S.W. (10).

Polystictus cinnabarinus Jacq., Gympie, Qld. (11).

P. lilacin-o-gilva var. eucalypti Lloyd. (Trametes eucalypti) (Polystictus eucalypti Kalchb.) on trunks, S.A., Vict., Qld. (10) and (13).


E. botryoides, Sydney, and E. saligna, Robertson, N.S.W. (11).

F. obliquus Cke., S.A., Vict., N.S.W., and Qld. (13).

F. Robinsonice Murrill on E. inelanophloia. On E. crebra and E. sp., Narrabri, N.S.W. (10) and (18).

R. rimosus Berk. on E. crebra and E. melanophloia, Narrabri, and E. paniculata, Brisbane (10) (18) (11).

F. yucatensis Murrill on E. saligna, Lisarow, N.S.W. (10).

F. conchatus Pers. on E. piperita (10).

Trametes Feei Fr. (10).

Hexagona bicolor McAlp. on Eucalyptus sp. (referred to Woolakiana) (16).

H. Gunnii Berk. on E. viminalis, Tas. (10).

H. Muelleri Berk. (13) and (16).

Melenus lachrymans (Dry-rot Fungus).*

Porina mollusca Cke. on E. obliqua, S.A., Vict. (13).

Family Agaricacese.

Pleurotus eucalyptorum Fr. on trunks (3) (13).

P. affinis Berk. on bark of E. amygdalina (3) (13).

P. applicatus Batsch. on E. viminalis (7) (13).

Crepidaulis haustellaris Fr. on trunks of E. viminalis, S.A. (13).

Paxillus eucalyptorum Berk. (4).

Marasmius putredinus B. and C. (7).

M. hypnoides Berk. on leaves (7).

M. meloniformis Berk. on leaves and branches (13).

M. eucalypti Berk. on fruits and twigs (1).

Naucoria horizontalis on E. piperita (9).

Lentinus hepatotrichus Berk. on Stringy-bark Gum tree (E. ? sp.) (1).

Panus lateritius Sacc. on rotten wood (13).

Leuconites aspera (Kl.) Fr. on E. globulus (18).

Family Lycoperdacese.

Xylopodum australic Berk. on trunk of E. hemiphloia, Vict., N.S.W. (15).

* C. A. Julius (W.A. Timber Tests, 1906, Schedule 5) gives chemical analyses of seven Western Australian timbers, and at p. 22 he has some remarks on the relation between Dry-rot and the decomposition of the sap. See also J. Mann’s “Australian Timber; Its Strength, Durability, and Identification,” p. 68. Also “Dry-rot in Timber” by G. P. Darnell-Smith in Aust. Forestry Journ., October, 1919, p. 314. There are also treatises entirely devoted to the subject of Dry-rot in Timber.
Family Sclerodermataceae.

*Pisolithus crassipes* (*Polysacrum crassipes*). This species is nearly always found on the soil under *E. spp.* in Australia. E.C. (18).

Family Nidulariaceae.

*Cyathus pusio* Berk., Qld. (4).

Fungi Imperfectae.

Family Sphærioidaceae.

*Macrophoma Mollerrana* (Thuem.) on leaves of *E. globulus*, Vict. (7).
*Phoma australis* Cke. on leaves, Vict. (7).
*P. vininalis* Cke. et Mass. on *E. vininalis*, Vict. (7).
*P. eucalyptidea* Thuem. on leaves, Vict. (7).
*P. purpurea* Cke. et Mass. on leaves, Qld. (13).
*Stagonospora orbicularis* Cke. on dead leaves, Vict. (13).
*Dothiorella eucalypti* Sacc. on leaves, Vict. (13).
*Sphæropsis phomatoidea* Cke. et Mass. on leaves, Vict. (13).
*S. eucalypti* Berk. et Br. in Nat. Herb. Syd.
*Diplodina Watsoniana* Fl. Tassi. on *E. Watsoniana*, Queensland (17).
*Hendersonia eucalypti* Cke. and Hark. on twigs of *E. globulus*, Vict. (2) and (13).
H. *grandispora* McAlp. on leaves, Wangaratta, Vict. (15).
*Camarosporium eucalypti* Wint. on leaves, Vict. (7) (13).

Family Nectroidaceae.

*Martinella eucalypti* Cke. on leaves, Vict. (12) (13).

Family Leptostromataceae.

*Leptothyrium aristatum* Cke. on dead leaves, Vict. (7) and (13).
*L. eucalyptorum* Cke. et Mass. on leaves, Vict. (7) and (13).
*Pigotia substella* Cke. on leaves, Vict. (7) and (13).
*Melasmia eucalypti* Cke. et Mass. on dead leaves, Vict. (7) and (13).
*Sacidium eucalypti* Cke. et Mass. on dead leaves of *E. globulus*, Vict. (13).
*Leptostromella eucalypti* Cke. et Mass. on leaves of *E. incrassata*, Vict. (7) and (13).

Family Excipulaceae.

*Protostegia eucalypti* Cke. et Mass. on leaves of *E. incrassata*, Vict. (7) and (13).

Family Melancoriaceae.

*Gloeosporium eucalypti* McAlp. on leaves of *E. cladocalyx* (*E. corynocalyx*) (16).
*G. nigricans* Cke. et Mass. on leaves of *E. coriacea* (*pauciflora*), Vict. (6) and (16).
*G. ochrostichum* Sacc. on leaves of *E. coriacea* (16).
*G. capsularum* Cke. et Hark. on fruits (6).
*Pestalozziella circulare* Cke. et Mass. on leaves of *E. coriacea* (13).
Also on *E. parviflora* (7).
Family Melanocoriaceae—continued.

Pestalozzina exilis Fl. Tassi. on leaves of E. eximia, N.S.W. (17).

Stilbospora foliorum Cke. on leaves, Vict. (13).

Pestalozzia monocheta Desm. on leaves of E. globulus (2) and (13).

P. funerea Desm. on twigs of E. globulus (2) and (13).

P. inquinans Cke. et Hark. on leaves (6).

Corynema viminal Ae Cke. et Mass. on leaves of E. viminalis, Vict. (13).

Cylindrosporium eucalypti McAlp. on E. melliodora, Dandenong Creek, Vict. (15).

Hyphomycetes.

Family Mucediniaceae.

Penicillium glaucum Link. on twigs of E. globulus (2) and (13).

Family Dematiaceae.

Hormiscium pilophyllum Nees, on leaves and branches, S.A., N.S.W. (13).

Clasterosporium clavatum (Cke. et Hark.) (Bactrodesmium clavatum Cke. et Hark.) on bark (7).

Cercospora eucalyptoides Cke. et Mass. on leaves, Vict. (13).

C. eucalypti Cke. et Mass. on leaves, Vict. (13).

Family Tuberculariaceae.

Fusarium obscurum Cke. et Mass. on E. globulus, Vict. (13).

Hymenula eucalypti Cke. et Mass. on leaves, Vict. (13).

Family Stilbacese.

Fusarium rubicola Berk. et Br. on leaves, Qld. (13).

Mycetozoa (Myxogastres).

Family Liceaceae.

Tubulina cylindrica (Bull.) var. nitidissima on leaves of E. microtheca, Qld. and Tas. (13).

Schizomycetes.

Bacterium eucalypti Greig Smith, in "Manna" from E. punctata. Proc. Linn. Soc. N.S.W., xxviii, 831 (1903)

Bibliography:

2. Cooke, M. C., and Harkness, H. W., Fungi on E. globulus, collected in California, Grevillea, IX, 127 (1880).
3. Cooke, M. C., Grevillea, Ix, 146 (1880).
4. " X, 60 (1881).
5. " XII, 82 (1884).
6. " XII, 94 (1884).
7. " " Handbook of Australian Fungi" (1892).
Bibliography:—continued.
10. Cleland, Dr. J. B., and Cheel, E., ibid, LI (1917).
15. " XXVIII, 97, 99 (1903).

d. Weeds,

In Annual Report, Forestry Commission, N.S.W. (up to 30th June, 1919), p. 27, is a note on the growth in twelve months of certain trees (E. macrocarpa, E. pilularis, E. saligna) affected and not affected by the strangling vines of Kennedya rubicunda, near Wyong, N.S.W. It had been brought under notice by Mr. F. G. McPherson, the local District Forester, Wyong, who reported—

"This vine is superabundant at present throughout the forests in this district, especially on areas which have been improved, where they attack and cover up the young hardwood trees in a very short space of time. I know areas where re-afforestation is good and young trees up to from 2 to 5 feet high are plentiful, but they are all hidden from view by this vine. I am afraid it will menace the forests by retarding the growth of the young trees."

The answer that I gave was as follows:

"A native of Australia. In open sandstone country it is usually a trailer, but in the scrub it is a vigorous climber. The point you raise is a very interesting one; there is, in effect, a struggle going on between the vine and the young trees. Probably it would not pay for the forester to interfere in the struggle as a rule. But I expect that, in the vast majority of cases, the young trees will shoot up and leave the humbler vine, the leaves of which may have some manurial value for the forest. Firing the land very much helps the dissemination of a vine like this, as it burns off its enemies and facilitates the germination of the seed of the vine."

Vines twine round other plants and sometimes destroy them, but some of them (Vitis) have the redeeming quality that they contain water, which can be obtained by
cutting them in pieces about a foot long, and draining them into a receptacle. *Ipomaeas* (Morning Glory), and many other twiners develop the strangling habit. I have referred to the matter and given illustrations under the title "Aboriginal Method of obtaining Water," at p. 14, Part LI, of my "Forest Flora of New South Wales."

V. Animals (Native and other).

See my "Forest Flora of New South Wales," Part LXX, p. 444, where the subject is, although inadequately, dealt with at some length.

VI. Miscellaneous.

Hand of Man.

The deliberate destruction has arisen from two causes—(1) the destruction of trees to convert them into timber; and (2) the destruction of trees and shrubs in the formation or improvement of pastoral and arable land.

In (1) the requirements of engineering and mining works, building, fencing, furniture, &c., have to be provided for. Under (2), the burning off has been incessant, but a fair percentage of dead timber has been converted into household fuel in the vicinity of towns. In Western Australia the cutting of green timber for fuel purposes in the vicinity of the goldfields is, because of the local scarcity of coal, carried out to an extent unknown in eastern Australia. Since the removal of all large timber in the vicinity of the gold-fields areas is complete, data should be obtainable in regard to the rate of growth of many species in definite areas, natural re-afforestation being usually allowed to proceed. Chiefly in South Australia there are large forest plantations, this being largely a treeless State. Victoria and New South Wales are doing some planting.

The compensating extent of natural re-afforestation is considerable, although sometimes lost sight of. Some species, *Eucalyptus pilularis* Sm., re-afforest rapidly in forest land, and it is believed that the seeds of forest trees, which pass through sheep and cattle, and which are trampled into the soil, are responsible for the conversion of large areas of grass land into forest in the eastern States. (See Part XLVIII, p. 248.)

The removal of the trees of a forest destroys the plant equilibrium, and interesting changes, which, however, cannot be discussed at this point, take place, particularly in the brush.
VII. THE INFLORESCENCE, and VIII, THE FRUIT—(continued).

DECIDUOUS STAMINIFEROUS RING.

a. Continuous.

b. Discontinuous (Eudesmieae.)

Bentham (B. Fl. Ill., 185) speaks of "Stamens numerous, in several series"

Mueller "Stamens inserted close to the edge of the calyx tube in several rows" (Eucalyptographia).

The staminal ring is an annular membrane to which are attached the stamens in more than one row. It is persistent in the majority of species, but deciduous in a few. In those cases in which it is deciduous, the ring may be pulled off (or drops off) with the stamens attached. Probably in most species (in which it passes as persistent) it is deciduous at an early date. In a number of cases it is semi-deciduous, that is to say, while its presence is obvious, it is not always deciduous.

These "staminiferous rims or rings" are called also "annular rim" and "deciduous rim." (I have occasionally used the term "halo rim.")

Following are the species in which they have been observed:

- E. Dawsoni, figs. 7a, 7b, Plate 175 (shows well the stamens attached; the ring may be likened to a collar in this species).

As a rule, one notices this deciduous ring better in the fruit, for example—

- E. affinis, Figs. 3d, 5, 6, 7, Plate 57.
- E. Behriana, Fig. 6d, Plate 48.
- E. Beyeri, Figs. 2b, 4f, Plate 49.
- E. Caleyi, Fig. 13d, Plate 56.
- E. crebra, Fig. 9, Plate 53.
- E. diversicolor, Figs. 4 and 5, Plate 49.
- E. eremophila, Figs. 7d and 10, Plate 149.
- E. grossa, Fig. 10, Plate 72.
- E. hemiphloia, Figs. 14, 15, Plate 57, and 1d, Plate 196.
- E. patens, Fig. 4, Plate 88.
- E. pruinosa, Fig. 7a, Plate 54 (so labelled, but it is really E. Shirleyi).
- E. Shirleyi, see E. pruinosa.
- E. sideroxylon, Fig. 12, Plate 55.
- E. Websteriana, Fig. 4b, Plate 143.

See also the Eudesmieae, under the caption "Bundling or Tuftiness of the Stamens," at p. 37.
In *E. Bakeri* the stamens may be persistent on the ring even as long as the valves are extruded, so that we may have ripe fruit and stamens together.

So far as I can see, botanists rarely refer to this deciduous rim, and then only in connection with the fruit, as its presence can be easiest seen in that stage.

Mueller refers to "Rim of the young fruit encircled inside by a flat annular membrane" (i.e., staminal ring). (*E. siderophloia,* "Eucalyptographia," which I suggest may be a slip of the pen for *E. sideroxylon*).

There is some correlation, but not a marked one, between species with marked annular rings, and the Terminales, *e.g.*, *E. sideroxylon, E. leucoryx, E. Caleyi, E. Dawsoni.*

**b) Discontinuous.**

**Bundling or Tuftiness of the Stamens (Eudesmieae).**

Robert Brown ("Appendix to Flinders' Voyage," II, 599, t. 3) proposed to establish the genus *Eudesmium,* as separate from *Eucalyptus,* partly by reason of the arrangement of the stamens indicated above. Under *E. erythrocyx,* Part XLV, p. 135, with figures, I have, I think, sufficiently explained the arrangement.

Bentham makes reference to what I have called the Bundling or Tuftiness of the stamens in the case of the following three species. He calls the group which includes them the Eudesmieae.

Stamens . . . forming 4 bundles alternating with the calyx-teeth, the claw or entire part very short and broad, or four clusters, if the claw be considered as a mere dilatation or lobe of the margin of the staminal disk. (*E. erythrocyx.*)

Stamens . . . more or less distinctly arranged in four clusters or bundles, alternating with the calyx-tube, but the claws or dilatations of the disk very short or scarcely perceptible . . . .

(*E. tetragon.*)

Stamens . . . distinctly arranged in four clusters or bundles alternating with the calyx-teeth . . . (*E. eudesmioides.*)

Mueller remarks—

*E. tetrodonta* shares with *E. erythrocyx* the remarkable characteristic of having its stamens united into bundles, which alternate with the teeth of the calyx, though the filaments do not actually unite, but are inserted on semiobicular lobes, different in colour and consistence. On this distinction rests R. Brown's genus *Eudesmium,* which to some extent holds the same position towards *Eucalyptus as Melaleuca towards Callistemon,* and as *Tristania* towards *Metrosideros;* the concrescence of the filaments of *Melaleuca* is one of degree only, and even in the typical *M. Leucadendron* affects merely the very base of the staminal bundles. But as in all three hitherto known Eudesmias, hardly any concrescence of the filaments themselves is traceable, I deemed it best to include them in the genus *Eucalyptus,* especially as calyx-teeth are still more strongly developed in *E. olontocarpa* and *E. tetrodonta.* ("Eucalyptographia," under *E. tetragon.*)

In the Eudesmieae (except *E. tetrodonta*) the four depressions are where the stamens are, or have been inserted.
I will content myself with some references, in the present Part, and it will be seen that the attachment of the stamens is to a deciduous, white, undulating staminal ring, the stamens not continuous as in the non-Eudesmiee, but broken because of the tuftiness already alluded to.

*E. erythrocorys*; see Part XLV, article "Bundling and Tuftiness of the Stamens," at p. 135, and figs. 2d and 2g, Plate 184.)

Two characters may arise from the undulations in the Eudesmiee—

(a) The width of the staminal ring may be greater at the crests or tops of each undulation, becoming narrowest in each trough. (See fig. 2d, Plate 184.)

(b) The lengths of the filaments vary, the longest emerging from the crests of each undulation. (See Part XLV, p. 135.)

*E. eudesmioides.* See Part XLV, p. 136; Part XLVI, p. 165.

*E. tetragona.* See Part XLV, p. 136; Part XLVI, p. 163.

*E. tetrodonta.*—It is expedient to again refer to this species in connection with figs. 2 and 3a, Plate 185, and top of page 136, Part XLV. Calyx distinct, as depicted, the lobes prominent, thick, obtuse, free from the operculum at the apex; operculum thin. Staminal ring cylindrical, raised above the undulate calyx lobes. Filaments numerous, slender, attached to the top of the staminal ring in an almost uniform manner, and not in four clearly distinct bundles. That the four bundles are not clearly marked is shown in fig. 3a. The undulate calyx-lobes in this species are not to be confused with the undulate staminal ring common in the Eudesmiee.

*E. Baileyana.* See Part XLIV, p. 113; Part XLV, p. 136.

---

**DISC OF THE FLOWER.**

**Historical.**

Bentham, 1866.

Mueller, 1879–84.

Following are the species in which Bentham refers to the disc, so far as the stamens are concerned, but I cannot trace where he gives a definition of the disc:

*E. macrocarpa.* "Their insertion (stamens) raised to about 2 lines above the edge of the calyx by the thick edge of the disc, which is also often slightly raised within the stamens in a ring round the ovary." (B.Fl., iii, 224.)

*E. globulus.* "Stamens . . . raised above the calyx by the thick edge of the disc." (ib., 225.)
"Disc very broad, forming within the stamens a thick prominent ring round the depressed top of the ovary." (Ib., 226.)

E. conoides (erythrocorys). "Stamens . . . raised by the thick disc /₄ to 1 line above the border of the calyx." (Ib., 227.)

E. robusta. "Stamens . . . somewhat raised above the calyx-border by the annular margin of the disc." (Ib., 228.)

E. Preissiana. "Disc broad and concave, the ovary with as many protuberances in the centre as valves." (Ib., 232.)

E. annulata. " . . . the margin of the disc that bears them (stamens) forming a raised inflexed ring about ½ line broad." (Ib., 234.)

E. spathulata Hook. " . . . the border of the staminal disc inflected over the sunk ovary. . . ." (Ib. 236.)

E. pachyplana. "Disc concave." (Ib. 237.)

E. Oldfieldii. "Disc forming a more or less raised ring within the stamens round the flat-topped ovary." (Ib., 237.)

E. Drummondii. "Disc very broad, nearly flat, forming a prominent ring round the ovary, of which the obtusely conical centre protrudes about 1 or 1½ lines above the disc at the time of flowering." (Ib., 237.)

E. orbifolia. "Disc narrow round the conical summit of the ovary, which protrudes 3 or 4 lines above the border of the calyx, tapering into the short thick style." (Ib., 238.)

E. resinifera. "Stamens . . . raised above the calyx-border by the disc. (Ib., 245.)

E. pellita. "Stamens . . . somewhat raised above the calyx-border of the disc." (Ib., 246.)

Mueller ("Eucalyptographia ") uses the term "staminiferous disc" (under E. occidentalis). He also uses the terms "disca1 summit" and "disca1 portion, &c." (See Part LX. p. 604.)

---

**DISC OF THE FRUIT.**

In the definition of the genus, Bentham says—

"Fruit . . . the persistent disc usually thin and lining the orifice of the calyx-tube when the capsule is deeply sunk; concave, horizontal, convex, or conically projecting, and more or less contracting the orifice when the capsule in not much shorter than, as long as, or longer than the calyx-tube; the capsule always adnate, &c." (B. Fl. III, 185.)

E. pachyphylla and E. Oldfieldii. "Disk forming a raised ring or prominent rim. . . ." (Ib., 196.)

E. pachyplana, E. Drummondii, and E. orbifolia. "Disk concave in the flower, very convex in the fruit. . . ." (Ib., 196.)

E. macrocarpa. Bentham says, "the very broad disk forming a raised rim." (Ib., 224.)

E. globulus. He uses the terms "flat-topped 'disk' or 'rim.'" (Ib., 225.)

E. pyriforrnis. He refers to the ring formed by the "disk." (Ib., 226.)

He uses the term "disk" in the sense of "rim" under erythrocorys, see p. .
Mueller, in the definition of the genus ("Eucalyptographia") says—

"... discal space intervening between the (inner, J.H.M.) edge of the calyx and the base of the valves from narrow to very broad in different species, and not seldom protruding."

"... discal expansion forming a narrow rim beyond the calyx-teeth." (Specific description of E. tetradonta.)

"... discal lining generally much extended beyond the ovary." (Generic definition of Eucalyptus—"Eucalyptographia.")

The following are synonyms:—

Discal-lining.
Floral disc (flower).
Capsular disc (fruit).

Let us begin with some preliminary observations.

_Disc or Discal-lining._ In _E. Preissiana_, _E. megacarpa_, _E. globulus_, and _E. alpina_, which we take as examples, the thick band or expansion at the top of the fruit is an enlargement of the floral disc. Its development in the fruit or capsule can be traced from the floral stage. In all species examined it varies somewhat, but its presence, as far as I have observed, is indicated by the usually dark zone or lining at the base of and on the sides of the calyx-tube. In the species mentioned, the pulvinate gland-like processes are present on the floral disc, and as the ovary develops, so also does the disc. As the ovary develops, it grows upwards and outwards, and apparently more so in the centre, until it is carried, with the disc, beyond the level of the calycine rim. The rim then increases in thickness, and at the same time gradually extends over the valves of the capsule, but in all cases leaves the tips of the valves free. In _E. Preissiana_ the disc is entirely free from the valves, and forms a thick crenate layer above them on the inner margin, while the outer edge is fused to the calycine portion of the capsule. The disc therefore derives its nutriment from the calycine portion, and not from any portion of the valves or ovary.

The term "discal-lining" applied by Mueller to some species is a very appropriate one, for in the species mentioned the calyx-tube cup is deep, and has a dark carnose lining which extends towards the ovary in a wave or crenate line, and is differentiated from the ovary by the colour, that of the latter organ being always much paler. The discal lining is naturally more noticeable in species with large flowers and fruits. The term could be conveniently used in descriptions when the disc is obscure, because it is, like the disc, an important character, as it is very largely responsible for the morphosis of the fruit.
EXPLANATION OF PLATES 248-251.

PLATE 248.

**Bracts and Bracteoles.**

1a. (a) Bracts (there are up to three, fused at the edges, to each bud), enveloping the single bud.

Where the pedicels are attached to the peduncle, the scar of the more inclusive bracts which envelop the umbel will also be seen.

1b. Bract at base of pedicel enveloping the entire umbel, of which only one bud is shown.

1c. Plan of a bud and bracts (1a (a)), the bracts surrounding the bud (b). All are from *E. pyriformis Turcz. var. elongata*, cultivated in Botanic Gardens, Sydney (W. F. Blakely, December, 1917).

2a. Twig of *E. Camfieldi* Maiden, showing leaves and undeveloped umbels.

2b. Umbel, enlarged, showing (a) bracts, enveloping the buds. From the type locality of *E. Camfieldi*, viz., about 100 yards south of the 17 mile-post, Galston-road, Hornsby, Sydney (W. F. Blakely and D. W. C. Shiress).

3a. Immature buds, somewhat irregular in contour, of *E. de Beuzevillei* Maiden.

3b. Young umbel, showing enveloping bracts, still fused by their edges. Same species, and all specimens from the type locality (W. A. W. de Beuzeville).

4. Enveloping bracts, as yet joined together, *E. mintata* A. Cunn., Goody Goody, Western Australia (W. V. Fitzgerald).

5a. An umbel, natural size, showing a bract at (a).

5b. The same umbel, greatly enlarged. (a) a bract; (b) a bracteole. The enclosed buds are shown shaded. Although in the enlarged drawing the bracts have the appearance of being continuous with the flattened peduncle, this is really not so, for at an early stage the bracts wither, and being articulated to the peduncle, drop off. *E. pyrophora* Benth., Saxby River, Northern Queensland (Miss Florence Salmon). See Part LVIII, p. 465.

6a. Buds with enveloping bracts (a).

6b. The enveloping bracts, with the buds removed.


These bracts are in pairs, more or less persistent, confluent with the peduncle, broad lanceolate to navicular, concave, thick, slightly keeled, the margins uniting, subperfoliate, 5-8 mm. long, 3-5 mm. broad. They are not unlike the bracts of some of the Loranthaceae. Enlargement concave and hooded, superposed by a strong solid apical process which is also slightly concave. The lower or larger cavity appears to be the impression caused by the outer bud; the smaller upper cavity represents the impression of the top of the central bud, which is usually longer than the lateral or outer buds. It would appear that in the early stage the bracts enveloped the three buds, are free at the apex, and the apical portion is a protection for the lower part of the bract.

7a. Umbel, natural size, of *E. ficifolia* F.v.M., showing subtending bract.

7b. Umbel, natural size, showing bracts (a) and bracteoles (b).

7c. Showing the bracts (a) and bracteoles (b) in plan.

7d. Umbel, natural size, showing bracts (a) and bracteoles (b).

7a, 7b, and 7d show progressive stages of development of the buds. Note that the opercula in 7b and 7d show more or less clearly where a second operculum has fallen off from each bud.

All the above from *E. ficifolia*, cultivated in the Botanic Gardens, Sydney.

Membranes of Bud.

8. (a) Calyx-tube.
    (b) Inner operculum (No. 2).
    (c) Outer operculum (No. 1).
    (d) Fragments of an outer scurfy layer.
    (e) External membrane of the calyx-tube.

(c) and (e) appear to correspond, so do also (a) and (b). (All of E. eximia Schauer.)

The membranes covering the calyx-tube and operculum in E. eximia appear to consist of the outer coverings of both organs. Each membrane is of such a tough, gelatinous-like nature that it can be separated without laceration.

If (c), the outer operculum, is of calycine origin, then what about (e), which is obviously of similar origin? It seems to me that they both represent the calyx, and we have a key to the position in the Hinged Operculum (see Part LVIII, p. 492), where, in numerous species of the Corymbosae, it is shown that in what corresponds to (e) and (c) there is a tearing, in other words, there is an indication of some continuity between them. In the present case there is a sharp line of demarcation between (c) and (e), but this must not be relied upon too much, as there is occasionally a fusion (and consequently a tearing) of (c) and (e) in E. eximia also.

Scurfiness.—The minute dark patches (d) on the outer membrane or outer operculum are due to a scurfy substance which more or less envelops the young buds and is not uncommon in the Corymbosae. It is therefore present on the calyx as well as the operculum.

We have a somewhat similar condition in E. terminalis, except that, in the latter species, the scurfiness is more persistent, and also in E. corymbosa, where there is a note on “Scurfiness of Fruits,” at Part XXXIX, p. 243.

The Operculum (double, solid and hinged).

9a. (a) Outer operculum (of an amber colour when fresh);
    (b) Inner operculum (of a green colour when fresh).

E. maculata Hook. f. See also Part LVIII, p. 489. When the outer operculum is cast in this species, the inner one is seen to be smooth and shining; in this character it appears to differ from all other species.

10. Showing the operculum, a little pyramidal cap, which has ceased to grow, and which is gradually pushed off by the expanding stamens. E. tetrapeta Turcz., cultivated in the Botanic Gardens, Sydney.

11a. Side or oblique view of fleshy operculum.

11b. Longitudinal section of the same. Note the increasing thickness as the apex is approached, and also the cavity which serves to enclose the stigma and the upper part of the style.

11c. The same, looked at from above; the mould-like cavity for the stigma is seen as a small inner circle. E. macrocarpa Hook., cultivated in the Botanic Gardens, Sydney, 13th August, 1917.

12a. External view of operculum.

12b. Oblique view of operculum.

Note how fleshy it is. At the centre of the inside of the operculum (i.e., at the top of the operculum) is a cavity which encloses the stigma and the top of the style. In the lithograph, this cavity is not as clear as in the original. It is not as deep as in E. macrocarpa, as may be readily inferred from the greater length of the umbo in this species. E. ppriformis Turcz., Mullewa, Western Australia (C. E. Chapman, October, 1919. It had shrunk a little when I received it).

13a. The winged, solid calyx-tube, which is orange-scarlet in colour. Note the slightly protruding stigma.

13b. The almost solid operculum, square, with rounded corners at the base. Note the deeper shaded circle in the centre, which indicates the sheath for the top of the style and of the stigma. E. tetrapeta Turcz., cultivated in the Botanic Gardens, Sydney, 17th September, 1919.

This method of protection of the stigma has been shown in three conspicuous instances. It is, however, probable that in Eucalyptus the stigma is protected in a similar manner in all or most cases, though it is obvious that in very small or thin opercula it would not be readily seen.

15. Flower showing the persistent operculum. *E. ficifolia* R.v.M., cultivated Botanic Gardens, Sydney. The same has also been observed in *E. caespifolia* R.Br.

In these cases (and it has been observed in other species, see Part LVIII, p. 492), it will be observed that the calyx-tube has continued to grow, leaving the operculum in arrested development, adherent to the calyx-tube in the manner of a hinge.

**Sepals and Petals.**

16. Comparatively young buds of *E. tetragona* F.v.M., showing oil-glands (dots) and also faint lines of demarcation indicating the margins of petals. Lynburn, Alexander River, Western Australia (H. P. Turnbull).

17. This calyx indicates clearly the partial division into sepals (*E. tetragona* F.v.M., Port Darwin, Northern Territory, Nicholas Holtze). It shows a bud free from insect action, and the raised tubular staminal ring behind the sepals. We have in this specimen something more than "a distinctly toothed calyx," as originally remarked by Robert Brown.

*E. tetragona* F.v.M., Bathurst Island, G. F. Hill, No. 466. See figs. 18a, 18b, being plan and elevation of a bud. (Compare also figs. 2 and 3a, Plate 185, Part XLI.)

Figs. 18a and 18b represent a bud attacked internally by insects, but externally they clearly demonstrate certain morphological characters. They not only show the young calyx separated into its sepals, but also the petals fused into an operculum. The four petals are partly united, but not perfectly so, for the demarcation lines are still present, which indicate the original line of cleavage of the petals before metamorphosis took place. This seems to indicate that at one time the petals of this species were free and valvate in the bud, with a thickened keel or raised line down the centre, but somewhat thicker towards the top. (I am aware that in the Myrtaceous the petals are very much imbricate in the bud. It may be that in the process of fusion of the petals the overlapping or imbrication has become obliterated, or is represented only by a thickening.)

The buds at this stage also show the sutural line of the operculum, which indicates that the petals were deciduous in a very early state.

Raised lines indicating the shape of the opercula are to be seen in at least two other species of the Endemiceae, e.g., *E. eugrados*, fig. 2f, Plate 184. See also its presence in *E. tetragona*, as shown in fig. 1b. Operculum fairly thin, hemispherical, copiously dotted with somewhat prominent oil-glands, and marked by four very fine lines which are sometimes only discernible with the aid of a lens, but often are much more distinct.

The less closely related *E. pygiformis* also shows these raised lines, e.g., figs. 16, 4c, Plate 75, and figs. 1d, 4b, Plate 76. In these cases, although there are more than four ribs, there are four principal ribs. See also fig. 6e, Plate 75, of *E. pygiformis* var. *minor*, which is *E. pachyphylla*, as shown in Part XLI, figs. 1-3, Plate 171.

Although in the previous examples we have been dealing with the evidence of petals in the operculum, it is proper to suggest that, in some cases, the ribs or wings in the calyx-tubes indicate the lines of demarcation of sepals. For example:

"*Endemia* (tetragona) . . . differs from *Eucalyptus* solely in having a striated operculum placed within a distinctly toothed calyx, and in its filaments being collected into bundles. The operculum in *Endemia*, from the nature of its striae, and their relation to the teeth of the calyx, appears to be formed of the confluent petals only; whereas that of *Eucalyptus*, which is neither striated nor placed within a distinct calyx, is more probably composed, in several cases at least, of both floral envelopes united. . . ." (Robert Brown, in "Flinders's Voyage," 1814.)

In Part LVIII I promised to discuss the above two sentences when a figure or figures of operculum were available, and when discussing the affinities of the Endemiceae.
19a. Longitudinal section of a nearly expanded bud of *E. tetragon* F.v.M., Stirling Range, Western Australia, showing inflection of the filaments, ovules, and top of ovary.

19b is the operculum of the same, and 19b (b) and 19a (a) are the same organ. (See also fig. 16.)

The inside of the operculum is more or less striate, and a small cleft, compressed or angular, stipes-like attachment projects from the centre of the top.

If a longitudinal section of a bud is made, this stipes-like appendage is seen to project downward towards the style, and sometimes it exceeds that organ. When it is longer than the point (stigma) of the style, the latter is seen to grow to one side, as it were, to allow the projection to pass down towards the base of the style. Or it may be that the stalk-like appendage is of much harder substance than the style, and in that case the style is forced to bend when it comes in contact with it.

This appendage is rarely seen, and requires investigation. In the bud-section its presence seems to accentuate the division of the operculum into four petals, and the "appendage" may be of the nature of a stipes or claw.

**PLATE 249.**

**Anthers.**

**A. Renanthera.**

1a. Renanthera (normal). (See Part LIX, p. 525.)

1b. Subseries Alpine. (See p. 526.)

1c. Subseries Brachyandra. (See p. 527.)

1d. Anthers of *E. Gwillioylei* Maiden, which open very widely and have the appearance of the wings of a butterfly. (See p. 528.)

**B. Renantheroidea.**

**C. Porantheroidea.**

3. Porantheroidea. (See p. 529.)

4. Terminales. Note the anther erect on the filament, and oblique on the filament. There is often absence of the gland in the Terminales. (See p. 550.)

**E. Platyanthera.**

5a. Platyanthera, of which the authors of *E. oleosa* may be taken as a type. (See p. 532.)

5b. Subseries Graciles. (See p. 533.)

5c. Subseries Pyriformes. (See p. 533.)

**F. Macranthera.**

6a. Subseries (1) Tereticornos. (See p. 533.)

6b. Subseries (2) Longiores. (See p. 535.)

6c. Anthers of *E. miniata* and *E. phanicea.* (See p. 535.)

6d. Anthers of *E. subialis* and *E. Camposea.* (See p. 536.)

6e. *E. calophylla.* Note the tapering of the filament at the connective, and thickening towards the base. This also shows a specimen of a versatile anther. All anthers may be versatile except Terminales and Porantheroidea.

6f. Globular anther—parallel slits. *Endesmiex* (*E. erythrocorys*). (See p. 536.)
60. Versatile anther with large gland, *E. goniantha*. One of the miscellaneous anthers indicated at top of p. 535.

6n. Anther of *E. diversicolor*. (See "Miscellaneous," top of p. 533.) This bears considerable affinity to fig. 2 (Rantheroideae), but seems to be anomalous, and may therefore be kept apart for further information.

**Lack of Uniformity.**—We must be careful not to suggest uniformity where it is non-existent. It may be that we have only one specimen of a particular species, and, if other specimens were found, the anthers would probably show some lack of uniformity. Indeed, in some common species it becomes difficult to say what one would adopt as the typical form of the anther. This is but an additional instance of the fact that all the organs of a species vary within limits—that variation is a grand law of Nature.

**Gland.**—In judging an immature anther, it is always the case that the gland is rather large, and as growth progresses it becomes less in size, as if its partial absorption were necessary for the development of the anther. I have briefly referred to the matter under *E. Shirleyi*, Part LVIII, p. 425.

**Size.**—In exhibiting a series of comparative drawings of anthers, one must be careful to remember that they vary a good deal in size. Indeed, some are so small that a life-size drawing would be of little value to the person of average eyesight.

**Inflexion of Stamens.**

I have omitted illustrations in the present work, as Mueller has so freely shown them in his longitudinal sections of the flower buds throughout the "Eucalyptographia." (See also the statements in Part LIX, p. 546.)

These two drawings, Nos. 7 and 8 (see also 19a, Plate 248), are intended more as a reminder than anything else.

7 is *E. tetrapetala* Turcz., and

8 is *E. erythrocorys* F.v.M., both cultivated Botanic Gardens, Sydney, 10th July, 1922.

7a is the wing of the calyx-tube and bud generally, and

7b is the wall of the bud generally.

In both figures, note that the stamens in the bud are inflected from the stigma. Notice also the section through the ovary, and the curve of the top of the ovary.

**Style and Stigma.**

9. From left to right, here are shown stigmas of *E. terminalis* F.v.M. (Darwin), two drawings showing papilla round the edge of the stigma, and *E. tetrodonta* F.v.M. (Darwin) two. It is very difficult to show differences in stigmas, other than those exhibiting an enlargement (as compared with the stigma), and those practically of the same diameter as the style. The styles vary in length of course. The young stigma of *E. phyllocladus* from an unopened bud has been found to be square in shape.

**Evolution of the Disc.**

10a–10e. *E. tereticornis* Sm. Floral disc conspicuous, forming a distinct dark, carmine, raised ring of 2–3 mm. around the base of the conical ovary, or projecting well beyond the staminal ring. Cylindrical disc broad, domed, exceeding the calyx-rim by 3–4 mm.

*E. tereticornis*, five figures (all enlarged) to illustrate the evolution of the adnate disc.

(All from Outer Domain, Sydney.)

10a. (a) Calyx-tube.

(b) Calyx-rim.

(c) Staminal ring.

(d) Floral disc.

(e) Ovary.
10b. (a) Calyx-tube.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Floral disc, more advanced than in Fig. 10a.
   (e) Ovary.
   (f) Base of style.

10c. (a) Calyx-tube.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Floral disc, more advanced than in Fig. 10b.
   (e) Half-developed ovary.
   (f) Base of style.

10d. (Showing capsular disc)—
   (a) Calyx-tube.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Capsular disc.
   (e) Valves of the capsule.

10e. (Showing capsular disc)—
   (a) Calyx-tube.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Capsular disc.
   (e) Valves of the capsule.

It will be observed from the figures that the floral disc changes (evolves) into the capsular disc; in other words, there is no fixed line between them. The evolution of the calyx can be traced in the same way.

PLATE 250.

The Disc.

*E. pyriformis* Turcz. var. *Kingsmilli* Maiden (1a to 1e, of which 1e is alone of natural size).

1a. Longitudinal section of flower.
   (a) Calyx-tube with wing.
   (b) Calyx-rim.
   (bl) Thickness of calyx-tube.
   (c) Staminal ring.
   (d) Nectary trough between the staminal ring and the floral disc.
   (e) Floral disc.
   (f) A deep nectary between the ovary and the floral disc.
   (g) Ovary and style.
   (h) Ovary.

1b. A very young fruit.
   (a) Calyx (calyx-tube) showing prominent ribs.
   (b) Calyx-rim.
   (bl) Thickness of calyx-tube.
   (c) Torn membranous lining of the lower edge of the operculum.
   (d) Staminal ring.
   (e) Outer nectary (between the inner edge of the staminal ring and the disc).
   (f) Floral disc.
   (g) Inner nectary, surrounding the ovary.
   (h) Ovary and style.
1c. Transverse section of base of style.

1d. Fruit (enlarged).
   (a) Calyx-tube, with its prominent ridges or wings.
   (b) Calyx-rim.
   (b1) Thickness of calyx.
   (c) Staminal ring.
   (d) Capsular disc.
   (e) Valves of the capsule (all drawn from the type).

1e. Fruit, natural size, for comparison with the above enlarged drawings.
   (Near Mount Keith, north of Leonora, Western Australia, Hon. W. Kingsmill, M.L.C.)

E. pyriformis Turcz.

2a. (a) Calyx-tube, winged.
   (b) Calyx-rim.
   (b1) Thickness of calyx-tube.
   (c) Staminal ring.
   (d) Stamens.
   (d) Floral disc.
   (e) Ovary and style (pistil).

2b. (a) Calyx-tube. Ridges of the calyx.
   (b) Calyx-rim.
   (b1) Thickness of calyx-tube.
   (c) Staminal ring.
   (d) Floral disc, with impressions left by stamens.
   (e) Ovary and style. The dark spots are the impressions of the anthers around the base of the raised ovary.

2c. Fruit (showing capsular disc).
   (a) Calyx-tube, showing prominent ribs.
   (b) Calyx-rim.
   (b1) The thickness of the calyx-tube supporting operculum.
   (c) Staminal ring.
   (d) Capsular disc.
   (e) Valves of the capsule.
   (Ooldea, north of Fowler's Bay, South Australia, Henry Deane.)

E. macrocarpa Hook. Floral disc forming a broad, slightly raised ring around the base of the ovary, and some distance from it, the upper surface of the disc more or less distinctly marked by the impression of the bases of the filaments, the inner edge sharp, slightly concave, lower than the centre of the ovary and staminal ring, so that a shallow nectary trough is formed around the ovary.

Capsular disc prominent, thick, more or less oblique, or in perfect specimens rounded or domed, exceeding the staminal rings by about 10 mm.

3a. (a) Calyx-tube.
   (b) Calyx-rim.
   (b1) Thickness of calyx.
   (c) Staminal ring.
   (d) Capsular disc.
   (e) Valves of the capsule.

3b. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx.
   (c) Carpels.
   (d) Cell.
   (e) Placenta.
   (f) Placental column.
PLATE 251.

*The Disc (continued).*

_E. erythrocorys* F.v.M. Floral disc thick, dark green, fleshy, forming a raised wheel-like design over the top of the ovary, from the circular portion four spoke-like ridges of the same thickness as the circular portion project into the calyx-tube, midway between the calyx-teeth, and form supports for the calyx lobes or the undulating staminal ring.

1a. (a) Calyx-tube (showing ribs).
   (b) Tooth of the calyx (of which there are four) or rudimentary sepals.
   (c) Calyx-rim.
   (d) Undulating staminal ring attached to the rudimentary petals.
   (e) Ridge supporting the rudimentary petal.
   (f) Circular floral disc over the top of the ovary.
   (g) One of the four trough-like nectaries outside the floral disc.
   (h) Top of ovary and nectary inside floral disc. The base of the style is also shown.

1b. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Thick placental column.
   (d) Cell.

1c. Transverse section of fruit.
   (a) Edge of the ribbed calyx-tube.
   (b) Thickness of the calyx-tube.
   (c) Cell.
   (Dongarra, Western Australia, W. D. Campbell.)

_E. Baileiana* F.v.M.

2. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Carpels.
   (d) Cell.
   (e) Placental column.
   (Eight-mile Plains, near Brisbane, F. M. Bailey.)
E. tetrodonta F.v.M. Floral disc more or less prominent, forming a dark carnose covering over the top of the conical ovary, almost up to the base of the style, and projecting in the thickish ridges over the centre of the embryonic valves of the ovary, and thus forming three or more distinct ovarian nectaries. Capsular disc forming a small dark carnose ridge over the centre of the valves as in the floral disc, and considerably lower than the staminal ring, which remains conspicuous on the ripe capsule. (No figure given of disc of E. tetrodonta at this place.)

E. tetrapera Turcz.

3a. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Cell.
   (d) Discal lining.
   (e) Top of carpel.
   (f) Edge of carpel.
   (g) Placental column.

3b. Transverse section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Cell.
   (e) Placenta.
   (f) Wing of the calyx.
      (Both near Cape Riche, Western Australia, W. Dunn)

E. tetragona F.v.M.

4a. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Cell.
   (c) Top of the carpels.
   (d) Ovary.

4b. Transverse section of fruit.
   (a) Rim of calyx-tube.
   (b) Thickness of calyx.
   (c) Cell.
      (Both Bremer Bay, Western Australia, J. Wellstead.)

E. Watsoniana F.v.M.

5a. (a) Calyx-tube.
    (b) Thin jagged membrane or inner lining of the operculum, which becomes detached from the lower inner edge, as the operculum falls off. (Same as 1b (c), in E. pyriformis var. Kingsmilli.)

5b. Operculum from the inside. Note the thick texture.
      (Delubra, Mundubbera, Queensland, H. S. Bloxsome.)

E. Oldfieldi F.v.M. Floral disc forming a short tubular raised disc above the base of the ovary and top of the calyx and about 2 to 3 mm. from the staminal ring. Staminal ring slightly raised above the top of the calyx, so that a shallow trough-like nectary is formed. The deeper hollow cavity around the top of the ovary would also serve as a reservoir for nectar. Capsular disc thick, semiconical (resembling the lower half of a cone), truncate, exceeding the calyx-rim by 4-5 mm. The morphology of the disc from the flowering to the fruiting stage in this species is similar to that of E. pyriformis and the variety Kingsmilli.

6a. Flower with stamens removed.
   (a) Calyx-rim.
   (b) Staminal ring.
   (c) Floral disc.
   (d) Ovary and portion of style.
6b. Very young fruit.
   (a) Calyx-tube.
   (b) Calyx-rim.
   (c) Thickness of calyx-tube.
   (d) Staminal ring.
   (e) Raised floral disc.
   (f) Ovary and base of style.

6c. Plan of same.
   (a) Calyx-rim.
   (b) Thickness of calyx-tube.
   (c) Staminal ring.
   (d) Floral disc.
   (e) Ovary and base of style.

6d. A cluster of fruits—natural size—showing the developed disc.
   (a) Calyx-tube.
   (b) Rim of calyx-tube.
   (c) Staminal ring.
   (d) Floral disc.
   (e) Ovary and base of style.

   (All Minginew, J.H.M.)

_E. Drummondi_ Benth. Floral disc forming a raised ring around the sides of the ovary and partly adnate to it, exceeding the calyx-rib by about 1.5 mm. Staminal ring indistinguishable from the top of the calyx, and slightly lower than it. A nectar-like trough is formed in this species somewhat similar to that of _E. Oldfieldi_, except that in _E. Drummondi_ it is the top of the calyx which is highest, and not the staminal ring. There is also a troughlike cavity around the conical ovary, as in _E. Oldfieldi_, but not nearly so deep, as the ovary is more exert and cone-like. Capsular disc thick, domed, exceeding the calyx-rib by about 3 mm. The staminal ring which has grown outward is also present on the ripe capsule, and it is higher than the calyx-rib, or top of the calyx of the flower.

7a. Illustrating the floral disc.
   (a) Calyx-tube.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Inner edge of staminal ring.
   (e) Floral disc.
   (f) Nectary.
   (g) Top of ovary and portion of style. The dark spots are the impressions of the anthers when in bud.

7b. Illustrating the capsular disc.
   (a) Calyx-tube.
   (b) Line indicating the top of the calyx or outer edge.
   (c) The broad band indicates the top and inner edge of the calyx-tube.
   (d) Staminal ring.
   (e) Prominent capsular disc.
   (f) Valves of the capsule.

   (Cut Hill, York, Western Australia. O. H. Sargent. No. 266. All enlarged. See Plate 74, figs. 7, 9, 10b.

_E. pellita_ F.v.M. Floral disc annular, carnose, purple-brown, slightly exceeding the staminal ring, as in _E. resinifera_. Capsular disc annular, truncate, completely absorbing the staminal ring in some cases, but in others, as in _E. resinifera_, the staminal ring may be present.

8a. Illustrating the floral disc.
   (a) Calyx-tube.
   (b) Calyx-rim.
   (b1) Thickness of calyx-tube.
   (c) Raised staminal ring.
   (d) Floral disc.
   (e) Ovary and portion of the style.
Sb. Plan of the top of the flower.
(a) Calyx-rim.
(b) Thickness of calyx-tube.
(c) Staminal ring.
(d) Ovary.
(e) Base of style.
(Ourimbah State Forest, New South Wales, W. A. W. de Beuzeville.)

Sc. Ripe fruit, illustrating capsular disc.
(a) Calyx-tube.
(b) Calyx-rim.
(b1) Line indicating inner edge of calyx.
(c) Raised staminal ring.
(d) Capsular disc.
(e) Valves of the capsule.
(Kuranda, North Queensland, Miss Edwards.)

Sd. Ripe fruit, illustrating the capsular disc, which is more domed than in Sc.
(a) Calyx-tube.
(b) Calyx-rim.
(b1) Line indicating inner edge of calyx-tube.
(c) Capsular disc.
(d) Valves of the capsule.
(Wrong, New South Wales, J. L. Boorman.)

*E. resinifera* Sm. Floral disc annular, carnose, dark purple-brown, projecting a little beyond the staminal ring. Capsular disc annular, truncate, the inner portion more or less sloping towards the valves; staminal ring sometimes absorbed by the disc.

9a. Illustrating the floral disc. (Enlarged.)
(a) Calyx-tube.
(b) Calyx-rim.
(b1) Thickness.
(c) Raised staminal ring.
(d) Floral disc.
(e) Ovary and portion of style.

9b. Longitudinal section of flower, illustrating the floral disc.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Top of calyx-tube.
(d) Staminal ring.
(e) Floral disc.
(f) Top of ovary.
(g) Ovules attached to placenta.
(h) Placental column.
(Tintenbar, New South Wales, W. Baueken.)
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:—

*acacioides* A. Cunn. (xlviii).
*acmenioides* Schauer (xxxii).
*affinis* Deane and Maiden (lvi).
*amygdalina* Labill. (xvi).
*Andreesi* Maiden (xxi).
*Baileyana* F.v.M. (xxxv).
*Bakeri* Maiden (lxx).
*Baueriana* Schauer (lvii).
*Baueriana* Schauer var. *conica* Maiden (lviii).
*Behriana* F.v.M. (xlvi).
*bicolor* A. Cunn. (xliv).
*Boornani* Deane and Maiden (xlv).
*Bosistoana* F.v.M. (xliii).
*Caleyi* Maiden (iv).
*capitellata* Sm. (xxviii).
*conica* Deane and Maiden (lviii).
*Considerniana* Maiden (xxxvi).
*coriacea* A. Cunn. (xv).
*corymbosa* Sm. (xii).
*crebra* F.v.M. (iix).
*Dalyrmpleana* Maiden (lxxiv).
*dives* Schauer (xix).
*dumosa* A. Cunn. (lxxv).
*eugenioides* Sieber (xxix).
*fruticetorum* F.v.M. (xlii).
*gigantea* Hook. f. (lii).
*globulus* Labill. (lxxvii).
*gonioalyce* F.v.M. (vi).
*hastastoma* Sm. (xxxv).
*hemphiloia* F.v.M. (vi).
*longifolia* Link and Otto (ii).
*maculate* Hook. (vii).
*melanophiloia* F.v.M. (liv).
*melliodora* A. Cunn. (ix).
*micracorys* F.v.M. (xxxviii).
*Muelleriana* Howitt (xxx).
*numerosa* Maiden (xvii).
*obliqua* L'Hérit. (xxii).
*ochrophloia* F.v.M. (l).
*odorata* Behr and Schlechtendal (xli).
*oloea* F.v.M. (lx).
*puniculata* Sm. (viii).
*pilularis* Sm. (xxx).
*piperita* Sm. (xxix).
*polyanthemos* Schauer (lxx).
*populifolia* Hook. (xlvi).
*propinqua* Deane and Maiden (lxi).
*punctata* DC. (x).
*radiata* Sieb. as *amygdalina* (xvi).
*regnans* F.v.M. (xviii).
*resinifera* Sm. (iii).
*robusta* Sm. (lxviii).
*rostrata* Schlecht. (lxxii).
*rubida* Deane and Maiden (lxxiii).
*saligna* Sm. (iv).
*siderophloia* Benth. (xxxi).
*sideroxylon* A. Cunn. (xxii).
*Sieberiana* F.v.M. (xxiv).
*Smithii* R. T. Baker (lxx).
*stellulata* Sieb. (xiv).
*tereticornis* Sm. (xi).
*tessellaria* F.v.M. (lxvi).
*viminalis* Labill. (lxv).
*virgata* Sieb. (xxv).
*vitrea* R. T. Baker (xxiii).

*Government Printer, Sydney. 49s. Each part contains 4 plates and other illustrations.*

**Note by Government Printer.**

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 23s. for 12 parts, will come into effect as from the 1st July, 1921.

Bracts and Bracteoles (1-7).
Membranes of Bud (8).
Double, solid and hinged opercula (9-15).
Sepals and Petals (16-19).
A new Anther system (1-6). Anthers enlarged.
Inflection of Stamens (7-8).
Some Stigmas (9). Enlarged.
Evolution of Disc (10). E. TERETICORNIS Sm. Enlarged.
THE DISC.

EUCALYPTUS PYRIFORMIS Turcz, var. Kingsmilli Maiden (1).
E. PYRIFORMIS Turcz. (2).
E. MACROCARPA Hook. (3).
[All natural size except 1A—1D.]
THE DISC—continued.

EUCALYPTUS ERYTHROCORYS F.v.M. (1).
E. TETRAPTERA Turcz. (3).
E. OLDFIELDII F.v.M. (5).
E. DRUMMONDI Benth. (6).
E. RESINIFERA Sm. (9).
INDEX OF PARTS PUBLISHED—continued.

PART XXXI.

PART XXXII.

PART XXXIII.

PART XXXIV.

PART XXXVI.

PART XXXVII.

PART XXXVIII.

PART XXXIX.

PART XL.

PART XLI.

PART XLII.

PART XLIII.

PART XLIV.

PART XLV.

PART XLVI.

PART XLVII.

PART XLVIII.


PART L.

II. The Bark and (Habit). 1. Early references to Eucalyptus bark and early Eucalyptus vernaculars in general. 2. Eucalyptus bark classifications. O. Maltese, Marlock, and other small species—(a) True Maltese. (b) False Maltese. (c) Marlocks. Plates, 204-207. (Issued December, 1921.)
INDEX OF PARTS PUBLISHED—continued


II. The Bark (and Habit)—continued.
1. Leptophloe (Smooth-Barks or Guns).
2. Hemphloe (Hali-barks).
3. Rhizophloe (Rough-barks).
4. Pachyphloe (Stringy-barks).
5. Schizophloe (Ireen-barks).
6. Leptophloe (Barks triable and lamellate).

Plates, 205-211. (Issued February, 1922.)

PART LII. 100. E. amphipluna Naudin. 101. x E. algereusis Trabut. 102. x E. aniptilusis Trabut. 103. x E. Boulteri Trabut. 104. x E. Cordleri Trabut. 190. x E. gomphocarpus Trabut. 105. x E.ьюpis Naudin. 106. E. alexandria Endl., var. aronensis Trabut.


300. x E. Indoxyestia Maiden u.sp.

II. The Bark—continued.
3. Classification of Trees in General by Means of their Barks.
4. Variation in Barks of the same Species.
5. Bark in Relation to Heat and Cold.
6. Adventitious Shoots.
7. Ringbarking.
11. Microscopic Characters of Bark.
12. Calcium Oxalate.
13. Tannin.
14. Oil in Bark.
15. Fibre in Bark.

Plates, 212-215. (Issued April, 1922.)

PART LIH. 301. x E. Barrocanus Gigantis Maiden u.sp.

302. x E. Panamericanus Maiden u.sp.

303. x E. Peacockeana Maiden u.sp.

304. x E. Stopfordii Maiden u.sp.

305. x E. Forsythi Maiden u.sp.

306. x E. Audranse Maiden u.sp.

307. x E. Strobila Maiden u.sp.

308. x E. Blackburniana Maiden.

309. x E. Studegensis Maiden u.sp.

III. Timber.

A. Early Attempts at Classification.
B. Modern Systems of Classification.

Colours.

Plates, 216-219 (Issued May, 1922.)

PART LV. 310. E. Mcintyreana u.sp.

311. E. Plagi MCoy.


313. E. shrublandi K. M. Johnston.

314. E. Deflittig Ettingshausen.

315. E. Diemontii Ettingshausen.

316. E. Ripi Ettingshausen.

317. E. Houtmanni Ettingshausen.

318. E. Mitchellii Ettingshausen.

319. E. Glocacca Ettingshausen.

320. E. Davidsonii Ettingshausen.

321. E. Oxleyana Ettingshausen.

322. E. placentifolia Ettingshausen.

323. E. Eucalyptus Ettingshausen.

324. E. proceracca Deane.

325. E. Hermitian Deane.

326. E. unicolor Deane.

327. E. Sclerophyllum Deane.

328. E. Buttoni formerly E. Muelleri Deane.

329. E. Chapmanii formerly E. Woolfii Deane.

PART LIV.

Fossil Plants Attributed to Eucalyptus.

A.—B. acuminata Unger.

B.—B. haemiglobula Ettingshausen.

C.—B. Aegia Unger.

D.—Myrtophyllum (Eucalyptus ?) Geinitzii Heer.

E.—Myrtophyllum (Eucalyptus ?) Schubleri Heer.

F.—E. sibirica Heer.

G.—E. (?) americana Lemeq.

H.—E. bocarina Heer.

I.—E. angusta Velenovsky.

J.—E. dubia Ettingshausen.

K.—E. deliciosa Lesueur.

L.—E. Gouldi Ward.

M.—E. proto-globulidae Soparta.

N.—E. Cheffalsttii Soparta.

O.—E. (?) attenuata Newberry.

P.—E. (?) angustifolia Newberry.

Q.—E. (?) nervosa Newberry.

R.—E. (?) parefolia Newberry.

S.—E. latifolia Hollick.

T.—E. Wurdaria Berry.

Myrica baranovii Berry.

IV. The Root.

Adventitious Roots.

V. Exudates.

a. Kinos.

b. Manua.

Plates, 209-227. (Issued August, 1922.)

PART LVI. 330. E. Jonesi n.sp.

331. E. Oblicruriceras n.sp.

332. E. leptophloe V.R.M.

333. E. excedinta Turra.

334. E. angusta n.sp.

335. E. margarita Sm.

336. E. supertulis F.V.M.

337. E. Bonitania F.V.M.

338. E. altitor (Deane and Maiden) Maiden.

339. E. conglomerata (R.B.), Maiden.

340. E. angustifolia Schauer.

341. E. Johnstonii n.sp.

VI. The Leaf.

A.—Juvenile Leaf. Historical. Morphological Plates, 228-281. (Issued September, 1923.)

PART LVII. 342. E. agglomereu Maiden.

343. E. Simmondsii n.sp.

235. E. sepedivale F.V.M.

346. E. forsythi Loebmann.

347. E. Kalpavineus n.sp.

348. E. melanoxylon, n.sp.

349. E. insignis n.sp.

350. E. appendicea Deane and Maiden.

VI. The Leaf—continued.

B.—The Mature Leaf. Historical.—Vation (cherry).

Plates, 282-285. (Issued January, 1923.)

PART LVIII. 351. E. collina W. V. Fitzgerald, n.sp.

352. E. Flocktoni Maiden.

353. E. Shirleyi n.sp.

354. E. Hummeri n.sp.

355. E. Herbertiana n.sp.

356. E. Camilo-Vallis n.sp.

357. E. langiania Link and Otto.

358. E. citromera Hooker.

359. E. hemipterida F.V.M.

360. E. microcarpa n.sp.

361. E. albina Miquel.

VII. Inflorescence.


PART LIX. 53. E. pruinosus Schauer.

54. E. melanoptera F.V.M.

139. E. Queeni Hook. f.

211. E. longicornis, F.V.M.

152. E. propinquae Deane and Maiden, var. major, var. minor.

30. E. haemanthusa Sm.

349. E. microtha DC.

530. E. kloeselii Maiden and Blakey, n.sp.

351. E. erubescens, n.sp.

212. E. Flocktonia Maiden.

VII. Inflorescence (in part)—continued.


PART LX. 54. E. pruinosus Schauer.

55. E. melanoptera F.V.M.

139. E. Queeni Hook. f.

211. E. longicornis, F.V.M.

152. E. propinquae Deane and Maiden, var.

30. E. haemanthusa Sm.

349. E. microtha DC.

530. E. kloeselii Maiden and Blakey, n.sp.

351. E. erubescens, n.sp.

212. E. Flocktonia Maiden.
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 2.

Part LXII of the complete work.

(with four plates)

Price three shillings and sixpence.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER.

1924.
INDEX OF PARTS PUBLISHED.

PART I.

PART II.
2. E. obliqua L. Hooker. Plates, 9-12. (Issued May, 1903.)

PART III.
3. b. citygogona Turczaninow. Plates, 9-12. (Issued July, 1903.)

PART IV.
4. E. incassata Labillardiere.

PART V.
7. E. coracae A. Cunn.

PART VI.
9. E. crassata Labillardiere.
10. E. linearis Deinhardt.

PART VII.
12. E. regnans F.v.M.
15. E. Andrewesi Maiden.

PART VIII.
17. E. capillifolia Sm.
18. E. Muelleriana Howitt.
19. E. macrocarpa F.v.M.
20. E. eucnemonioides Sieber.
21. E. marginata Sm.
22. E. subprenata F.v.M.

PART IX.
24. E. alpina Lindl.
25. E. macrocarpa F.v.M.
29. E. apocrata Baker and Smith.
30. E. acutiflora Baker and Smith.
31. E. Planchoniana F.v.M.
32. E. Flocktoniana F.v.M. Plates, 41-44. (Issued November, 1907)

PART X.
33. E. piperita Sm.
34. E. Sieberiana F.v.M.
35. E. Consolidae Maiden.
36. E. hornomutata Sm.
37. E. siderophloia Benthi.
38. E. Boormani Deane and Maiden.
39. E. leptogloea F.v.M.
40. E. Behringia F.v.M.
41. E. populifolia Hook.
42. E. Bowmani (Doubtful species.) Plates, 45-48. (Issued December, 1908.)

PART XI.
43. E. Bosistoana F.v.M.
44. E. bidor A. Cunn.
45. E. hemiploea F.v.M.
46. E. odorata Behr and Schlechtend.
47. E. acutoides A. Cunn.
48. E. Thozetiana F.v.M.
49. E. ochrophyloia F.v.M.
50. E. microphyloia F.v.M. Plates, 49-52. (Issued February, 1910.)

PART XII.
50. E. Rauveriania F.v.M.
51. E. crebra F.v.M.
52. E. Muelleriana F.v.M.
53. E. melopotheria F.v.M.
54. E. prunoea Schauer.
56. E. Neuwidi Schauer.
57. E. sideroxylon A. Cunn.
58. E. leucophloia F.v.M.

PART XIII.
60. E. affinis Deane and Maiden.
61. E. paniculata Sm.
62. E. polyanthemos Schauer.
63. E. Rauderi Maiden.
64. E. hovariata Schauer.
65. E. encorifolia DC. Plates, 57-60. (Issued July, 1911.)

PART XIV.
66. E. melliodora A. Cunn.
67. E. fasciculata F.v.M.
68. E. vaccinosa Turczaninow.
69. E. decipiens Endl.
70. E. concord Schauer.
71. E. Chloina Maiden.
72. E. olivacea Schauer. Plates, 61-64. (Issued March, 1912.)

PART XV.
73. E. oleosa F.v.M.
74. E. Gobis Maiden.
75. E. falcatula Turcz. Plates, 65-68. (Issued July, 1912.)

PART XVI.
77. E. Le Souci Maiden.
78. E. Caudleri Maiden.
79. E. decurea F.v.M.
80. E. dorotanx Hiern.
81. E. corynophilla Meisn.
82. E. Stricklandi Maiden.
83. E. Campaspe S. K. Moore.
84. E. hypogroa Andrews.
85. E. Griffithsi Maiden.
86. E. grossa F.v.M.
87. E. Pimpiniana Maiden.
88. E. Woodwardia Maiden. Plates, 69-72. (Issued September, 1912.)

PART XVII.
89. E. salmonophloia F.v.M.
90. E. leptopoda Bentham.
91. E. squamosa Deane and Maiden.
92. E. Oldfieldia F.v.M.
93. E. orbifolia F.v.M.
94. E. purpurifrons Turczaninow. Plates, 73-76. (Issued February, 1913.)

PART XVIII.
95. E. macrocarpa Hook.
96. E. Preissiana Schauer.
97. E. megalocarpa F.v.M.
98. E. globulus Labillardiere.
99. E. Mai deni F.v.M.
100. E. gigantura Hook. f. Plates, 77-80. (Issued July, 1913.)

PART XIX.
101. E. geniculata F.v.M.
102. E. stenofolia F.v.M.
103. E. clorophora F.v.M.
104. E. cordata Labill.
105. E. angustifolia F.v.M. Plates, 81-84. (Issued December, 1913.)

PART XX.
106. E. gigantea Hook. f.
107. E. longifolia Link and Otto.
108. E. divaricatio F.v.M.
109. E. Gilmoye Maiden.
110. E. Patens Bentham.
111. E. Todtna F.v.M.

PART XXI.
113. E. cinerea F.v.M.
114. E. polvrellata Sims.
115. E. cosmophyloia F.v.M.

PART XXII.
117. E. cyathiflora Turcz.
118. E. acaciaformis Deane & Maiden.
119. E. peltisifolia F.v.M.
120. E. celsea Bentham.
121. E. tetrapetala Turcz.
122. E. Forrestiana Diels.
123. E. miniat A. Cunn.
124. E. phanoea F.v.M. Plates, 93-96. (Issued April, 1915.)

PART XXIII.
125. E. robusta Smith.
126. E. botryoides Smith.
127. E. ophidica Sm.
128. E. phellucia F.v.M. Plates, 97-100. (Issued July, 1915.)

PART XXIV.
129. E. Deanei Maiden.
130. E. Dauini Maiden.
131. E. Sturtiana Howitt.
132. E. Banksii Maiden.
133. E. quadrandulata Deane and Maiden.

PART XXV.
134. E. Macarthurii Deane and Maiden.
135. E. aggregata Deane and Maiden.
136. E. parvifolia Capege.
137. E. alba Reinewardt.
138. E. rubida Deane and Maiden.
139. E. orevita Labill.
140. E. neglecta Maiden.

PART XXVI.
142. E. prococ Roxburgh.
143. E. orevita Labill.
144. E. pteris Maiden.

PART XXVII.
145. E. vernicosia Hook f.
146. E. Muelleri T. B. Moore.
147. E. Kitsoniana J. O. L. Maiden.
148. E. viminulis Labillardiere.

PART XXVIII.
149. E. Decewleri F.v.M.
150. E. scoparia Maiden.
151. E. Benthami Maiden and Cambage.
152. E. propinquus Deane and Maiden.
153. E. punctata DC.

PART XXIX.
155. E. resinifera Sm.
156. E. phelitica F.v.M.
A Critical Revision of the genus Eucalyptus

By

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 2.
Part LXII of the Complete Work.
(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

MACAULAY'S "Essay on Milton."

PRICE THREE SHILLINGS AND SIXPENCE.

Published by Authority of
THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES;

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1924.
**CCCLV. Eucalyptus Gardneri n.sp.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CCCLVI. Eucalyptus astringens n.sp.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Synonym</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CCCLVII. Eucalyptus Sargenti n.sp.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**XI. Eucalyptus Risdoni Hook. f., var. elata Benth.**

<table>
<thead>
<tr>
<th>Synonym</th>
</tr>
</thead>
</table>

**× CCCLVIII. Eucalyptus Chisholmi Maiden and Blakely n.sp.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**× CCCLIX. Eucalyptus Taylori n.sp.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LXXIII. Eucalyptus oleosa F.v.M.**

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
</table>
CCVI. Eucalyptus intermedia R. T. Baker.

Range . . . . . . . . . . . . . . . 66

CCCLX. Eucalyptus Nowraensis n.sd.

Description . . . . . . . . . . . . . . . 68
Range . . . . . . . . . . . . . . . . 68
Affinities . . . . . . . . . . . . . . . . 69

Explanation of Plates (252-255) . . . . . . . 70-80
DESCRIPTION.

CCCLV. E. Gardneri n.sp.

ARBOR GRACILIS, 20—30' alta, "Blue-leaf Mallet" nota; cortice tenui, astringenti ligno, dilute-fusco, denso; folis maturis petiolatis crassiusculis rigidis, cyanico-viridibus, lanceolatis paulum falcatis, venis indistinctis, venis lateralisbus tenissimis ex costa media 45° orientibus; nulla vena peripherica distincta; inflorescentia pedunculo longo, applanato, umbellas 6—7 flores in brevibus pedicellis ferentibus; alabastris ante maturitatem elongatis, teretibus, gracilibus; fruits elongatis pyriformibus vel cylindricis, paulum incinctis orificio, margine distincta, valvarum apicibus ex orificio non exsertis.

A tree of slender habit, about 20—30 feet, not much branched, the trunk slender, and both it and the branches erect, the foliage throughout of a bluish-green cast, hence the name "Blue-leaf Mallet." Bark fairly thick, decorticating in small thin flakes, silver-grey to silver-brown, very astringent. Timber light-coloured, dense.

Juvenile leaves shortly petiolate, moderately thick, ovate, lateral veins moderately distinct and nearly parallel, with intermediate ones less distinct and more or less parallel. The lateral veins making an angle of 45—60 degrees with the midrib. Intramarginal vein well removed from the edge.

Mature leaves petiolate, rather thick and rigid, of a glaucous or bluish-green when fresh. In fact they are the identical colour of the dried specimens—more blue than green. Equally green on both sides, lanceolate, slightly falcate, about 9 cm. long by 2 cm. in greatest width; venation inconspicuous, the very fine lateral veins making an angle of about 45 degrees with the midrib. Intramarginal vein well removed from the edge.

Inflorescencce, a long flattened peduncle supporting umbels of 6—10 flowers, the pedicels short and nearly terete. Buds (not seen ripe) elongated, about 2 cm. long, terete, slender, slightly tapering to a sharp point which is sometimes hooked. Filaments yellowish, anthers (a little immature), long, with gland at the back, opening in lateral slits; versatile. Style slightly protruding from the calyx-tube, stigma not dilated.

Fruits elongated pear-shaped, or cylindroid, 12 mm. long and 5 mm. broad, tapering though not imperceptibly, into the pedicels, slightly constricted at the orifice, with a distinct rim; the tips of the valves flush with the orifice. The surface of the calyx-tube pitted all over, presumably the result of contraction in drying. Floral disc (or discal lining) very obscure, forming a very thin reddish lining to the inside of the calyx-tube. Capsular disc fused to the staminal ring, forming a slightly thickened ring around the top of the capsule.

Near Bendering (257 miles from Perth, on the Narrogin-Narembeen line), Western Australia, in gravelly loam on rising ground, forming thicket-like growths with E. astringens (C. A. Gardner, No. 1239, 6th February, 1922). This interesting species is named in honor of Charles Austin Gardner, of the staff of the Conservator of Forests of Western Australia. He has done much to elucidate this species and has done admirable botanical work.

"A scrubby form (mallee) of this species is common on the plains to the north of the Stirling Range. It attains a height of 3—4 feet, with spreading stems, otherwise typical. My Wagin specimens, collected in 1920, show the style to be as long as the filaments, also the valves to be slightly exserted (in the Bendering specimens they are level with the top of the capsule)." (Gardner.)
RANGE.

Confined to Western Australia so far as we know at present. Its range may be stated as Lake Yearlering eastwards beyond Kondinin, westwards to some distance on the Great Southern Railway, and southwards to Katanning. (C. A. Gardner.)

Four miles north of Wagin, on laterite ridges and hills, either among *E. reducna* var. *elata* and *E. longicormis*, with a scattered undergrowth of *Oxylobium parviflorum* and *Gastrolobium spinosum*, or forming dense thicket-like growths with *E. astringens*. (C. A. Gardner, No. 509, 15th June 1920.)

AFFINITIES.

1. With *E. reducna* Schauer var. *elata* Benth.

The blue cast of the foliage readily separates *E. Gardneri* from *E. reducna* var. *elata*, the "Wandoo." At the same time (compare Plate 140, Part XXXIV). The Wandoo is a larger tree, with thicker, less astringent bark. The buds and fruits of the new species and of the variety have a good deal in common.

2. With *E. astringens* Maiden.

The "Blue-leaf Mallet" (*E. Gardneri*) closely resembles the "Brown Mallet" (*E. astringens*) in appearance, but the bark is slightly thinner, but also of a colder, brownish-grey. The decorticating flakes of bark are also much smaller, and the fresh bark lacks the warmth of colour so characteristic of the Brown Mallet. (C. A. Gardner.) It can readily be distinguished by its glaucous foliage.
DESCRIPTION.

CCCLVI. *E. astringens* n.sp.

_Acorn erecta, cortice levii, "Brown Mallet" vocata; cortice deciduo in statu secedente maculas fere albas relinquente, astringente et plus minus "kino" continent; foliis juvenilibus glaucis, crassiusculis, petioliis, oblongis vel ovato-cordatis venu peripherice a margine distincte remotis; foliis maturis crassiusculis petioliis concoloribus, lanceolatis, paulum falcatis, non magquis, venis lateralis fere parallelis et ex costa 35-40° orientibus; inflorescentia pedunculis longis, umbellis circiter 7 floribus brevibus pedicellis, operculo terete cylindroidice, calycis tubum duplo equilongo; calycis tubo levii vel cum diisbus costis; antheris Cornutiis similibus, filamentis glandulosis; fructibus fere hemisphericis vel ovoidis, leniter ureolatis, circiter 6-9 mm. longis 3 mm. diametro, valvis paulum recurvatis, distincte extermis.

A smooth-barked tree of from 40-60 feet high, and erect in habit; trunk 2 or 2½ feet in diameter, often slightly angular or fluted (C. A. Gardner). The bark in course of time cracks and flakes away, leaving smooth, almost white patches. It usually contains a more or less well-defined layer of friable brown kine, contributing to the astringency of the bark and to the name "Brown Mallet" for the tree. Timber tough, pale-brown and dense.

_Juvenile leaves_ of a deep green or only slightly glaucous, thickish, petiolate, oblong to ovate-cordate, lateral veins spreading, making an angle of about 40-50 degrees with the midrib, the intramarginal vein considerably removed from the edge.

_Mature leaves_ rather thick, petiolate, equally green on both sides, lanceolate, slightly falcate, not large, say 8 to 12 cm. long, 1 to 2 cm. broad, venation inconspicuous, the lateral veins roughly parallel, and making an angle of about 35-40 degrees with the midrib; the intramarginal vein close to the edge.

_Inflorescence._—Peduncles long and from rather narrow to rather broad and widening under the umbel, which consists of about seven flowers on short, nearly terete but sometimes flattened pedicels, the operculum twice as long as the calyx-tube, terete and cylindrical in shape, with a slight constriction about the middle; separated by a well-defined commissural line from a sub-cylindroid to conoid calyx-tube, which is smooth or with two or more ridges; anther the usual shape of those of the Cornutus; filaments glandular. Style protruding beyond the calyx-tube to a distance more than equal to the length of the latter, and with a slightly enlarged stigma.

_Fruit_ nearly hemispherical to ovoid and slightly ureolate, not tapering gradually into the pedicel, 6 to 9 mm. long, 5 mm. in diameter, rim well defined, and with well-exsert; somewhat recurved valves. Floral disc forming a narrow dark carnose band around the top of the ovary, but quite free from it. Capsular disc forming a thin dark band around the inner rim of the capsule and slightly exceeding the staminal ring, which is thicker than the capsular disc. The lines indicating the calyx rim, staminal ring, and the disc can be seen with the aid of a lens on the top of the capsule.

The type is Broome Hill, Western Australia (J.H.M., December, 1909).

_Illustrations._—Plate 149, figs. 3a-3f (Part XXXVI), depict the type, and in conjunction with figs. 2 and 5, seem to render any further figures unnecessary at this place.

(Figs. 4a-4e are from Meare’s Lake, and belong to _E. Sargentii_ n.sp. described at p. 58.)
As regards leaves, specimens of this species afford illustrations of Diels's Law, and of the varying shapes of intermediate leaves.

**Mallet Scrub.**—At Part XXXVI, p. 141, I have referred to the dense, heath-like scrub which goes under the above name. I examined a good deal of it on the Kalgan Plains, and figured it at figs. 1a–1g, Plate 149. In that Part I look upon it as a depauperate form of *E. occidentalis*. I am now inclined to think that it may be a depauperate form of *E. astringens*, and invite the attention of our Western Australian friends to the subject. Mr. Gardner informs me that there is a scrubby form at Tambellup, in sandy soil, which is a low form of *E. astringens* and not of *E. occidentalis*.

---

**SYNONYM.**


---

**RANGE.**

It is confined to south-western Western Australia. Specific localities have been dealt with in Part XXXVI, pp. 144, 145, and especially at p. 146.

A general statement as to Range will be found in the top paragraph of p. 144, and this may be compared with the statements of Mr. C. A. Gardner:

"Southwards from Pingelly on the Great Southern Railway to beyond Tambellup and Gnowangerup, eastwards to beyond Lake Grace and Bending, and westwards to the vicinity of Dardar and Arthur River (Albany Road). In the northern localities the species is confined to the laterite caps and slopes of hills. Towards the south it descends to the loam flats, but usually where laterite is present in the soil. At Wagin, which is about the centre of the Mallet areas, the trees are very common, and some have been seen growing in a granite soil." (9th February, 1922, and 7th February, 1923.)

Wickepin, 27th November, 1916 (Mr. F. M. C. Schock, on behalf of the Forest Department, Western Australia); Wagin, in laterite, on rising ground. (C. A. Gardner, No. 1223.)

Owing to the demand for the bark of this species, Mr. Gardner points out that it is "now rarely seen in a mature state." Mr. Gardner tells me that the eastern limit of *E. astringens* and *E. Gardneri* is not known. "It has been suggested by Mr. Schock as some distance east of Kondinin, but, owing to the comparative scarcity of either species in the Kondinin district, I am inclined to think that they do not extend much further east than that station."

The specimens from near Meare's Lake (O. H. Sargent, No. 707), referred to in detail at Part XXXVI, p. 146, belong to *E. Sargenti*, n.sp., see p. 58.
AFFINITIES.

1. With *E. occidentalis* Endl.

This is "Swamp Yate" or "Black Mallet," and is said by H. Salt to contain 20-26 per cent. of tans. There is not a great deal of difference in the shape of the fruits in *E. occidentalis* and *E. astringens*. The buds of the latter are more slender while the fruits of *E. occidentalis* are more rigid, and have more exserted valves.

2. With *E. Gardneri*, n.sp. See p. 53.

It differs from *E. Gardneri* in the smaller and narrower juvenile leaves, smaller buds and fruits. The adult foliage seems to be constantly narrower and not by any means blue, indeed contrasting with the bluish leaves of *E. Gardneri*, while there is some difference in the bark, as already indicated, but we require more field-notes of this and allied species.

3. With *E. Sargenti*, n.sp. See p. 58.

Some of the smaller fruits appear to run into *E. Sargenti*. Exceptionally *E. astringens* has fruits as large.
DESCRIPTION.

CCCLVII. E. Sargenti n.sp.

Arbor mediocris, corice lave astringentissimo, extremitate plus minus in duris lamiis aecendente; folis maturis petiolatis, lineari-lanceolatis, temnoribus, venis tenubus et indistinctis, venis lateribus fere parallelis ex costa 15-30° orientibus; inflorescentia decumbente, pedunculo longe tenue umbellam 6-7 floram ferente; pedicellis brevibus tertibus; operculo terete erecto vel cornu similii, calyces tubum cylindricum fere hemispheriis vel conico-cylindroideis levibus circiter 8 mm. longis 5 mm. diametro, capsule valvis subulatis et distincte excisit.

A tree of medium size, bark smooth and very astringent, more or less hard-flaky at the butt. Timber unknown.

Juvenile leaves thin, linear lanceolate, venation fine and not distinct (but not seen perfectly characteristic).

Mature leaves petiolate, narrow-lanceolate, rather thin, equally green on both sides, venation fine and not distinct, the lateral veins nearly parallel, and making an angle of about 15-30 degrees with the midrib. Intramarginal vein distinct from the edge.

Inflorescence decumbent, with a long, thin, nearly terete peduncle supporting an umbel of 6-7 flowers, the pedicles short and terete, and somewhat abruptly tapering into the calyx-tube. The operculum thin, terete, straight or shaped like a horn, twice the length of the calyx-tube, which is cylindroid and smooth. The anthers the usual shape of those of the Cornaceae, but somewhat small.

Fruit nearly hemispherical to conoid-cylindrical, smooth, about 8 mm. long and 5 mm. in diameter, the calyx-tube tapering somewhat abruptly into terete pedicels of about its own length, rim thin but distinct, the tips of the capsule awl-like and well exserted. Floral disc dark coloured, attached to the base of the calyx-tube, projecting slightly over the top of the conical ovary. Capsular disc forming a small dark ring around the inner rim of the capsule and more or less fused to the considerably thickened staminal ring, which does not exceed the calyx rim.

Type: Meare's Lake, County Peak, Beverley, Western Australia, O. H. Sargent, No. 707.

In honour of Oswald Hewlett Sargent, of York, Western Australia, who first supplied me with specimens, and who is well known for his researches on the flora of Western Australia.

RANGE.

Confined to Western Australia, so far as we know at present. The type is from near Meare's Lake, County Peak, Beverley, about 45 miles from York. (H. H. St. Barbe More, O. H. Sargent, No. 707.) Mr. Sargent says that it grows only in the bed of the Salt Water River, and that it was stripped for tanning purposes all along this river.
AFFINITIES.

The history of some specimens may be convenient at this place.

A. *E. redunca* Schauer var. *angustifolia* Benth (B.Fl. iii, 253). This consists of three plants:—

(a) *E. xanthonema* Turcz.: See Part LXI, p. 5.

(b) Drummond’s 5th Coll. No. 187 (1849). These specimens consist of mature leaves, buds and flowers, and display a good deal of similarity to *E. Sargenti*, but the leaves appear to be smaller.

(c) “South side of Stirling Range (s) and eastward to Phillips Ranges (Maxwell)” I have not seen these specimens, and would invite attention to the fact that *E. occidentalis* Endl. var. *oxymitra* Diels comes from the Phillips River, in the same general district.

B. *E. occidentalis* Endl. var. *oxymitra* Diels

*Oxus*, sharp, *mitra*, a mitre (applied to the calyptra in certain mosses), hence, as applied to *Eucalyptus*, a sharp or pointed operculum. Specimens from “Phillips River in *Eucalyptus* scrubs in sandy places” (Dr. L. Diels, No. 4885) have been distributed by Dr. Diels under the above name, but I cannot trace any published description of the reputed variety. (See Part XXXIV, p. 93.)

Figured under *E. redunca* var. *oxymitra* at figs. 5a, 5b, Plate 141. See a translation by Drs. Diels and Pritzel on *E. occidentalis* var. *oxymitra* Diels, and its affinity to *E. redunca* at Part XXXVI, p. 150 (top of page).

C. *E. redunca* Schauer var. *oxymitra* Maiden, var. nov.

Broad Arrow, Western Australia (R. Helms, No. 102). (See Part XXXIV, p. 98.) Figured at figs. 4a, 4b, 4c, Plate 141.

My action in making *E. redunca* var. *oxymitra* Maiden in part only, and not wholly, a synonym of *E. occidentalis* var. *oxymitra* Diels, is, however, calculated to cause some confusion. I took this action because the material of *E. occidentalis* var. *oxymitra* Diels in my possession is poor, and I could not satisfactorily describe it, nor obtain additional material of it for distribution.

1. With *E. redunca* Schauer var. *elata* Benth.

*E. Sargenti* has narrower juvenile leaves in comparison with the apparently broad ones of those of *E. redunca* var. *elata*. Compare the drawings of *E. Sargenti* (figs. 4a, 4b, 4c, Plate 149, under *E. occidentalis* var. *astringens*) with those of *E. redunca* var. *elata* in Plate 140. The leaves of the former are thinner and more graceful, while the fruits are smaller and with well-exserted valves.
2. With *E. astringens* Maiden.

*E. Sargentii* was included in *E. occidentalis* Endl. var. *astringens* Maiden (in part), in Part XXXVI, p. 146, “Grows only in bed of Salt River . . . Great Southern Railway.” Figured at 4a, 4b, 4c, Plate 149. Some of the differences from *E. astringens* have been already indicated at p. 54.

*E. astringens* has affinity with *E. Sargentii* in the disc.

3. With *E. Gardneri* Maiden.

The principal differences between *E. Sargentii* and this species may be said to consist in the distinctly blue foliage of the latter. See also *E. Gardneri*.

---

**XI. E. Risdoni** Hook. f., var. *elata* Benth.

**SYNONYM.**

*E. hypericijolia* R. Br. See Part VI, p. 173, 1905 (“Notes on the Synonyms”), where I state the conclusion: “I cannot separate any specimens (of *E. hypericijolia*) I have seen, from *E. Risdoni* or its var. *elata*.”

In his paper, “Notes on *Eucalyptus Risdoni* Hooker,” by L. Rodway (*Pap. and Proc., Roy. Soc., Tas.*, 367, 1910), the species or variety *hypericijolia* is dealt with. Mr. Rodway provisionally refers four forms (a, b, c, d) to it, and figures form c (upper portion of Plate XI) and form d (lower portion of Plate XII), together with first year seedling of form d (upper portion of Plate XII), second year seedling of form d (lower portion of Plate X), third year seedling of form d (upper portion of Plate X).

In his 1917 paper (*op. cit.*) on “Tasmanian Eucalypts,” p. 13, he states that *E. hypericijolia* is “Cabbage Gum,” and that the juvenile leaves differ from those of *E. Risdoni* in being more lanceolate and long.

In spite of the caution inculcated by me (*op. cit.*, 87, 1918), after further consideration I do not see how they can be kept apart. Through the kindness of Dr. A. B. Rendle, F.R.S. (British Museum, Botany), I have received a specimen of the juvenile leaves of *E. hypericijolia* R. Br. (type), and it is figured at fig. 3, Plate 254. The original was labelled “*Eucalyptus hypericijolia* R. Br., in coll. saxos prope Risdon Cove, R. Brown.” It was subsequently given the number ‘4789.”
DESCRIPTION.

\( \times CCCLVII. \) \( E. \) Chisholmi Maiden and Blakely, n.sp.

Assumed parents—\( E. \) piperita Sm., and \( E. \) micrantha DC.

A solitary tree, about 50 feet high and from 18 to 20 inches through at the butt, which extends to 9 feet and then throws out three or four branches. The stem from the ground to 9 feet above, where it branches, is covered with rough fibrous bark, as in typical \( E. \) piperita, the limbs immediately above this being smooth, creamy-white with blue mottlings, like those of typical \( E. \) micrantha. Timber very similar to that of \( E. \) piperita in colour, but it has the very short grain and brittle fracture of that of \( E. \) micrantha.

Juvenile leaves.—The youngest juvenile leaves available are from a branch about 15 feet up. They are narrow-lanceolate, rather pale and inclined to be glaucous, and somewhat similar to those of \( E. \) micrantha. They appear to be intermediate.

Mature leaves.—These also resemble those of \( E. \) micrantha, and are glabrous, narrow lanceolate-falcate, without the strong peppermint odour of \( E. \) piperita. The dimensions of an average leaf may be given as 11 by \( \frac{1}{2} \) cm. \( (\frac{1}{2} \) by \( \frac{3}{4} \) inch). The secondary veins are fairly prominent, spreading, and make an angle of 10 to 25 degrees with the midrib. The intramarginal vein is close to the edge.

Inflorescence axillary, the peduncle short or about 1 cm. long, semi-terete, bearing an umbel of 7-9 slender clavate buds, the operculum acute, scarcely half the length of the calyx-tube; pedicels slender, about 3 mm. long or about as long as the calyx.

Fruits in shape approaching \( E. \) piperita more closely than those of \( E. \) micrantha. Somewhat globular, thin and shining, with a small orifice, but not urceolate, showing resemblance to \( E. \) Moorei and to \( E. \) Mitchelliana; somewhat barrel-shaped, about 6 mm. in diameter.

Both the supposed parents are common in the district, but no other example could be found which showed resemblance to the supposed parents. \( E. \) micrantha is common on the hills and on the flats.

The type is No. 265, Dr. Edwin Claude Chisholm, then of Marrangaroo, 102 miles west of Sydney, on the Great Western Railway (May, 1922). The name proposed for this hybrid species is a testimony to the excellent critical work that Dr. Chisholm has accomplished in regard to the Eucalypts (and other genera) of the Marrangaroo district and the Blue Mountains.

RANGE.

So far this has only been found in New South Wales, and in the one locality, viz., “Marrangaroo, growing on top of a ridge between 500 and 600 feet above the surrounding level. In its immediate vicinity are found \( E. \) piperita, \( E. \) micrantha, \( E. \) Siebertiana and \( E. \) Eugenioides.” (E. C. Chisholm.)
AFFINITIES.

1 and 2. With _E. piperita_ Sm., and _E. micrantha_ DC.

"I consider the trunk as of the _E. piperita_ type, while the limbs, leaves, and to a less extent the fruit, that of the _E. micrantha_ type." (E. C. Chisholm.)

This matter has already been discussed. The plant should have a name, and other specimens should be sought for, for it obviously differs in a marked manner from either of the species mentioned.
DESCRIPTION.

x CCCLIX. E. Taylori n.sp.


A tree of medium size, usually 60 to 80 feet high, with a diameter of 1½ to 2½ feet. Bark of trunk rough, "half Ironbark, half Box, but more Box-like on the branches," the branches, say, about 1 inch in diameter nearly smooth, the timber pale reddish, hard and heavy.

Juvenile leaves thickish, sub-glaucous on both sides, the lower ones very shortly petiolate, the upper ones with slightly longer petiodes, oblong-lanceolate, obtuse to shortly acute, 3 to 6 cm. long, 1½ to 2 cm. broad, with slightly undulate margins, the intramarginal vein somewhat distant from the edge, the secondary veins very fine, making an angle of 30-40 degrees with the midrib; the midrib reddish and more prominent underneath.

Mature leaves thin, petiolate, narrow-lanceolate to falcate-lanceolate, sometimes tapering into a long point, 10 to 12 cm. long, 1 to 2 cm. broad, the intramarginal vein very close to the edge in the narrow leaves, and moderately distant from the edge in the broad ones, the secondary veins very fine, making an angle of 30-40 degrees with the midrib.

Inflorescence paniculate, the umbels 3 to 8 in number, the buds varying from 5 to 9 in the umbel, clavate, the peduncle flattened, pedicels short terete; calyx-tube funnel-shaped, gradually tapering into the pedicel, about 3 mm. long, the operculum very small, somewhat acute, conoid, shorter than the calyx-tube. Flowers semi-terminal, opening in round pores or slits, the filament at the base or nearly so; gland at the back. Floral disc forming a thin discal lining to the inside of the calyx-tube.

Fruit conoid or cylindrical-conoid, i.e., tapering into the pedicel, truncate, the valves well enclosed, 7 mm. long, 3 mm. in diameter. Capsular disc slightly thicker than the floral disc, not exceeding the staminal ring, which is present on the ripe fruit.

The type is Spring Ridge State Forest, Gunnedah district, New South Wales (Assistant Forester Tom Walker Taylor).

RANGE.

Only known from New South Wales at present, but it will probably be found further south (in New South Wales) and also to extend into Queensland.

Single specimens are to be met with in the Gunnedah district wherever Ironbark (E. crebra) and Box (E. conica) are growing together, and throughout the whole of the Pilliga Scrub areas. In the latter places single trees are to be met with in the Ironbark-Pine-(Callitris)-Box type of forest, and are easily distinguished from the true Ironbarks-and Boxes. The bark on the trunk of these trees usually partakes of the Ironbark character, whilst the branches generally show a pronounced Box type. These characteristics vary in some specimens, some trees being distinctly Ironbark-like in appearance, and in others partaking more of the Box type.
AFFINITIES.

1. With *E. crebra* F. v M.

It resembles this species in the buds, and to some extent in the thin fruit, but the fruits of *E. crebra* are never so conical. The timber is red, and a good deal like that of *E. crebra*. The bark, however, is more flaky on the trunk, while the branches are nearly smooth. The juvenile leaves of *E. Taylori* somewhat resemble those of *E. crebra*, that is, they are narrow or narrowish, but not as narrow as those of *E. crebra*. The anthers resemble those of *E. crebra*.

The following note concerning the timber of *E. Taylori* is from Mr. Taylor's pen:—

"Some years ago I saw two or three logs milled at Messrs. A. and L. Schwager's Merimbrough Sawmill in the Pilliga Scrub. The logs were sawn as Ironbark for bridge-decking, and passed as such. The timber, though generally slightly paler than *E. crebra*, in some cases cannot be distinguished from that timber by the colour, and almost invariably shows genuine Ironbark characteristics in texture and fissility. Unless warned beforehand, it would be well nigh impossible for an expert in timbers to detect it when mixed with *E. crebra*."

2. With *E. conica* Deane and Maiden.

In buds and fruits it resembles this species, but the fruits of *E. Taylori* are thicker and slightly contracted at the top, while the fruits of *E. conica* are broad at the top, with a very thin sharp rim, with the staminal ring enclosed. In *E. Taylori* the staminal ring is flush with the top of the fruit. The Box-like bark on the branches exhibits some resemblance to the bark of *E. conica*, which is a Box. The timber is redder than that of *E. conica*. There is a slight resemblance between the juvenile leaves of these two species, but the suckers of *E. conica* are broader than those of *E. Taylori*.


The affinity to this species is somewhat similar to that of *E. crebra* in the leaves, buds and fruits, but the timber of *E. Beyeri* is brownish and the bark is more deeply furrowed and harder than that of *E. Taylori*.

4. With *E. melliodora* A. Cunn.

Somewhat, in the leaves being inclined to develop the triplinerved venation. Some trees, however, resemble *E. melliodora* in the bark, which is rather soft and flaky on the butt. Trees possessing this class of bark, and with their narrow, drooping, somewhat glaucous foliage could very easily be mistaken for *E. melliodora*. The yellow timber of *E. melliodora* is very different from that of *E. Taylori*. 


LXXIII. *E. oleosa* F.v.M.

Under Part XV, p. 170 (bottom of page) will be found the following note:

"'Peeneri' (native name) Mallee, water bearing, *i.e.*, the roots, if cut into portions and drained, yield drinking water. Sandhills east of Ooldea. Mr. Deane points out that this Mallee has a vertical growth—no drooping of the leaves, and that it is very rare, only one patch having been seen in a journey of 140 miles from Port Augusta."

A leaf, buds and fruits are figured at Plate 65, 10a, b, c.

We may compare this with the following:

"Mallee clump, 10 yards across, remarkable for its prostrate trunks, which lie on the ground for several feet, sometimes arched. The branches spread out horizontally upwards. In the clump seen one or two of the trunks were erect finally and about 9 feet high. Most of the clump was only 4 or 5 feet high. Very ashy-grey in appearance. Bark light grey and rough on the prostrate trunks and small branches. Branchlets smooth and reddish. Growing in hollow between sandhills, Barton, South Australia, Transcontinental Railway Line." (E. H. Ising, No. 1372, 19th September, 1920.)

Both the Peeneri Mallee and No. 1372 are more or less glaucous; the fruits of the former have not the awl-like tips to the valves of No. 1372 (see fig. 2b, Plate 255), but they may have been rubbed off. We have only imperfect specimens of both forms, which should be further inquired into. Barton and Ooldea are in the same general district, at no great distance from each other.

Then we have a "Mallee form with mid-grey brown bark, peeling off in long strips, smooth right to the ground, 15 to 18 feet high; trunks fairly erect. Branchlets and leaves erect." (E. H. Ising, Barton, South Australia, No. 1361, 19th September, 1920.) This is nearly typical *E. oleosa*, with shining leaves. It was also collected by Mr. Henry Deane "Sandhills east of Ooldea, South Australia, June, 1909." It is different in appearance to the two preceding specimens.
CCVI. *E. intermedia* R. T. Baker.

In Part XXXIX, p. 52, I have given the history of this somewhat anomalous, and still doubtful, species. After further consideration and examination of additional material, I cannot see any botanical characters separating *E. intermedia* from *E. corymbosa*. Juvenile, intermediate and mature leaves, buds, flowers, fruits and seeds have been compared in this connection.

*E. intermedia* has always a flaky-fibrous "Bloodwood" bark, sometimes paler than that of the typical *E. corymbosa* bark from the Sydney district.

The timber of so-called "White Bloodwood" or *E. intermedia*, varies in colour from pale red to a deep red, but neither in colour nor texture can I distinguish timbers of the deeper colours (labelled White Bloodwood) from that of *E. corymbosa*.

In other words, if one were to widen the definition of the colour of *E. corymbosa* timber (it has never yet been officially defined), it would include *E. intermedia*.

---

RANGE.

This has been dealt with at pp. 252-255 of Part XXXIX. From the localities there given I desire to exclude Mr. W. Baeuerlen’s Bateman’s Bay specimens (bottom of p. 253) as referable to *E. Nowraensis* n. sp.

**New South Wales.**—I desire to add the following to p. 254, after the late Forester Hardiman’s Bohnöck specimens:—"White Bloodwood; three young trées; the only ones I have ever noticed in my life. Thought they might be a cross between the Bloodwood and Spotted Gum. The true Bloodwood flowers here about the middle of February, and this one towards the end of April." (From Bungay, Wingham, G. F. Hill, May, 1920.)

I have known Mr. Hill as a fine bushman for very many years, and attach particular importance to his statement. The timber he sends is rather pale, but not paler than, indeed not so pale as other specimens I have received in the *E. intermedia* series. Whether there is any persistent differences in the flowering periods of these Bloodwoods remains to be ascertained.

Coming to the Victorian border, a note on White Bloodwood by Mr. Forest Guard Henry H. Rose of Eden will be found at Part XXXIX, p. 253, to which may be added a subsequent note by him:—

"A specimen within the town boundary of Eden measured 9 ft. 2 in. in girth at 2 ft. 6 in. from the ground. Small pipe, head sound. The White Bloodwood is mixed with other Bloodwood trees growing under the same conditions and with wood of a dark red colour. About 30 feet distant from the tree the
specimens were cut from is another mature tree with timber of a dark red colour. Bloodwood is fairly abundant along the sandy coast country north of Twofold Bay on a stretch running parallel with the sea, and about 3 to 4 miles in width. I have no doubt that a certain percentage of these trees contain wood of a pale colour, but as far as observed, there being no true outward indications to prove two different species of Eucalypts, it is impossible to give any idea of quantity. There is no Bloodwood along the southern foreshores of Twofold Bay, nor along any of the coast country. I have travelled to Cape Howe, but inland, and close to the Victorian border. I am reliably informed that there is a small quantity. The Victorian Forest Guard stationed at Genoa tells me there is plenty of Bloodwood in his district, both White and Red.”

Victoria.—Here follows testimony from a Eucalyptus observer who is a well-known timber expert, and this should be read in conjunction with my statement at Part XXXIX, p. 246, as to the Victorian range of E. corymbosa, and of E. intermedia at p. 253. Mr. Hopkins is an architect, and was for very many years the Public Works Inspector for Gippsland. It will be observed that he looks upon E. corymbosa as including what Mr. Baker calls E. intermedia. Another Victorian, Mr. C. Daley, appears to hold a similar view, and therefore it seems futile to give separate Victorian boundaries for E. intermedia as distinct from E. corymbosa in the present state of our knowledge. If E. intermedia is looked upon as a colour variety of E. corymbosa, all our queries as to range disappear. At all events, I have established a case for the fullest inquiry.

“I am much interested in the descriptive notes on E. corymbosa and its affinities. I notice you have some doubt about its southern (Victorian) limit. It is fairly plentiful around Mallacoota Inlet, intermixed with other species, such as E. Sieberiana, E. capitellata, E. eugenioides, and it extends along the coastal tracts to about the Wingan River, which I believe is its southern limit. I have seen no sign of it west of the Wingan, and it does not appear to reach far inland. It touches the Cann River to Genoa-road at one point only—near the 76-mile tree, where a few scattered trees are seen. It does not appear to ascend on to even the foot-hills of the ranges in Victoria, and I believe it is there confined to a small strip, not more than 10 or 15 miles wide from the coast, and with the Wingan River as its south-western boundary. The timber generally is rather pale coloured, very full of ‘gun veins,’ though some trees are darker coloured, brown or reddish in the heart wood. I will send you some specimens gathered at Mallacoota.” (Harry Hopkins, Bairnsdale, Victoria, 27th April, 1920.)

“The other (No. 2) specimens are from a mature or old tree at Mallacoota West, collected in November, 1913. This tree was felled for foundation blocks for a school building at Mallacoota West. The wood was so pale coloured that when I saw the blocks I doubted if they were Bloodwood, and to satisfy myself I went out to where they were got (only about half a mile) and saw the tree from which they were obtained, and took my specimens from it. Tree 2½ or 3 feet in diameter. Wood very full of gun-veins, but otherwise quite sound.” (H. Hopkins, 4th May, 1920.)

I received specimens labelled No. 1 and No. 2 in due course, and do not know how to separate them from E. corymbosa. Indeed, the question of a difference between that species and E. intermedia would not have been raised except in regard to the colour of the timber.
DESCRIPTION.

CCCLX. E. Nowraensis n.sp.

Arbor 60', "Spotted Gum" nota; ligno pallidissimo, fissili; foliis maturis petiolatis saturate viridibus, lanceolatis, falcatis in pediolum apicemque, leniter angustatis; venis leniter prominentibus, secundaris proximantisculis parallelibus, emn costa 45° orientibus, vena peripherica a margine remota; umbellis 3-7 floribus corymbum solutum formantibus, umbella quaque in pedunculis pedicellisque teretibus; alabastris laevibus, operculo hemispherico ad conico, calycis tubi urceolati dimidium acuante; fructum pedunculis crassis, elongatis-urceolatis, 15-18 mm. longis 10-13 mm. latis, margine tenui, capsula depressa.

A tree of 60 feet, with a diameter of 15 inches, known as "Spotted Gum," but occasionally as "Grey Gum." Timber very pale, fissile.

Juvenile leaves not seen. Mature leaves petiolate, of a bright sap-green on both sides, lanceolate, more or less falcate, tapering gradually into the petiole, and very gradually into the apex. Moderately thick and of moderate size, say 10-14 cm. in length by 2-2½ cm. in width. Venation moderately prominent, the secondary veins rather close together and parallel, and making an angle of about 45 degrees with the midrib. The intramarginal vein close to the edge.

Inflorescence.—Umbels 3 to 7-flowered, usually several together, on short branches, forming a loose panicle or corymb, each umbel on a long terete peduncle and terete pedicel, the latter being about half the length of the former. The buds smooth, the operculum hemispherical to conical and about half the length of the urceolate calyx-tube, the anthers those of the Corymbosae, the styles protruding beyond the top of the calyx-tube, stigma globular.

Fruits with stout peduncles of 7-15 mm., elongated urceolate, the greatest length being 15-18 mm., and the greatest breadth 10-13 mm., rim thin, countersunk, the capsule depressed.

Floral disc.—In this species (as in many of the Corymbosae), there is no well defined floral or capsular disc (the discal lining of Mueller), but the inside of the deep calyx tube is covered with a thin carnose reddish lining which extends from the top of the depressed three-celled ovary to the thin staminal ring. Capsular disc similar, but slightly thicker than the floral disc, and almost absorbing the staminal ring.

The type is that of Mr. Alexander Joseph Gallagher, who collected it 4 miles east of Nowra (Parish of Nowra). I look upon Mr. W. Baeuerlen's specimens as co-types, or paratypes, and would have constituted them the type, but I cannot trace precisely where he obtained his material.

RANGE.

Hitherto only found in the South Coast of New South Wales, but careful search will greatly extend the present known area.

Mr. W. Baeuerlen's specimens (1890) referred to at Part XXXIX, bottom of p. 253, (a) Sources of the Clyde, No. 37; (b) Mogo, near Moruya, Mogo being 8 miles from Bateman's Bay township, are from localities practically the same.

Mr. Gallagher's specimens were collected (1921) 4 miles east of Nowra, and 2 miles south of that town. Mr. Gallagher's and Mr. Baeuerlen's localities are about 60 miles apart.
AFFINITIES.

1 and 2. With *E. maculata* Hook, and *E. corymbosa* Sm.

*E. Novraensis* undoubtedly possesses characters intermediate between these two species, and the following is the first comparison made between them.

Under "Descriptions of New Australia Plants, with occasional other annotations," by Baron von Mueller, in "The Victorian Naturalist," vol. 7, No. 6 (October, 1890), p. 77, occur the words:—

"... Mr. Baumerlen has sent from near the Clyde also specimens of a Eucalypt, which he considers a hybrid between *E. corymbosa* and *E. maculata*, in which case the characteristics of the former are prevailing; the leaves, however, are generally narrower, the operculum is double like that of *E. maculata*, and it separates by a clear transverse line; the wood also was found much lighter in colour than that of the genuine *E. corymbosa*, and the bark smooth on the upper portion of the stem as in *E. maculata*. The flowering time proved later than that of the former; as many as sixteen flowers occur in an umbel; the fruits are generally not so long as those of *E. corymbosa*.''

See some comments on these specimens at Part LII, p. 62, of the present work.

Mr. Gallagher's Nowra specimens show—

(a) A smooth bark—a Grey Gum, something like Spotted Gum (*E. maculata*). It has certainly no rough bark like Bloodwood (*E. corymbosa*).

(b) A fissile, pale timber, as pale as the palest. One of the specimens has the faintest blush of pink in it; this is not unusual in Spotted Gum. It has certainly no dark timber like one of the types of *E. intermedia*, nor does it closely resemble any of the Bloodwoods.

The kino of *E. Novraensis* appears to be red (like *E. corymbosa*, &c.), not olive-green (like *E. maculata*). I had only a small quantity, from a crack in a block of wood, and the observation should be repeated when a larger quantity is available.

On my drawing Mr. Gallagher's attention to this tree, he wrote: "I am now more than ever convinced that this tree is totally distinct from any other species, and more closely resembles Spotted Gum (*E. maculata*) than any other tree." (26th September, 1921.) I agree with him.

The angle the secondary veins make with the midrib in *E. Novraensis* is 45 degrees; in *E. maculata* the angle is 35–50 degrees, which does not greatly differ, but in *E. corymbosa* the angle is from 50 to 65 degrees, which is distinctly different.


The only thing we can say about *E. Novraensis* and *E. intermedia* is in reference to the sometimes pale colour of the timber of the latter. But the bark and the texture of the timber of *E. intermedia* are closer to *E. corymbosa* than to those of the very different *E. Novraensis*. For further remarks see under *E. corymbosa*. 
Explanation of Plates 252–255.

PLATE 252.

E. Preissiana Schau.

Floral disc carnose, dark colored, represented by 5–12 pulvinate glandular processes which project from the inner wall of the calyx towards the ovary; those that project midway between the raised sutureal line of the ovary are very much larger than those situated opposite the sutureal line.

Capsular disc broad, carnose, depressed in the centre, the outer half plain, except for the pitted impressions of the filaments and anthers; inner margin thick, crenate, with as many as twelve pulvinate processes protruding over the valves, some of them being smaller ones between the valves.

The above preliminary remarks will make the following details of the figures clear. All the figures natural size.

1a. Showing the staminal ring, &c.
   (a) Calyx.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Discal lining.
   (e) Style.

1b. Plan of flower with nearly all the stamens removed, not lettered in figure.
   (a) Calyx-rim.
   (b) Staminal ring.
   (c) Pulvinate processes of the floral disc.
   (d) Ovary.

Botanic Garden, Hobart, Tasmania, cultivated (J.H.M.).

2a. Fruit, not lettered.
   (a) Calyx-rim.
   (b) Staminal ring.
   (c) Pulvinate processes of disc.
   (d) Top of valves.

Takalarup Road from Porongorups, near King George's Sound (J.H.M.).

2b. Fruit (riper than 2a), not lettered.
   (a) Calyx-rim and staminal ring fused together or nearly so.
   (b) Outer portion of the Capsular disc, which in the flower or the tubular calyx formed the dark discal lining.
   (c) Pulvinate processes of the disc protruding over the valves of the capsule.
   (d) Valves of the capsule.
   (e) Placenta.

Bremer Bay, east of King George's Sound (J. Welstead).

3. Fruit (top figure), not lettered.
   (a) Calyx-rim.
   (b) Staminal ring.
   (c) Capsular disc.
   (d) Top of valves.

Fruit (figure at right).
   (a) Calyx-rim.
   (b) Staminal ring.
   (c) Outer broad band of capsular disc.
   (d) Pulvinate processes of the disc.
   (e) Valves of the capsule.

Botanic Garden, Hobart (J.H.M.).
4a. Top of fruit with valves closed, not lettered.
   (a) Calyx-rim.
   (b) Staminal ring.
   (c) Large glandular processes on disc. They are pulvinate (convex swellings).
   (d) Small glandular processes on disc.
   (e) Stellate arrangement of the top of the closed capsule, which is free from the wall of the calyx.

4b. Vertical section of fruit.
   (a) Calyx-rim.
   (b) Thickness of calyx.
   (c) Ball-like (pulvinate) protuberance covering the pith which is round the several rows of seeds.
   (d) Seeds showing through star-like design on the top of the fruit. Compare 4a.
   (e) Vertical section of valve.
   (f) Seeds attached to the placenta.
   (g) Carpel.
   (h) Portion of placenta without seeds.
   (i) Columella.

4c. Transverse section of fruit.
   (a) Calyx-rim.
   (b) Thickness of calyx.
   (c) Cells showing seeds.
   (d) Section of columella.

Botanic Garden, Hobart (L. Bodway).

E. megacarpa F.v.M.

Floral disc dark, carnose, forming gland-like processes over the embryonic valves of the ovary, one to each valve: the discal lining also dark and pitted, carnose.

Capsular disc broad, domed, sometimes cruciform (but also in 5's), extending well over the valves nearly concealing them, usually absorbing the staminal ring and much raised above the calyx-rim.

The following figures are natural size.

5.
   (a) Calyx.
   (b) Top of calyx.
   (c) Staminal ring.

Bow River, South-west Australia (Sid. W. Jackson).

6.
   (a) Calyx.
   (b) Calyx-rim.
   (c) Capsular disc.
   (d) Valve.

Jarrahdale, South Western Australia (Forest Ranger Donovan).

E. globulus L'Hérit.

Floral disc carnose, quinquangular, with four or five pulvinate gland-like processes extending over the embryonic valves of the ovary; discal lining of the calyx carnose, pitted by the impressions of the filaments and anthers

Capsular disc very broad, thick, domed, usually quadrangular over the valves and almost concealing them in the process of development; the staminal ring is completely absorbed, but the calyx-rim is always present.

The following figures are natural size.

7a. Flower with stamens removed.
   (a) Calyx-rim.
   (b) Staminal ring.
   (c) Floral disc.
   (d) Base of style.
   (e) Stigma.
7b. Young fruit. ? Floral disc.
   (a) Angular calyx.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Floral disc.
   (e) Nectary.
   (f) Base of style.

7c. Floral disc.
   (a) Calyx.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Floral disc.
   (e) Style.

7d. Capsular disc.
   (a) Calyx.
   (b) Calyx-rim.
   (c) Capsular disc completely covering the valves.

You Yangs, Victoria (Forestry Commission, Victoria).

8. Capsular disc.
   (a) Calyx.
   (b) Calyx-rim.
   (c) Capsular disc extending nearly halfway over the valves.
   (d) Valves of the capsule.

E. alpina Lindl.

Floral disc not raised, but forming a broad dark, carnose, pitted band or ring around the ovary. This, no doubt, is referable to the term "discal space" of Mueller, and therefore it is interesting to trace its development from a coloured band or ring to a broad domed disc on the capsule.

Capsular disc thick, domed, completely absorbing the staminal ring, exceeding the calyx-rim by 3-5 mm.

The following figure is magnified about twice natural size.

9.
   (a) Calyx.
   (b) Calyx-rim.
   (c) Staminal ring.
   (d) Capsular disc.
   (e) Ovary and base of style.


E. robusta Sm.

Floral disc forming a dark carnose lining to the calyx-tube flush with the rim of the staminal ring, and slightly extending over the outer edge of the ovary.

Staminal ring slightly raised above the edge of the calyx-rim.

Capsular disc a little thicker than the floral disc, convex on the inner face, the edge flush with the staminal ring, which still retains its elevated position over the calyx-rim on the ripe capsule, and referred to by Mueller as the "Annual margin of the disc." It is common on species with this class of capsule, and also on the capsule of species whose valves are enclosed.

The following figures are magnified about three times.

10a.

Flower enlarged with nearly all the stamens removed. Seen from the top. The three dark shaded portions surrounding the style are the nectaries.
105. Flower enlarged vertically, with nearly all the stamens removed.

(a) Calyx.
(b) Outer rim of calyx.
(c) Inner rim of calyx.
(d) Staminal ring.
(e) Nectary.
(f) Top of style.

Five Dock, Port Jackson, Sydney (Henry Dean).

_E. annulata_ Benth.

_Sexual disc_ tubular, uniting with the staminal ring, and raised above the calyx-rim 1—2 mm.

Staminal ring inseparable from the disc, the base of the inner filaments growing across, and resting on the disc.

Capsular disc and staminal ring united, and forming a narrow dark band around the top of the capsule. In this species the outer wall of the calyx grows faster than the disc, and therefore reaches the top of the staminal ring, but does not proceed beyond it; so that the top of the calyx, staminal ring and disc grow together, at the same time increasing but very little in thickness to that of the flowering stage.

The following figure is magnified about three times.

11. To illustrate the floral disc.

(a) Calyx.
(b) Calyx-rim.
(c) Broad staminal ring showing the bases of the anthers adhering to it.
(d) Floral disc.
(e) Ovary and base of style.

Between Gnowangerup and east of Stirling Range, South Western Australia (W. C. Grasby).

_E. sideroxylon_ A. Cunn.

_Flower disc_ forming a dark, smooth, carnose lining to the base of the calyx-tube and gradually diminishing as it reaches the top of the calyx.

Staminal ring broad, projecting over the ovary, at first quite flat, but gradually becoming slightly convex as the flower develops. Staminal ring sometimes persistent on the capsule and forming a broad ring over the top of it. The space between the staminal ring and ovary would answer very well for a nectar cup.

Capsular disc similar to the floral disc, but thicker.

The following figures are enlarged about four times.

12a. Longitudinal section of flower.

(a) Calyx.
(b) Calyx-rim.
(c) Broad staminal ring.
(d) Dark discal lining.
(e) Pale top of ovary.
(f) Style.
(g) Ovules.

12b. Showing broad staminal ring.

(a) Calyx.
(b) Top of calyx, or calyx-rim.
(c) Staminal ring.
12c. Fruit, showing semi-persistent staminal ring.

(a) Calyx.
(b) Calyx-rim.
(c) Staminal ring.

_E. eremophila_ Maiden.

*Floral disc* absent, or if present it appears to be fused to the lower surface of the staminal ring.

*Staminal ring* thick, disc-like, extending right up to the style and almost resting on the top of the ovary, persistent until the capsule is ripe. Stamens erect, attached to the disc-like staminal ring right up to the style. Inner stamens shorter than the outer ones.

*Capsular disc* absent, but in this species the persistent staminal ring functions as the disc.

The following figures are enlarged about three times.

13a. Longitudinal section of flower.

(a) Calyx.
(b) Calyx-rim.
(c) Staminal ring (stamens right up to the style).
(d) Oil ducts of the staminal ring.
(e) Dark discal lining to the inside of ovary.

13b. Fruit.

(a) Calyx.
(b) Persistent staminal ring on fruit, which is disc-like.

13c. Fruit, seen from the top.

(a) Calyx.
(b) Staminal ring.
(c) Valves of the capsule.

Seven miles west of Parker's Road (Merredin to Southern Cross, Western Australia), near railway at 217½ miles (E. A. le Souef).

_E. Planchniana_ F.v.M.

14a. Longitudinal section of fruit, not lettered.

(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Carpels.
(d) Placental column.

14b. Transverse section of fruit.

(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Cell.

Trial Bay (J. L. Boorman).

PLATE 253.

_E. ptychocarpa_ F.v.M.

1a. Longitudinal section of fruit.

(a) Rib of calyx-tube.
(b) Calyx-tube.
(c) Thickness of calyx-tube.
(d) Carpels.
(e) Placental column.

1b. Transverse section of fruit.

(a) Calyx-tube.
(b) Rib (of which there are nine in this particular specimen) of the calyx-tube.
(c) Thick pithy covering of the calyx-tube.
(d) Woody portion of the calyx-tube.
(e) Cells.
(f) Placental column.

Pine Creek, Northern Territory (C. E. F. Allen).
2. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Carpels.
   (d) Placental column.

Northern Territory (W. S. Campbell).

[Placenta and Placental Column or Axis have been referred to at Part LIX, p. 565. The Placenta (Latin, a cake) is the organ which bears the ovules in an ovary. It surrounds or envelops the Placental Column, to which it is attached. This column sometimes goes by the name of Columella. In the Corymbose these ovules can be commonly seen attached to the Placenta, and *E. physeocarpa* affords a good example. In this species the wings of it are deflexed at the tips.]

3a. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Carpels.
   (d) Edge of the carpel.
   (e) Placental column.
   (f) Oblique rim of fruit.

3b. Traverse section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Pith.
   (d) Cell.
   (e) Carpel.
   (f) Placental column.

Kalgan Plains, Western Australia (J.H.M).

*E. buprestium* F.v.M.

4a. The capsule falling away from the wall of the calyx (calyx-tube).

4b. Showing separation of carpels.

4c. Fertile seeds.

[The above are slightly diagrammatic, and are from Gaertner’s “De Fructibus,” tab. xxxiv, fig. 1 (1788) as *Metrosideros gumifera*.]

4d.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Carpels.
   (d) Seed.
   (e) Placental column.

Hornsby, Sydney (W. F. Blakely).

*E. Foelscheana* F.v.M.

5. Longitudinal section of capsule to show the carpels falling away from the wall of the calyx-tube.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Carpels.
   (d) Placental column.

Stapleton, Northern Territory (G. F. Hill, No. 453=450).

*E. dichromophloia* F.v.M.

6. Longitudinal section of fruit.
   (a) Calyx-tube.
   (b) Thickness of calyx-tube.
   (c) Carpels.
   (d) Placental column.

Chillagoe, North Queensland, (E. Doran).
Longitudinal section of fruit.
   \((a)\) Calyx-tube.
   \((b)\) Thickness of calyx-tube.
   \((c)\) Carpels.
   \((d)\) Placental column.


\[\text{E.} \text{ hematoxylon Maiden}\]

Longitudinal section of fruit.
   \((a)\) Calyx-tube.
   \((b)\) Thickness of calyx-tube.
   \((c)\) Carpels.
   \((d)\) Placental column.

Jarrahwood, Western Australia (Forest Ranger W. Donovan).

\[\text{E.} \text{ perfoliata} \text{ R. Br.}\]

Longitudinal section of fruit.
   \((a)\) Calyx-tube.
   \((b)\) Thickness of calyx-tube.
   \((c)\) Carpels.
   \((d)\) Placental column.

King Sound, North Western Australia (W. W. Froggatt).

\[\text{E.} \text{ fieifolia} \text{ F.v.M.}\]

10\text{a.} The longitudinal section of the fruit shows the thickness of the calyx-tube, and also its continuity with the Placental column, which is comparatively thin and pointed in this species. It will also be seen that the top of the ovary is depressed towards the centre. Inside and outside the surface of the calyx-tube is covered with fibro-vascular bundles, more or less reticulated.
   \((a)\) Calyx-tube.
   \((b)\) Thickness of calyx-tube.
   \((c)\) Carpels.
   \((d)\) Placental column.
   \((e)\) Top of ovary.

10\text{b.} Transverse section. The cells are arranged in a cruciform manner, and are narrow-oblong or linear-oblong, scarcely acute. When fresh they are set in a darker outer zone, which forms a Maltese cross in section, and which consists of a pulpy or cellular mass very regularly dotted over with (or embedded in the mass), small kino-fragments regular in size. This colloidal, pulpy mass readily dries up, and forms a powdery substance small in bulk. Each of the four cells are enclosed in a yellow, parchment-like membrane (reminiscent of the membrane of the core of an apple) The membrane is also shown longitudinally at—
   \((a)\) Calyx-tube.
   \((b)\) Thickness of calyx-tube.
   \((c)\) Pith with kino spots.
   \((d)\) Cell.
   \((e)\) Placental column.

10\text{c.} Transverse section.
   \((a)\) Calyx-tube.
   \((b)\) Thickness of calyx-tube.
   \((c)\) Inner edge of calyx-tube.
   \((d)\) Pith with kino spots.
   \((e)\) Carpels.
   \((f)\) Cell.
   \((g)\) Placental column.
10d. Longitudinal section.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Top of carpel.
(d) Carpel.
(e) Seed attached to the placenta.
(f) Placental column.


10e. Longitudinal section.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Top of carpel.
(d) Carpel.
(e) Placental column, with placenta attached.

Porongorups, Western Australia (W. Dunn, cultivated).

E. *calophylla* R. Br.

11a. Longitudinal section.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Top of carpel.
(d) Carpel.
(e) Seeds attached to the placenta.
(f) Sterile seeds.
(g) Placental column.

11b. Transverse section. The valves or cells are cruciform, and broadly and acutely cordate. The seeds are black, and not winged. The cells are broader than in *E. ficifolia*, owing, no doubt, to the larger seed, which in most cases is solitary in each cell, whereas, in *E. ficifolia*, the seeds are thinner and narrower, usually more than one in each cell. The combined thickness of the seeds, however, does not equal that of *E. calophylla*.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Carpels showing the seeds.
(d) Cells.
(e) Pith between the carpels.


E. *ficifolia* × *calophylla*.

12. Longitudinal section.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Valves.
(d) Carpel.
(e) Placental column.

La Quinta, Santa Ursula, Canary Islands (the late Dr. G. V. Perez, cult.).

E. *sepulcralis* F.v.M.

13a. Longitudinal Section.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Carpels.
(d) Placental-column.

13b. Transverse section.
(a) Calyx-tube.
(b) Thickness of calyx-tube.
(c) Cells.

Eyre's Range, east of King George's Sound (B. K. Wellstead).
E. casta Benth.

14a. Longitudinal section.
  (a) Calyx-tube.
  (b) Thickness of calyx-tube.
  (c) Carpels.
  (d) Placental-column.

14b. Transverse section.
  (a) Calyx-tube.
  (b) Thickness of calyx-tube.
  (c) Cells.

Uberin Hill, near Dowerin, Western Australia (C. E. Fauntleroy, through W. C. Grasby).

E. Lehmanni Preiss.

15. Transverse section of a head of fruit. The vertical section is shown under "Receptacle" in Plate 247, Part LX. The following are not lettered.
  (a) Calyx-tube.
  (b) Thickness of calyx-tube.
  (c) Cell.
  (d) The line indicates the fusion of the calyx-tubes.
  (e) Tip of the valve.

Staveley, near Hamilton, Victoria (cultivated) (W. V. Wardle).

PLATE 254.

E. miniata A. Cunn.

1a. Longitudinal section.
  (a) Broad wing of the calyx-tube.
  (b) Thick woody portion of the calyx-tube.
  (c) Carpels.
  (d) One of the cells of the capsule.
  (e) Thick obtuse placental-column.

(The column in this species is very thick. The capsule being three-celled, it is not an easy matter to get a longitudinal section showing the column clearly.)

1b. Transverse section.
  (a) Ribs of calyx-tube.
  (b) Thickness of capsule.
  (c) Reniform cells.
  (d) Thick placental-column.

Dehiscence of the Capsules.

2a–2e show the valves of the capsule of some species fused or united, as described in Dr. L. Trabut's paper translated at p. 585, Part LX. The numbers of Dr. Trabut's figures are given in brackets—
  2a (1), 2b (2), 2c (3), 2d (4), 2e (5).

Showing dehiscence with the valves of the capsule fused or united.

2a (1) E. cornuta Labill.
  (a) Calyx-tube.
  (b) Calyx-rim.
  (c) Valves united.
  (d) Opening between the valves, or commonly referred to as the cells.
2b (2) *E. robusta* Sm.
(a) Calyx-tube.
(b) Calyx-rim.
(c) Valves, almost united.
(d) Cells.
Types of deliscence showing the valves disunited.

2c (3) *E. globulus* L'Hérit.
(a) Calyx-rim.
(b) Valves not exsert.
(c) Cells.

2d (4) *E. rostrata* Schlecht.
(a) Calyx-tube.
(b) Disc (capsular).
(c) Valves exsert.
2e Partie sphacelée des valves.

In species with a long operculum, the valves of the capsule are always conspicuous, and in a few species the valves remain united at the top of the ripe and empty capsule. In all the Cornutae there is a tendency thus to cohere at the tips, especially when young, but the valves usually separate as growth proceeds. There is some shrinkage of the lower portion of each valve, and thus longitudinal apertures are formed, through which the seed is discharged.

*E. cornuta* Labill. If we turn to Plate 142, figs. 7a and 7b, and Plate 143, fig. 2a, it will be seen that the upper portions of the valves are not coherent.

The following specimens have the upper portions coherent, *i.e.*, fused at the tips.

No. 225, E. Pritzel, Dist. S. W. Plantagenet; King George's Sound (B. T. Goadby); King George's Sound, Lower King River (J.H.M.). Many of the valves are united at the tips, others are free; Cape Naturaliste (J.H.M.); Wonnerup, near Busselton (Forest Ranger Donovan).

In *E. Lehmannii* Preiss, an allied species, we have tips of valves united in the following specimens:—Wilson’s Inlet (S. W. Jackson); Cape Riche (J. Wellstead); Enola (correspondent of J. Staer). See also figs. 3b and 5c, Plate 144.

*E. annulata* Benth. See Plate 145, fig. 1d.


x *E. Chisholmi* Maiden and Blakely, n. sp.

4a, mature leaves; 4b, immature buds, with bracts; 4c, views of not perfectly mature anthers; 4d, fruits, not quite mature. On the ridge near the new railway tunnel, Marrangaroo, 5 miles west of Lithgow, New South Wales. (W. F. Blakely and Dr. E. C. Chisholm, 8th May, 1922.)

*E. Gardneri* n. sp.

5a, juvenile leaf; 5b, 5c, mature leaves; 5d, 5e, mature leaves; 5f, umbel of young buds; 5g, different views of anthers; 5h, calyx-tube showing persistent style; 5i, fruits. All Wagin, Great Southern Railway, Western Australia, except 5c, which is Bendinger. (C. A. Gardner.) The type.

PLATE 255.

x *E. Taylori*, n. sp.

1a, juvenile leaf, as early as has been seen; 1b, twig with buds and flowers; 1c, different views of anther; 1d, twig with fruits. Note that the leaves of 1d are narrower and more mature than those of 1b. State Forest No. 596, Spring Ridge, Gunnedah District, County of Pottinger, New South Wales. (Assistant Forester T. W. Taylor.)
E. oleosa E.x.M.

2a, twig with mature leaves; 2b, fruits. Barton, South Australia, 376 miles west of Port Augusta, South Australia, on the Transcontinental Railway Line. (E. H. Ising.)

This is a distinctly glaucous form of the species, and complete material is necessary for a final decision as to its relations to E. oleosa. It has certainly affinities to the "Peeneri" Mallee, figured at 10a to 10c, Plate 65.

E. Nowracnsis, n. sp.

3a, large mature leaf; 3b, twig, bearing buds and flowers, also immature fruits showing persistent styles and slightly rounded stigmas; 3c, different views of ripe fruits. Parish of Nowra, 2 miles south of Nowra, New South Wales. (Forest Guard A. J. Gallagher.) The type.

The same species is figured at figs. 8a-c, Plate 162, Part XXXIX.
Floral and Capsular Discs (except No. 14).
Fruits (Vertical and Tranverse sections).
Fruit (sections). (1). Dehiscence of Capsules (2).

EUCALYPTUS RISDONI var: elata (E. HYPERICIFOLIA R. Br) (3). [See Plate 32.]

× E. CHISHOLMI Maiden and Blakely, n.sp. (4).

E. GARDNERI n.sp. (5).
x EUCALYPTUS TAYLORI, n.sp. (1).

E. OLEOSA, F.v.M. var: (2). [See Plate 65.]

E. NOWRAENSIS, n.sp. (3).
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:—

<table>
<thead>
<tr>
<th>Species</th>
<th>Author</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>acacioides</td>
<td>A. Cunn.</td>
<td>(xlviii).</td>
</tr>
<tr>
<td>acenonioides Schauer</td>
<td>(xxxii).</td>
<td></td>
</tr>
<tr>
<td>affinis Deane and Maiden</td>
<td>(lvi).</td>
<td></td>
</tr>
<tr>
<td>amygdalina Labill.</td>
<td>(xvi).</td>
<td></td>
</tr>
<tr>
<td>Andreasi Maiden</td>
<td>(xxi).</td>
<td></td>
</tr>
<tr>
<td>Bakeri Maiden</td>
<td>(lxx).</td>
<td></td>
</tr>
<tr>
<td>Baueriana Schauer</td>
<td>(lvii).</td>
<td></td>
</tr>
<tr>
<td>Baueriana Schauer var. conica Maiden</td>
<td>(lviii).</td>
<td></td>
</tr>
<tr>
<td>bicolor A. Cunn.</td>
<td>(xlii).</td>
<td></td>
</tr>
<tr>
<td>Boornani Deane and Maiden</td>
<td>(xlv).</td>
<td></td>
</tr>
<tr>
<td>Caleyi Maiden</td>
<td>(lv).</td>
<td></td>
</tr>
<tr>
<td>capitellata Sm.</td>
<td>(xxviii).</td>
<td></td>
</tr>
<tr>
<td>conica Deane and Maiden</td>
<td>(lviii).</td>
<td></td>
</tr>
<tr>
<td>Consideniana Maiden</td>
<td>(xxxvi).</td>
<td></td>
</tr>
<tr>
<td>coriacea A. Cunn.</td>
<td>(xv).</td>
<td></td>
</tr>
<tr>
<td>corynabosa Sm.</td>
<td>(xii).</td>
<td></td>
</tr>
<tr>
<td>Dalrympleana Maiden</td>
<td>(lxiv).</td>
<td></td>
</tr>
<tr>
<td>dives Schauer</td>
<td>(xix).</td>
<td></td>
</tr>
<tr>
<td>dunsosa A. Cunn.</td>
<td>(lxv).</td>
<td></td>
</tr>
<tr>
<td>eugenioides Sieber</td>
<td>(xxix).</td>
<td></td>
</tr>
<tr>
<td>gigantea Hook. f.</td>
<td>(li).</td>
<td></td>
</tr>
<tr>
<td>globulus Labill.</td>
<td>(lxvii).</td>
<td></td>
</tr>
<tr>
<td>hauumastoma Sm.</td>
<td>(xxxvii).</td>
<td></td>
</tr>
<tr>
<td>hemiphloia F.v.M.</td>
<td>(vi).</td>
<td></td>
</tr>
<tr>
<td>longifolia Link and Otto</td>
<td>(ii).</td>
<td></td>
</tr>
<tr>
<td>maculata Hook.</td>
<td>(vii).</td>
<td></td>
</tr>
<tr>
<td>melliodora A. Cunn.</td>
<td>(ix).</td>
<td></td>
</tr>
<tr>
<td>microcorys F.v.M.</td>
<td>(xxxxvii).</td>
<td></td>
</tr>
<tr>
<td>Muelleriana Howitt</td>
<td>(xxx).</td>
<td></td>
</tr>
<tr>
<td>numerosa Maiden</td>
<td>(xxvii).</td>
<td></td>
</tr>
<tr>
<td>obliqua L'Hérit.</td>
<td>(xxii).</td>
<td></td>
</tr>
<tr>
<td>ochrophloia F.v.M.</td>
<td>(i).</td>
<td></td>
</tr>
<tr>
<td>odorata Behr and Schlectendal</td>
<td>(xli).</td>
<td></td>
</tr>
<tr>
<td>paniculata Sm.</td>
<td>(viii).</td>
<td></td>
</tr>
<tr>
<td>pilularis Sm.</td>
<td>(xxxi).</td>
<td></td>
</tr>
<tr>
<td>piperita Sm.</td>
<td>(xxxiii).</td>
<td></td>
</tr>
<tr>
<td>polyanthemos Schauer</td>
<td>(lix).</td>
<td></td>
</tr>
<tr>
<td>populifolia Hook.</td>
<td>(lxvii).</td>
<td></td>
</tr>
<tr>
<td>propinqua Deane and Maiden</td>
<td>(lxi).</td>
<td></td>
</tr>
<tr>
<td>punctata DC.</td>
<td>(x).</td>
<td></td>
</tr>
<tr>
<td>radiata Sieb. as amygdalina</td>
<td>(xvi).</td>
<td></td>
</tr>
<tr>
<td>resinifera Sm.</td>
<td>(iii).</td>
<td></td>
</tr>
<tr>
<td>robusta Sm.</td>
<td>(lxviii).</td>
<td></td>
</tr>
<tr>
<td>rostrata Schlect.</td>
<td>(lxii).</td>
<td></td>
</tr>
<tr>
<td>rubida Deane and Maiden</td>
<td>(xliii).</td>
<td></td>
</tr>
<tr>
<td>saligna Sm.</td>
<td>(iv).</td>
<td></td>
</tr>
<tr>
<td>siderophloia Benth.</td>
<td>(xxxix).</td>
<td></td>
</tr>
<tr>
<td>sideroxylon A. Cunn.</td>
<td>(xiii).</td>
<td></td>
</tr>
<tr>
<td>Sieberiana F.v.M.</td>
<td>(xxxv).</td>
<td></td>
</tr>
<tr>
<td>Smithii R. T. Baker</td>
<td>(lxx).</td>
<td></td>
</tr>
<tr>
<td>stellulata Sieb.</td>
<td>(xiv).</td>
<td></td>
</tr>
<tr>
<td>tereticornis Sm.</td>
<td>(xi).</td>
<td></td>
</tr>
<tr>
<td>viminalis Labill.</td>
<td>(lxiv).</td>
<td></td>
</tr>
<tr>
<td>virgata Sieb.</td>
<td>(xxv).</td>
<td></td>
</tr>
<tr>
<td>vitrea R. T. Baker</td>
<td>(xxxiii).</td>
<td></td>
</tr>
</tbody>
</table>


Note by Government Printer.

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

Sydney: Alfred James Kent, Government Printer—1924.
INDEX OF PARTS PUBLISHED—continued.

PART XXXI.
166. E. Bancrofti Maiden.

PART XXXII.
161. E. seeana Maiden. 
162. E. argentea F. v. M.
163. E. Pariumatis C. Hall.
164. E. Blackeye Maiden.
165. E. didactyla A. Cunn.
166. E. Burchell F. v. M.

PART XXXIII.
165. E. rostrata Slendendal.
166. E. radii Endlicher.
167. E. Dunsby Maiden. 
168. E. pachyema Bent. Plates, 136-139. (Issued December, 1917.)

PART XXXIV.
172. E. redunda Schauer.
173. E. occidentalis Endlicher.
175. E. Websteriana Maiden. Plates, 140-143. (Issued April, 1918.)

PART XXXV.
176. E. lehmanni Preiss.
177. E. annulata Bent.
178. E. platypus Hooker.
179. E. spathulata Hooker.
180. E. camphorata F. v. M.
181. E. argyrolea W. V. Fitzgerald. Plates, 144-147. (Issued August, 1918.)

PART XXXVI.
182. E. acutifolia Endlicher.
183. E. macandra F. v. M.
184. E. subulata F. v. M.
185. E. cladoscyllum F. v. M.
186. E. Cooperiana F. v. M.

PART XXXVII.
195. E. clavigera A. Cunn.
196. E. aspera F. v. M.
197. E. grandifolia R. Br.
198. E. pumana F. v. M.
Plates, 152-155. (Issued March, 1919.)

PART XXXVIII.
199. E. tinsellii F. v. M.
200. E. Spenceriana Maiden.
201. E. Cliftoniana W. V. Fitzgerald.
202. E. setosa Schauer.
203. E. terugrassia Schauer.
204. E. Moore Maiden and Cambage.
205. E. dunnosa A. Cunn.
206. E. torquata Luehmann.
207. E. ampygala Labill.
208. E. radiata Sieber.
209. E. numerosa Maiden.

PART XXXIX.
214. E. Torelliana F. v. M.
215. E. cardamine Smith.
217. E. petaloides F. v. M.
218. E. elatostylis Terneczwino.
219. E. gracilis F. v. M.
220. E. transcontinental Maiden.
221. E. longipetala F. v. M.
222. E. olearia F. v. M.
223. E. plectonemion Maiden.
224. E. virga Sieber.
225. E. oblongifolia Baker.
226. E. obtusifolia DC.

PART XL.
230. E. terminalis F. v. M.
231. E. dichromophila F. v. M.
232. E. pycnochaeta Bent.
234. E. tetriginoa DC.
236. E. pyriformis F. v. M.
237. E. flaviflora var. King.
238. E. umbricola A. Cunn.
239. E. varicosa F. v. M.
240. E. odorata Behr and Schleich.
242. E. bicolor A. Cunn.
243. E. Pilgremia Maiden.
244. E. Pauhrichiana F. v. M.
245. E. micranthera F. v. M.
246. E. notabida Maiden.

PART XLI.
256. E. excisa Schauer.
257. E. poliata Bentam.
258. E. Watsoniana F. v. M.
259. E. trachycarpa F. v. M.
260. E. hybridra Maiden.
261. E. Kruseana F. v. M.
263. E. polygonemous Schauer.
264. E. davaniana Schauer.
265. E. conica Deane and Maiden.

PART XLII.
276. E. seifolia F. v. M.
277. E. caespitosa F. v. M.
278. E. snairiay Maiden.
279. E. macleata Hook.
280. E. Mooreana (W. V. Fitzgerald) Maiden.
281. E. approximans Maiden.
282. E. Stowardi Maiden. Plates, 180-183. (Issued February, 1921.)

PART XLIII.
284. E. pycnophora F. v. M.
285. E. eudesmioides Maiden.
286. E. tetradonta (W. V. Fitzgerald) Maiden, n.sp.
287. E. Basteana F. v. M.
288. E. Lane-Forke Maiden.
289. E. Ewartiana Maiden.
290. E. Bakeri Maiden.
291. E. Jacksoni Maiden.
292. E. echeveri Maiden. Plates, 184-187. (Issued April, 1921.)

PART XLIV.
293. E. erythrocorys F. v. M.
294. E. tetrodonta F. v. M.
295. E. odontocarya F. v. M.
296. E. capricornia Smith.
297. E. Cambsdla Maiden.
298. E. Blazdani Maiden and Cambage.
299. E. Normanstonensis Maiden and Cambage. Plates, 184-187. (Issued April, 1921.)

PART XLV.
300. E. tetrava F. v. M.
301. E. eulensiodes Maiden.
302. E. pachyphonos Maiden n.sp.
303. E. Andressi Maiden.
305. E. Kybeanonis Maiden & Cambage.
306. (dup. of 293) E. erythropila Maiden.
308. E. arboricola Deane and Maiden. Plates, 193-196. (Issued May, 1921.)
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 3.

Part LXIII of the complete work.

(with four plates.)

Price Three Shillings and Sixpence.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER.
1924
INDEX OF PARTS PUBLISHED.

PART I.

PART II.
2. E. obliqua L'Héritier. Plates, 5-8. (Issued May, 1903.)

PART III.

PART IV.

PART V.

PART VI.
6. E. angyalaia Labillardiere. Plates, 29-32. (Issued April, 1905.)

PART VII.

PART VIII.
8. E. capitata Sm. Plates, 36-38. (Issued March, 1906.)

PART IX.

PART X.
10. E. macrocarpica F.v.M. Plates, 42-44. (Issued November, 1907.)

PART XII.

PART XIII.
51. E. sericea F.v.M. Plates, 49-52. (Issued February, 1910.)

PART XIV.
52. E. melanolepis F.v.M. Plates, 53-56. (Issued November, 1910.)

PART XV.
53. E. affinis Deane and Maiden. Plates, 57-59. (Issued July, 1912.)

PART XVI.
54. E. olesa Deane and Maiden. Plates, 60-62. (Issued September, 1912.)

PART XVII.
55. E. salomonophila F.v.M. Plates, 63-66. (Issued February, 1913.)

PART XVIII.

PART XIX.
57. E. geniculata F.v.M. Plates, 71-74. (Issued December, 1913.)

PART XX.
58. E. gigantea Hook f.
59. E. longifolius Link and Otto.
60. E. shrubrookii F.v.M.
61. E. bailiffae Maiden.
62. E. pfeifferi Bentham.
63. E. macropodica F.v.M.
64. E. microtheca F.v.M.
65. E. semicircularia Sm.
66. E. pedicellata F.v.M.
67. E. pedunculata F.v.M.
68. E. pedunculata F.v.M.
69. E. pedunculata F.v.M.
70. E. pedunculata F.v.M.
71. E. pedunculata F.v.M.
72. E. pedunculata F.v.M.
73. E. pedunculata F.v.M.
74. E. pedunculata F.v.M.
75. E. pedunculata F.v.M.
76. E. pedunculata F.v.M.
77. E. pedunculata F.v.M.
78. E. pedunculata F.v.M.
79. E. pedunculata F.v.M.
80. E. pedunculata F.v.M.
81. E. pedunculata F.v.M.
82. E. pedunculata F.v.M.
83. E. pedunculata F.v.M.
84. E. pedunculata F.v.M.
85. E. pedunculata F.v.M.
86. E. pedunculata F.v.M.
87. E. pedunculata F.v.M.
88. E. pedunculata F.v.M.
89. E. pedunculata F.v.M.
90. E. pedunculata F.v.M.
91. E. pedunculata F.v.M.
92. E. pedunculata F.v.M.
93. E. pedunculata F.v.M.
94. E. pedunculata F.v.M.
95. E. pedunculata F.v.M.
96. E. pedunculata F.v.M.
97. E. pedunculata F.v.M.
98. E. pedunculata F.v.M.
99. E. pedunculata F.v.M.
100. E. pedunculata F.v.M.
101. E. pedunculata F.v.M.
102. E. pedunculata F.v.M.
103. E. pedunculata F.v.M.
104. E. pedunculata F.v.M.
105. E. pedunculata F.v.M.
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 3.
Part LXIII of the Complete Work.
(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

MACAULAY'S "ESSAY ON MILTON."

PRICE THREE SHILLINGS AND SIXPENCE.

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

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1924.
CCXI. Eucalyptus longicornis F.v.M. ... 81

CLXXV. Eucalyptus Websteriana Maiden. ... 81

CCCLXI. Eucalyptus nutans F.v.M.

Description ... 82
Range ... 82
Affinities ... 82

IX. The Seed.

1. Historical ... 84
2. Danger of collecting seed of inferior species ... 85
3. Vitality of Eucalyptus seeds ... 86
4. Seeds for food of Aborigines ... 89
5. Sterile seeds. Use of the term "Chaff." ... 90
6. Seeds figured by Mueller in the "Eucalyptographia" ... 91
7. The Wing ... 92
8. The Hilum ... 94
9. Sculpture ... 95
10. Testa ... 96
11. Colour ... 97
12. Size ... 100
13. Species of which no seed has been seen by me ... 104
14. Description of Seeds:—

Series Terminaliptera ... 105
" Naviculares ... 109
" Scutiformes ... 113
" Kochioides ... 114
" Heteroptera ... 115
" Curviptera ... 117
" Micromembraneae ... 118
" Scutelliformes ... 119
" Striolatae ... 121

Explanation of Plates (256-269) ... 125
CCXI. *E. longicornis* F.v.M.

"POOT" OR "RED MORREL."

In Part LIX, p. 502, it is stated that the juvenile leaves attributed to "Poot" at figs. 1a, 1b, Plate 67 (as *E. longicornis*) should be held in abeyance. In sending me specimens of *E. longicornis* from Borden, Western Australia, as "Poot," Mr. C. A. Gardner sends juvenile leaves which are similar to those figured in Part LIX, Plate 241, fig. 1a. We are, therefore, now able definitely to say that the Poot juvenile leaves as figured in Plate 67 are not *E. longicornis*. What the leaves are does not now matter; all that we are concerned is that we now know what the juvenile leaves of "Poot" are.

Mr. Gardner's letter says:

While waiting for the train at Borden (a siding a little to the south of Gnowangerup) I observed a few Morrel trees. These are the most southerly trees of the kind I have seen in this State. I had only time to fell one tree, which, curiously enough, had no fruits on, and to collect juvenile foliage from the stump of an adjacent tree. They are locally known as "Poot" (Morrel is a name foreign to the people of this district), but it appears to me to be identical with *E. longicornis*. Following is the note made on the spot:—"Locally known as 'Poot.' A typical Morrel of 45-60 feet, and 2 feet diameter, with a rough persistent grey fissured bark, white sapwood, and red timber. Borden, W.A., in red loamy soil, forming open forest with *E. occidentalis*." (1st May, 1923, No. 1964.)

CLXXV. *E. Websteriana* Maiden.

Two leaf specimens are labelled in Professor Tate's handwriting (a) "Ayers Rock (?) Eucalyptus, Mt. Sonder, see fruits." I have not seen fruits of either of these specimens. They are doubtless the same plant as that referred to in Report, Horn Expedition, Part III, Botany, p. 159 (Professor Tate), as "*E. Oldfieldii* F. v. M. var. with oval-oblong to ovate-obcordate leaves, one to one and a quarter inches long, Slopes of Mt. Sonder."

They are probably *E. Websteriana* Maiden, but it would not be right to speak positively until flowers or fruit are found. The Macdonell Ranges are, however, indicated as a probable locality for the species. Many problems of distribution will have light thrown upon them when the Macdonell Ranges and Central Australia generally are better explored.

Re *E. orbifolia*. The specimens forwarded by Mr. Grasby from Mt. Jackson district, Lake Giles, and Macdonell Ranges, Horn Expedition, are slightly distinct from the typical form of *E. Websteriana*. They are more glaucous, with broader leaves and larger fruits. They are somewhat similar to the type of *E. orbifolia* (Part XVII, fig. 12a, Plate 74), but the operculum is smooth, not striate as shown in the figure of *E. orbifolia*. The anthers appear slightly different in the Mt. Jackson specimen to those of the type of *E. Websteriana.*
DESCRIPTION.

CCCLXI. E. nutans F.v.M.

In *Fragm.* III, 152 (April, 1863).

A translation of the original description will be found at Part XXXV, pp. 120, 121.

I agree with Mueller that its rich purple filaments would render it a pleasing object in gardens.

*Illustrations.* See Plate 146, figs. 1a to g. It does not appear necessary to further figure it.

RANGE.

Confined to Western Australia, so far as we know at present. Mueller states that the type comes near the eastern shores of Bremer Inlet (Maxwell). Bentham, quoting him, "In the interior from Bremer’s Inlet, forming dense thickets, Maxwell." This is usually now known as Bremer Bay. I collected it at Kundip, 20 miles north of Hopetoun, near Ravensthorpe. Kundip is east of Bremer Bay, and it may be said that the present known range of the species is confined to the south coastal counties of Kent and Oldfield. I am confident that search will extend its range.

AFFINITIES.

1. With *E. platypus* Hooker.

*E. nutans* is nearest to *E. platypus*. Mueller (*Fragm.* III, 152) in contrasting them says "*E. platypus* is similar to our species in leaves, the breadth of the peduncles, and the opercula; differing entirely, however, in the not very deeply ribbed calyx and the fruits."

Bentham (*B. Fl. *III, 235) says "Flowers and fruits larger, the ribs more prominent, one or two sometimes expanded into thick wings."

I think that the differences are more fundamental. There is a marked difference in the seedlings. Those of *E. nutans* are narrow and glabrous, those of *E. platypus* are broad and more or less stellate, like those of *E. Lehmanni*.

Contrast the figures of those of *E. platypus* (Plate 145, figs. 4 to 8), with those of *E. nutans* (Plate 146, fig. 1). The leaves of *E. platypus* are broadly ovate to orbicular, those of *E. nutans* lanceolate, with relatively longer petioles. In *E. nutans* we have the peduncles shorter, more nodding, the opercula much shorter, almost ovate, about as long as the calyx-tube, the filaments deep crimson or purple, not cream-coloured.
In *E. nutans* there is a shorter and more slender style, which is soon deciduous, and a different shaped floral disc which forms a nectary-like cup or depression around the base of the style.

The fruits of the two species appear chiefly to differ in the rather larger size and more numerous valves of those of *E. platypus*, but these points require further investigation since there is but little *E. nutans* in collections. I have not satisfied myself that there is a real difference in the wings of the two species.

The "Supposed Variety" (of *E. platypus*) referred to at Part XXXV, p. 122, is a lanceolate-leaved form of the species, and illustrates the truth of my thesis that species which we know as normally having broad leaves may be expected to occur with lanceolate ones. It is quite different from *E. nutans*. 
IX.—THE SEED.

1.—HISTORICAL.

Gaertner, J., "(De Fructibus et Seminibus Plantarum" 2 vols., 4to., 1788–1807. At vol. i, p. 170, Plate xxxiv, he figures E. corymbosa (as Metrosideros gum(m)ifera) and two species (somewhat uncertain) under M. salicifolia. These appear to be the only Eucalyptus seeds figured in the work. Indeed, the genus was not known at the time of publication of the first part of the work, and very little during the remainder. The drawing of M. gum(m)ifera is not satisfactory, as far as (b) and (c) are concerned, which purport to show the capsule in situ. (d) shows sterile seeds, and (e) fertile seeds.

Bentham, G., " Flora Australiensis," III, 1866. In the description of the genus he says (p. 185):

Seeds for the greater part abortive, but more or less enlarged, variously shaped and of a hard apparently uniform texture, one or very few in each cell perfect, usually ovoid or flattened and ovate when solitary, variously shaped and angular when more than one ripen; testa black, dark coloured, or rarely pale, smooth or granular, not hard, in a few species expanded into a variably-shaped wing; hilum ventral or lateral.

At the conclusion of the genus he remarks (p. 188):

For similar reasons I have very seldom mentioned the seeds, for great as are the differences observed, we have, very seldom, means of judging whether they are individual or specific. The fruiting specimens in our herbaria and museums have generally shed their seeds, at least the perfect ones. The abortive seeds are usually numerous in the capsule, unimpregnated and of a hard granular uniform texture, but enlarged, especially those near the top of the capsule, and variously-shaped according to the degree of mutual pressure, the several seeds of the same specimen often differing more from each other than the corresponding ones of different species. Of perfect seeds there generally only ripen either two or three or a single one in each cell, and their shape is accordingly modified. They are, moreover, always near the orifice of the capsule and the first to be shed, and are thus unknown in a large portion of the species.

The note concludes with a few remarks on the seeds of the Corymbosae, given at p. 107.

Mueller, " Eucalyptographia," 1879–1884. In the generic description, says:

Seeds numerous, but comparatively few fertile; testa of these thin, generally without any appendage, or that of some species expanded into a membranous large terminal appendage, or that of other species forming narrow membranes along the angles of the seeds. Hilum ventral or basal. Embryo of amygdaline consistence. Cotyledons, &c. (see under 'Cotyledons'), not yet published,
Under each species he usually briefly describes the seeds. As a rule he contents himself with the statement that the fertile seeds are broader or larger than the sterile ones. He usually figures the seeds, both fertile and sterile, and a number of these drawings are most helpful. He is the only author who has done this, and it is a pity he did not give full descriptions. The figures of the sterile seeds appear to have but little value, since there are no characters to separate those of various species.

Lubbock, in "A Contribution to our Knowledge of Seedlings," (1892), describes the seeds of two species, *E. globulus* and *E. stellulata*.


As pointed out by Bentham, the fertile seeds only differ from each other in being wingless or winged, and "that the wing when it exists varies remarkably in size and shape in different seeds from the same specimen." And though Baron F. v. Müeller, in his "Eucalyptographia," has depicted the seeds (fertile and sterile) for each, yet he does not utilise the apparent distinctions among the leading specific characters. I, myself, have thought it not worth the while to test the value of this structure.

Dr. Cuthbert Hall, *Proc. Linn. Soc., N.S.W.* XXXIX, 476 (1914), states:

Fruit generally many seeded, the majority, or all but one, being sterile. In the Corymbosae group, of which *E. corymbosa* may be taken as a type, there is generally only one fertile seed to each cell, and this is vertically compressed and flattened from before backwards, the hilum showing as a paler depression in the middle of the ventral surface, and the testa is frequently prolonged into a membranous appendage to aid distribution by the wind. In *E. corymbosa*, the posterior angle is keeled. In most of the other Eucalypts, the fertile seeds are more numerous, and are compressed and angled laterally, according to their position in the cell; the hilum is at the narrower inner extremity, and the larger outer extremity is rounded to the shape of the wall of the cell. The sterile seeds are light brown, narrow or linear, the fertile ones dark brown or black.

See the *E. corymbosa* series at p. 108.

**2.—DANGER OF COLLECTING SEED OF INFERIOR SPECIES.**

In Part LXI, p. 30, of my "Forest Flora of New South Wales," are two paragraphs, headed "Industry of Seed-collecting" and "Danger of Planting Inferior Species," which are taken from my Presidential Address, *Journ. Roy. Soc., N.S.W.*, XXXI, 51 (1897). To these I beg to refer my readers, for I have very definitely pointed out the seriousness to the community of collecting and distributing inferior seed. The trouble is a very old one, and is far from being stamped out even yet.
The Rev. J. E. Tenison Woods, F.L.S., etc., exhibited seeds of various kinds of Eucalyptus, and directed attention to the fact that Eucalyptus seed had frequently been sold under fictitious names, the seeds of common and inferior kinds having been substituted for the more valuable descriptions. (Proc. Linn. Soc., N.S.W., III, 20, 1878.)

I was staying in the country, about 50 miles south of Sydney, in the year 1896, when I came across a large sheet spread on the ground, with limbs of Eucalyptus piperita, heavily laden with fruit, thrown on to it, and the seed had already begun to shed. As the collector had other sheets spread out in the district, I did not see him for a day or two. He was quite honest, and perfectly frank as to his operations.

Pointing to the E. piperita seed, and knowing it to be an almost useless species, at all events in this district, I said, "What is this, and why are you collecting it?" He replied, "E. longifolia, and it's a fine timber." I said, "I am afraid what you are collecting is not as valuable as you think it is," explained the harm he was doing, and gave the man my card. He then told me he was collecting for so and so, mentioning the name of a respectable Sydney firm.

Now E. piperita is known as "Peppermint," and in the coast districts (far away from where we were then), E. longifolia, which produces a valuable timber, goes under the names of "Redwood" or "Peppermint." Ergo, the seeds of the E. piperita are those of the more valuable E. longifolia! He naively said that they appeared in "our catalogue" as such. I pity the poor buyer, and I wonder how many other collectors of seeds for respectable firms throughout Australia were and are as ignorant as that one.

This is one of the explanations why some buyers in other countries have given up growing Eucalyptus, because, having ordered the seeds of one species, they have been supplied with the seeds of another. Another difficulty which confronts the buyer arises out of the fact that during the last quarter of a century very active work has been undertaken with the view of purifying nomenclature and, in that operation, old species have been redefined, new species described, and the genus overhauled generally. Seedsmen being rarely botanists, it is not a matter of surprise that they have not kept track of these botanical revisions. It seems to me that the buyer should buy his Eucalyptus seeds under a botanical guarantee. He will ascertain that the seeds of some of the new species, obtained from distant localities, are not on the market.

3.—VITALITY OF EUCALYPTUS SEEDS.

If Mueller collected data on this subject, I have mislaid them; he records a few very imperfect notes in "Eucalyptographia" under E. globulus.
Following are the results of a research by Professor A. J. Ewart:

<table>
<thead>
<tr>
<th>Species</th>
<th>Years old</th>
<th>No. of Seeds</th>
<th>Per cent. Germ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. alpina Lindl.</td>
<td>57</td>
<td>130</td>
<td>Nil.</td>
</tr>
<tr>
<td>amygdalina Labill.</td>
<td>11</td>
<td>1,500</td>
<td>4.1</td>
</tr>
<tr>
<td>botryoides Sm.</td>
<td>10</td>
<td>10,000</td>
<td>8.5</td>
</tr>
<tr>
<td>calophylla R. Br.</td>
<td>10</td>
<td>120</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>32</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>45</td>
<td>Nil.</td>
</tr>
<tr>
<td>coecifera Hook. f.</td>
<td>11</td>
<td>1,500</td>
<td>3.2</td>
</tr>
<tr>
<td>cornuta Lab.</td>
<td>10</td>
<td>2,000</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>180</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>128</td>
<td>Nil.</td>
</tr>
<tr>
<td>corynocalyx F.v.M.</td>
<td>10</td>
<td>10,000</td>
<td>2-2*</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>500</td>
<td>Nil.</td>
</tr>
<tr>
<td>diversicolor F.v.M.</td>
<td>14</td>
<td>100</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>200</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>150</td>
<td>Nil.</td>
</tr>
<tr>
<td>dumosa A. Cunn.</td>
<td>37</td>
<td>250</td>
<td>Nil.</td>
</tr>
<tr>
<td>fremunda Schau.</td>
<td>10</td>
<td>10,000</td>
<td>3.9*</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>2,000</td>
<td>Nil.</td>
</tr>
<tr>
<td>globulus Labill.</td>
<td>Fresh</td>
<td>200</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>10,000</td>
<td>4-1*</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>500</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>1,000</td>
<td>2-2</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>500</td>
<td>Nil.</td>
</tr>
<tr>
<td>gomphrosephala DC.</td>
<td>30</td>
<td>2,000</td>
<td>0-8</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>550</td>
<td>Nil.</td>
</tr>
<tr>
<td>goniocalyx F.v.M.</td>
<td>10</td>
<td>5,000</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>2,000</td>
<td>4</td>
</tr>
<tr>
<td>Gunnii Hook. f.</td>
<td>11</td>
<td>2,500</td>
<td>2-2</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>1,200</td>
<td>Nil.</td>
</tr>
<tr>
<td>* incressata Lab. var. costata (E. costata R.Br.)</td>
<td>57</td>
<td>200</td>
<td>Nil.</td>
</tr>
<tr>
<td>lariglores F.v.M.</td>
<td>57</td>
<td>83</td>
<td>Nil.</td>
</tr>
<tr>
<td>(bicolor A. Cunn.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leptopoda Benth.</td>
<td>30</td>
<td>100</td>
<td>1-2</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>500</td>
<td>Nil.</td>
</tr>
<tr>
<td>minuta A. Cunn.</td>
<td>13</td>
<td></td>
<td>Some</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>1,000</td>
<td>4-3</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>850</td>
<td>2-2</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>280</td>
<td>Nil.</td>
</tr>
<tr>
<td>obcordata Turcz.</td>
<td>10</td>
<td>10,000</td>
<td>6-5</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>500</td>
<td>8-2</td>
</tr>
<tr>
<td>obliqua l'Herit.</td>
<td>Fresh</td>
<td>200</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>100</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>200</td>
<td>Nil.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>180</td>
<td>1-1</td>
</tr>
<tr>
<td></td>
<td>46</td>
<td>250</td>
<td>Nil.</td>
</tr>
<tr>
<td>occidentalis Endl.</td>
<td>57</td>
<td>200</td>
<td>Nil.</td>
</tr>
<tr>
<td>odorata Behr.</td>
<td>7</td>
<td>100</td>
<td>15</td>
</tr>
</tbody>
</table>

* Germ. in five days at 22 deg. C.

Des. 56 days at 37 deg. C.
Dr. Cuthbert Hall (Proc. Linn. Soc., N.S.W., XXXIX, 475, 1914) gives the following figures:—

Seed of *E. Baileyana*, after 23 years, failed to germinate; and others that also gave no result were *E. lactea* (19 years), *E. quadrangulata* (18), *E. sideroxylon* (17), *E. meliodora* (13), *E. Muelleri* (16), *E. terminalis* (12), *E. angophoroides* (11), *E. virea* (12), *E. dextrepina* (13 and 18), *E. Dawsoni* (13), *E. hwmastoma* (16), *E. franciscoides* (13), *E. acaciaformis* (14), *E. Luehmanniana* (19), *E. fastigata* (13), *E. pyriformis* (21), *E. albens* (12), and *E. tesselaris* (12 years). On the other hand, *E. Risdoni* (9 years), *E. carnea* (11), *E. Stuartiana* (10), *E. ocafulata* (12), *E. Woodiana* (8), *E. pendula* (11), *E. hemilampra* (9), *E. punctata* (16), *E. umbra* (6), *E. viridis* (11), *E. paludos* (13), *E. trachyptila* (18), *E. Rossii* (7), *E. pulverulenta* (10), *E. Baeuerleni* (10), *E. Mozartheri* (8), *E. nigra* (13), *E. gonioalyx* (13), *E. covic* (11), *E. capilibera* (12), *E. gratilis* (8), *E. Planchniana* (11), *E. intexta* (10), *E. Morrisii* (11), *E. aggregata* (13), *E. doubita* (12), *E. marginata* (7), *E. affinis* (10), *E. hwmastoma var. micrantha* (16), and *E. obliqua* (18 years), all germinated after such long periods of preservation. That seeds of *E. obliqua* and *E. trachyptila* should keep 18 years, and *E. hwmastoma var. micrantha* and *E. punctata* 16 years, is a remarkable testimony to the power of the seeds of this genus of withstanding desiccation for prolonged periods.

---

*Eucalyptus.* On re-testing with thinner sowing, and removing seedlings daily, the percentages were approximately doubled. All the seeds were soaked and germinated in 3-15 weeks at 20 deg. C-33 deg. C. Where the older seed had a higher percentage than the lower, this appeared in all cases to be due to the latter containing a higher original percentage of infertile seed. No Eucalyptus seed appeared to have completely impermeable coats, though many absorbed water only slowly. ("On the Longevity of Seeds," Proc. Roy. Soc. Vic., xxvi, (New series), Part I, 1908, pp. 67-70.)
In the course of my work on the "Seedlings," I have arrived at much the same results as those of Professor Ewart. With very few exceptions I have dated herbarium specimens for the seeds sown for producing the seedlings, while the dates of the drawings of the cotyledons were always noted. My difficulty was to obtain seed; if it was available in a well-grown state, I had no difficulty in getting germination with seeds up to 30 years old. One has to bear in mind that fruit-bearing specimens lose most of their seeds in the post if there is a delay of more than a few days between gathering and receipt in the herbarium, and that the heavier, fertile seeds go first. Then in a large herbarium there is more or less steady demand for a few seeds as the years roll on, and finally the least plump seeds (amongst the fertile ones) as well as the sterile ones are often all that remain. I think that Professor Ewart's results on longevity are decidedly on the safe side, and I hope that they will be supplemented by himself and other observers, using dated seed of ascertained botanical origin, such seed to be first-class, and preserved in such containers as are employed by first-class seedsmen.

The buyer who requires more than packets should demand seed tested as to germination. I have been official buyer of Eucalyptus seeds for South African Governments since 1897, and never pass untested seed. As a very general rule, the seed supplied by high-class firms shows a high percentage of germination, but as they usually buy it from collectors they are dependent on the conscientiousness of others.

In the Botanic Gardens at Sydney there is an up-to-date seed-testing establishment maintained by the Department of Agriculture, where seed can be tested on behalf of anyone at a trilling cost, so that there is no excuse for sowing bad seed. The question of seed being true to name is a wider one, as will be obvious to those who have studied the facts I have brought together in the present Part.

Guppy ("Observations of a Naturalist in the Pacific," II, 479), records finding drift Eucalyptus fruits on the Valparaiso (Chili) beaches; but I know of no researches as to mature seeds completing such a voyage, and (if any) how many remain fertile. As Eucalyptus seeds fall out so readily after the ripening of the capsule, I am afraid very few would stand the turbulence of the waves. Nor have they chitinous coats, as have those of Acacia.

**4. SEEDS FOR FOOD OF ABORIGINES.**

In my "Forest Flora of New South Wales," Part 44, pp. 75, 76, are some notes on Eucalyptus seeds used by the aborigines for food. There are three references, viz., (1) Seeds of a Yellow Box from Central Queensland, referred to by the late Mr. P. O'Shanesy, of Rockhampton; (2) seeds of a Coolabah from Mr. Herbert Clark, of Killaw, Mulligan River; (3) Eucalyptus seeds forming a staple article of diet in the Boulia district of Queensland, recorded by Dr. Roth, then Protector of the North Queensland aborigines.
As regards No. 1, I can only guess at the species; No. 2 is probably \textit{E. microtheca}; and how the name \textit{E. bicolor} came to be given I do not know. As regards No. 3, "Coolabah" is not mentioned, and it may be that the seed referred to by Dr. Roth is truly \textit{E. bicolor}, \textit{i.e.}, that both that species and \textit{E. microtheca} yield sustenance to the blacks.

In "(Die Eingeborenen der Kolonie Sud Australia.)" by Erhard Elymann (Berlin, 1905), we have at p. 289 some notes on the seeds of \textit{E. microtheca} as food. Following is a translation:—"The seed is eaten everywhere where it can be collected in sufficient quantity, especially therefore in the neighbourhood of Lake Eyre. The seeds are no larger than sand grains, by shaking the branches of which the fruit is ripe over a wooden bowl enough can be collected in a short time to appease hunger. The largest quantity of vegetable foodstuff (about 1 hectolitre) which I saw in the possession of an aborigine among the Central tribes consists entirely of this seed."

(At p. 297). "The seed of \textit{E. microtheca}, \textit{Claytonia}, grasses, etc., are cleaned, if requisite, by winnowing, ground on a millstone with addition of water, and then either made into a broth or dough. The latter is then baked in hot ashes while the former is eaten without preparation."

Mr. H. Clark (already referred to) many years ago gave me a quantity of seed of the same species, from the Mulligan River, Western Queensland, which, he informed me, was a favourite article of food of the blacks. Doubtless its use is as extensive as the species, which is very considerable, being only inferior in this respect to \textit{E. rostrata}.

5.—STERILE SEEDS. USE OF THE TERM "CHAFF."

The principal quantity of what is known in the seed-trade as "Chaff" (Eucalyptus) consists of sterile seeds.

Inasmuch as in the fruits of many species the sterile seeds greatly preponderate, a parcel of genuine seeds may contain many sterile ones. If a buyer desires entirely fertile seed, the others must be sieved off, and he will find that he will have to pay very much more for what he requires. But he will gain in the long run by only dealing in fertile seed, a definite article, for at the present time the seedsman (or the seed-collector) regulates his prices according to the percentage of worthless sterile seed he leaves in it.

The term "Chaff," as applied to sterile seed, is not strictly correct. "Chaff" is the term more fitly applied to the broken wings of the winged seeds, which, in practice, are mainly confined to the Corymbosae. It has, however, taken on a wider meaning, as just explained.
The sterile seeds of the winged Corymbosæ, Series Terminaliptera, are glossy, scale-like or flaky, and somewhat hyaline, and usually much wrinkled and more or less finely pitted or imperfectly striate, with a terminal scar. In all cases they are smaller and thinner than the fertile seeds.

Those of the non-winged Corymbosæ, Series Naviculares, are glossy, scale-like to thick and angular, like particles of resin or kino, very brittle, with a terminal scar, and usually shorter than the fertile seeds. They are also finely pitted or imperfectly striate.

In the non-winged seeds they are glossy, usually angular, polymorphic, or somewhat cubiform subulate, triangular to clavate, and invariably hard and brittle, with the usual terminal scar and markings as in the preceding, but apparently without a separable testa.

In collections they are often seen as fragments, if originally long, and examples of these will be figured in a later Part.

Although sterile seeds (particularly from the average-sized fruit, which is rather small) are usually linear or aciform, they vary a good deal in size, and may be narrow, to even broad, as in E. hyprestum.

6.—SEEDS FIGURED BY MUELLER IN "EUCALYPTOGRAPHIA"

The following seeds are figured by Mueller in the "Eucalyptographia," but many of them are imperfect.

- E. Abergiana
- E. aemenioides
- E. alba
- E. alpina
- E. amygadina
- E. Baileyana
- E. botryoides
- E. hyprestum
- E. calophylla
- E. capitellata
- E. clavigera? (doubtful if this species)
- E. cordata
- E. corvina
- E. corymbosa
- E. corynotheca (cladocalyx)
- E. cosmophylla
- E. crebra
- E. decipiens
- E. diversicolor
- E. doratoxyylon
- E. crythocorys
- E. crythrocemea
- E. eugeniioides
- E. eximia
- E. ficifolia
- E. fiecoiida
- E. Foelscheana
- E. gamaphylla
- E. globulus
- E. gomphocephala
- E. goniocalyx
- E. gracilis
- E. Gunnii
E. haemastoma.
E. hemiphloia.
E. Howittiana.
E. incrassata (includes E. angulosa).
E. largiflorens (bicolor).
E. leucoxylen.
E. longifolia.
E. macrocarpa.
E. macrorhynchaa.
E. maculata.
E. marginata.
E. megacarpa.
E. melliodora.
E. microcorys.
E. microtheea.
E. miniata.
E. obcordata (platypus).
E. obliqua.
E. occidentalis.
E. odorata.
E. Oldfieldii.
E. oleosa.
E. pachyphylla (the var. pedicellata Maiden).
E. paniculata.
E. patens.
E. paniciflora (coriacca).
E. peltata.
E. pilularis.
E. piperita.
E. Planchoniana.
E. polygonanthemos.
E. populinaria.

E. Preissiana.
E. proinosa.
E. ptychocarpa.
E. pulverulenta (cinerea).
E. punctata.
E. pyriformis.
E. Raveretiana.
E. redunca.
E. resinifera.
E. robusta.
E. rostrata.
E. rudis.
E. saligua.
E. salmonophloia.
E. salubris.
E. santalifolia (pachyloma).
E. sepulcralis.
E. setosa.
E. siderophloia.
E. Sieberiana.
E. stellulata.
E. stricta.
E. Stuartiana.
E. tereticornis.
E. tessellaris.
E. tetragonoa.
E. tetraptera.
E. tetradonta.
E. Todtiana.
E. trachyploia.
E. vaccinata (leptophylla.)
E. viminialis.
E. Watsoniana.

7.—THE WING.

This is an expansion of the testa which follows closely the shape and contour of the endosperm, and often, where the latter becomes thin and expanded, the testa appears to flow over and develop into a variously shaped wing. Sometimes a small or rudimentary wing is also formed on a prominent ridge or on an acute margin.
Some interesting examples of the wing are to be found in the Corymbosæ, both in Series Terminalipètera and Series Naviculaires. In the former, see Plate 256, fig. 7a, the testa is expanded into a broadish terminal membrane or wing, while the testa on the endosperm is marked on the ventral by irregular depressions and wrinkles, which are the impressions of the sterile and fertile seeds. The sides are moderately smooth and glossy, and offer but slight resistance in distribution by natural agencies. It will be noted that the wing is uniquely constructed in proportion to the endosperm, so that it is admirably adapted for dissemination by the wind.

In E. calophylla, Plate 257, fig. 2a, the seed is comparatively narrow, being compressed laterally, and it is moderately straight on the ventral side and marked with numerous small ridges and depressions, while the dorsal is gradually curved and expanded into a very thin, sharp, semi-transparent, membranous keel (b), which, no doubt, is intended by nature to serve the purpose of a wing. See also E. corymbosa, same Plate, figs. 1a to 1c, which show the rudimentary dorsal wing more plainly, as indicated by (b).

In E. Watsoniana and its allies, Plate 257, figs. 4a to 9a, the seed is broadly navicular, or compressed dorsiventrally, showing a broadish hilum in the centre, or nearly so, of the ventral side, while the dorsal is smooth and glossy and contracted into a somewhat thickened obtuse keel, and the margin is sometimes bordered by a thin wing or membrane. See E. trachyphtloia, fig. 9a. The development of the seeds of this Series is perhaps more symmetrical than many others. The hilum is approximately in the centre of the ventral side, and the expansion of the endosperm is moderately even at both ends, and also at the sides, thus forming a more or less circumferential margin, which is sometimes bordered by a minute membrane or wing.

In seeds of the following species the wing is terminal, or nearly so:—

E. Abergiana.  E. latifolia.
E. Cliftoniana.  E. perforata.
E. dichromophloia.  E. pyrophora.
E. ferruginea.  E. ptychocarpa.
E. ficifolia.  E. setosa.
E. Foelscheana.  E. terminalis.

In the following the wing is terminal, but more or less rudimentary:—

E. Burracopinensis.  E. Oldfieldi.

In the following the wing is circumferential, accompanied by one or more very small transverse wings:—

E. eudesmioides.  E. tetragona.
E. tetraperta.
In the following the wing is dorsal to somewhat circumferential:—

\[ E. buprestium \quad E. pachypluma \quad E. Todtiana. \]

Wing or membrane circumferential:—

\[ E. angulosa \quad E. macrocarpa \]
\[ E. Isingiana. \quad E. pyriformis. \]

Wing rudimentary, circumferential:—

\[ E. cornuta \quad E. Lehmanni. \]
\[ E. gomphoecephala \quad E. occidentalis. \]
\[ E. gamophylla ("Eucalyptographia") \quad E. pachyphylla \quad \text{do.} \]

Wing rudimentary.

(a) The following species have a very small, imperfectly developed, dorsal wing:—

\[ E. corymbosa \quad E. calophylla. \]
\[ E. Nowraensis. \quad E. calophylla \text{ var. rosea.} \]

(b) The following have a very small marginal membrane or rudimentary wing, which is present on some of the seeds only:—

\[ E. Bloxsomei. \quad E. maculata. \]
\[ E. citriodora. \quad E. peltata. \]
\[ E. eximia. \quad E. trachyphloia. \]
\[ E. Watsoniana. \]

8.—HILUM.

The hilum is the scar left on a seed to which the placenta was formerly attached.

In a number of cases it is readily distinguished by its size, and also in being slightly or markedly different in colour to that of the testa. It is usually ovate to orbicular; sometimes it is surrounded by a deep or shallow depression. There are, however, exceptions, when it is obscure or microscopic and only discernible under a powerful lens.

Bentham used the terms "ventral or lateral" to designate its position on the seed; while Mueller made use of the terms "ventral or basal." The former term is very largely used in the descriptions which follow, as the seeds of a large number of species are found to possess a more or less ventral hilum. In some cases it is sometimes very difficult to say what the position of the hilum really is, owing to the shape of the seed, and also without an examination of the seed while attached to the placenta.
Take, for example, *E. setosa*, Plate 256, fig. 1a, one of the winged Corymbosae, Woolngi, Northern Territory, Dr. H. I. Jensen. In this species the hilum is close to the lower ventral portion of the seed, and might be termed semi-basal, while in *E. perfoliata*, fig. 7a. Lennard River, W. V. Fitzgerald, it is somewhat semi-ventral. In the latter case, the development of the seed has been much greater on one side of the hilum than the other, which makes it appear to be more lateral than ventral.

The term "lateral" is somewhat misleading, and perhaps such species as *E. corymbosa* and *E. calophylla* may have given rise to the term. The seeds of both are narrow and compressed laterally, with a ventral hilum, and owing to their narrowness some authors refer to the hilum as being "lateral."

Excellent examples of the ventral hilum in other members of the Corymbosae are to be found in all the species belonging to the Series Naviculares (b). For instance, see *E. Watsoniana*, Plate 257, fig. 4b, and *E. eximia*, Plate 257, fig. 5a, which are broadly navicular and compressed dorsiventrally, i.e., the opposite to *E. corymbosa* and *E. calophylla*.

In any case, the hilum does not appear to be strictly lateral in any seeds of the genus. If the testa is removed, it will be found in a large number of cases that the scar beneath it is often larger and more distinct and definite in shape to that observed on the testa.

### 9. SCULPTURE.

As might be expected in such a large and diversified genus, there are variations in the sculpture of the seeds, but to a lesser extent than that observed in the morphology of the fruits.

The seeds may be divided into two main divisions, viz., Winged and Non-Winged, the latter kind being far more numerous than the former.

The winged series may be conveniently divided into three main groups—
(a) Those terminating in a broadish, more or less oblique, usually obtuse, wing, as in Series Terminaliptera of the Corymbosae or part thereof.
(b) Those with a dorsal wing, or the testa expanded from the dorsal to the sides, as it were, into two semi-circumferential wings, as in Series Cochleata. Or perhaps almost circumferential wings, with 3-5 rather prominent spreading nerves, as in *E. Todtiana*, fig. 1, Plate 264, Part LXV.
(c) Seeds mostly compressed dorsiventrally with a circumferential wing, and which is sometimes accompanied by one or more narrow, or rudimentary wings, as in Series Heteroptera. Or the wing may be represented by a very narrow membranous margin only. See Series Kochioiides, Micromembraneae, and Scutiformes. Some of the members of this group seem to merge into group (b), the seeds of which are scarcely compressed.
Seeds that are provided with more than one wing are furnished with slight projections on the endosperm which correspond to the wings. A projection is also present on some of the monopterous seeds, and a series of depressions and ridges as well.

In the non-winged division the principal types are—

(a) Those that are somewhat pyramidal and more or less scaly, and usually with a microscopic fringe or jagged margin, which appears to give the seed a light or feathery appearance, and which assists the seed to function as a wing. For examples see *E. punctata*, fig. 12, Plate 262, and *E. canaliculata*, fig. 10, Plate 262, *E. cosmophylla*, fig. 11, Plate 262, and also some of the allied species which are only slightly scaly or fringed. An example is *E. globulus*, fig 1, Plate 262.

(b) Non-scaly, but somewhat pyramidal, with rather conspicuous radiating ridges extending from a rather broadish terminal hilum to the edge. Invariably the seeds of this group are thickish and more or less angular and somewhat irregular in shape. See *E. Planconiana*, fig. 12, Plate 264, and other members of the D-shaped series, and also *E. sepulcralis*, fig. 2, Plate 264, which, though differing from the D-shaped series in shape, is furnished with prominent ridges and the surface of the ventral is more or less muricate.

(c) Thick, with a large depressed ventral hilum surrounded by radiating ridges. Series Pachysperma. Members of this group connect with group (b).

(d) Compressed ovate to nearly orbicular, usually with a small depressed ventral hilum and a more or less striate smooth testa. There is a total absence of prominent ridges in this group, and the seeds are flattish and moderately thin, and liable to be carried a considerable distance by the wind. They vary in size from 1 to 3 mm. See *E. pruinosa*, fig. 2, Plate 260, and *E. hemipholia*, fig. 4, Plate 260. In shape the seeds of *E. microcorys* are similar to the above, but the persistent honeycombed testa is very dissimilar, and may for the present be placed next to the Series Lepidotse-fimbriatae. The seed is light and easily disseminated by wind or water.

(e) Compressed ovate, often very acute, thin or slightly thickened, with faint obtuse angles, and with a smooth, somewhat obscurely pitted testa, and a variously shaped ventral hilum. It differs from group (d) mainly in angularity and in thickness. *E. Perriniana*, fig. 1, *E. rubida*, fig. 2. See *E. Gunnii*, fig. 7, *E. ovata*, fig. 6, *E. Lane-Poolei*, fig. 8, *E. oleosa*, fig. 11, Plate 261.

10. — TESTA.

"Testa (of fertile seeds, it is presumed) black, dark-coloured, or rarely pale, smooth or granular." (Bentham.)

In the majority of cases the testa is very thin and moderately soft. In a few instances it is hard and brittle, and in some of the larger seeds it is more or less coriaceous. In the former cases it breaks up when germination takes place, and
therefore this type is rarely seen on the cotyledons. Sometimes the hard, brittle testa becomes tough when subjected to moisture, and it is not uncommon to see it adhering to the growing cotyledons. In such species as *E. terminalis* and *E. miniata* (doubtless there are others), it is usually carried upwards on the cotyledons. Its presence on the cotyledons is, however, also very largely controlled by the period of germination and the nature of the soil. Given rapid germination and a moist, friable soil, the most delicate type of testa is usually found on the cotyledons as they break through the soil.

The surface of the testa is invariably glossy and smooth. At the same time, it may be very finely striate, either longitudinally or transversely rugose, or finely pitted striate or somewhat obscurely reticulate, and also more or less muricate.

In *E. microcorys* it is honeycombed all over, and in the Series Lepidotae it is more or less covered with minute deciduous shiny scales.

The testa of the sterile seeds does not appear to be inseparable from them, at least in the majority of species. The members of the Corymbosae may be an exception to the rule, but I have not applied the test.

11. —COLOUR.

I have not always been able to obtain perfectly ripe seeds. Seeds vary in size, shape, colour, and lustre, within limits, according to ripeness. I do not doubt that a botanist will specialise in seeds and will thus bring forth much information. I have not dealt with all seeds; it will be an object of a worker to obtain fully ripe seeds of as many species and from as many localities as possible; and let me again suggest that all Eucalyptus seeds be backed with herbarium material, with the fullest information as to appearance of plant, locality, date of collection, &c. It should be borne in mind that research on seedlings cannot be satisfactory if the seeds be unsatisfactory.

The fertile seeds may be reddish-brown, light-brown, light-brown shading to dark-brown, or dark-brown to jet black; the majority, however, are dark brown.

Reddish-brown.

*E. Bloxsomei.*
*E. setosa.*

*E. eximia.*
*E. terminalis.*

*E. Foelscheana.*
*E. tessellaris.*

*E. grandifolia.*
*E. Watsoniana.*

*E. Nowraensis.*
(sometimes jet black).

*E. perfoliata.*
*E. Woodwardi.*

*E. ptychocarpa.*
Light-brown.

E. acmenioides.
E. amygdalina.
E. Behriana.
E. botryoides.
E. Burracoppinensis.
E. cladocalyx.
E. corymbosa.
E. Dawsoni.
E. Deanei.
E. dichromonphloia.
E. diversifolia.
E. erythronema.
E. fastigata.
E. ferruginea.
E. ficifolia.
E. focunda.
E. gigantea.
E. Gillii.
E. Gunnii.
E. hemastoma.
E. hemipholia.
E. Isingiana.
E. Kruseana.
E. latifolia.
E. leptophleba.
E. lirata.
E. longifolia var. multiflora
(but not quite ripe).
E. macrocarpa.
E. microcarpy (a very light brown or buff). E. umbra.

Light-brown to dark-brown.

E. affinis.
E. albens.
E. bicolor.
E. buprestivum.
E. Caleyi.
E. Cliftoniana.
E. crebra.
E. diversicolor.
E. gomphophylla.
E. gomphoccephala.
E. gracilis.
E. intertexta.
E. Lane-Poolei.

E. microthea.
E. neglecta.
E. notabilis.
E. numerosa.
E. obliqua.
E. obtusiflora.
E. occidentalis.
E. oleosa.
E. pachyloma.
E. pachyphylla.
E. Parramattensis.
E. pellita.
E. pilularis.
E. propinia.
E. quadrangulata.
E. radiata.
E. Raveetiana.
E. reduca.
E. resinifera.
E. robusta.
E. rostrata.
E. saligna.
E. salmonophloia.
E. salubris.
E. Spenceriana.
E. stellulata.
E. stricta.
E. trachyphloia.
E. Todtiana.
E. torquata.
Dark-brown.

E. aggregata.
E. Andreesi.
E. angulosa.
E. de Bouzervillei.
E. Bosistoana.
E. calophylla var. rosea.
E. Camfieldi.
E. canaliculata.
E. cinerea.
E. confluenis.
E. Considerianna.
E. coriacea.
E. cornuta.
E. cosmophylla.
E. crucis.
E. dealbata.
E. decipiens.
E. decurva.
E. Dunnii.
E. elaeophora.
E. erythrocorys.
E. eudesmioides.
E. eugenioides.
E. exserta.
E. fasciculosa.
E. globulus.
E. goniocalyx.
E. Kirtoniana.
E. lavopinea.
E. leucocylon.
E. longifolia.
E. Macarthurii.
E. macrorhynchia.
E. maculosa.
E. Maiden.
E. megacarpa.
E. miniata.
E. Mitchelliana.
E. Morrisii.
E. Muelleriana.
E. nitens.
E. Oldfieldi.
E. ovata var. camphora.
E. parvifolia.
E. patellaris.
E. peltata.
E. Penrithensis.
E. Perriniana.
E. platylaris var. pyriformis.
E. platypus.
E. Preissiana.
E. pruinosa.
E. punila.
E. punctata.
E. pyriformis.
E. rariflora.
E. regnans.
E. rubida.
E. rudis.
E. scoparia.
E. Shiressii.
E. sideroxylon.
E. similis.
E. Simmondsii.
E. Smithii.
E. Stuartiana.
E. Studleyensis.
E. taniola.
E. tereticornis.
E. tetraptera.
E. tetrodonta.
E. tetragna.
E. uncinata.
E. unialata.
E. viminalis.
and multiflowered form.
E. vitrea.
E. Websteriana.
12.—SIZE.

The fertile seeds of the various species differ in size from 1/2 to 16 mm. long, and from 1/4 to 7 mm. broad. Those of E. dealbata are found to measure 1/2 to 1 mm. long, and 1/4 to 3/4 mm. broad. The seeds of E. calophylla measure 5 to 16 mm. long, and 5-7 mm. broad.

So far there have been observed ten species with seeds not exceeding 1 mm. in length. No less than 90 species possess seeds over 1 mm. long, but not exceeding 2 mm. in length. The vast majority of the fertile seeds have no wing or appendage, and a large percentage of them are so small, and may be distributed by the wind, like dust or fine sand.

The non-winged seeds, 3 mm. and over, are less liable to be disseminated by wind (strong gales excepted) than those considerably smaller. In any case, it is safe to say that as all the seeds are comparatively light, they may at various times be conveyed long distances by the wind from the parent tree. Or they may also be washed away by local streamlets and flood water.

In nearly all cases the majority of the fertile seeds are larger (sometimes several times larger) than the sterile seeds.

In some species the seeds may be said to be large for the size of the capsule, for example, E. microtheca and E. Macarthuri. The capsules of the former are 3 to 4 mm. long and about as broad, while the seeds are from 1 1/2 to 2 1/2 mm. long, and 1 mm. broad. The capsules of E. Macarthuri measure 4 to 5 mm. long, and 4 to 5 mm. broad, and the seeds vary from 1 1/2 to 2 mm. long, and 1 to 2 mm. broad. When compared with a large-fruited species such as E. pyriformis, the capsule of which measures 50 mm long and 65 mm. broad, with the seeds 3 to 4 mm. long and 3 mm. broad, the comparison is a remarkable one. Or take another large-fruited species, i.e., E. macrocarpa, whose capsule measures 35 mm. by 70 mm., and the seeds are 4 to 5 mm. long and 3 mm. broad. In the cases of E. microtheca and E. Macarthuri, the percentage of fertile seeds to the cell would be found to be much smaller than that of E. pyriformis and E. macrocarpa.
Some authors say that there are only one to two or three fertile seeds in a cell. The vast majority of what appear to be "seeds" in commercial seeds are sterile ones, usually brighter coloured and much smaller than the fertile ones.

Dr. C. Hall points out (Proc. Linn. Soc., N.S.W., XXXIX, 517) that the shape and size of the seed are largely determined, when an endosperm is absent, by the size, shape, and manner of folding of the cotyledons. Moreover, the Bloodwoods (Corymbiae) have one fertile seed in each cell, with a few sterile ones. The occurrence of the single fertile seed permits of the development of the winged appendage of the testa many members of this group possess, and which is impossible in the smaller fruits, with closely packed seeds, of the majority of the Eucalypts.

In "Eucalyptographia," under E. megacarpa, are some measurements of both fertile and sterile seeds of twenty-eight species made by Mr. J. G. Luehrmann. Those of a large number remain to be done, as they were not available.

The following are the approximate measurements of the fertile seeds of 198 species as determined by Mr. W. F. Blakely, my assistant:

<table>
<thead>
<tr>
<th>Species</th>
<th>Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not exceeding 1 mm. long</td>
<td></td>
</tr>
<tr>
<td>E. dealbata, 1-1(^2) by 1 mm</td>
<td></td>
</tr>
<tr>
<td>E. exserta, 1 by 1-1(^2) mm</td>
<td></td>
</tr>
<tr>
<td>E. Kruseana, 1 by 1(^2)-1 mm</td>
<td></td>
</tr>
<tr>
<td>E. odorata var. calcicultrix, 3-1 by 3-1 mm</td>
<td>E. Studleyensis, 1 by 3-1 mm.</td>
</tr>
<tr>
<td>E. Parramattensis, 1 by 3-3 mm.</td>
<td></td>
</tr>
<tr>
<td>E. propinqua, 1 by 3 mm.</td>
<td></td>
</tr>
<tr>
<td>E. reducens, 1 by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. rudis, 1 by 3-3 mm.</td>
<td></td>
</tr>
<tr>
<td>Less than 2 mm. long</td>
<td></td>
</tr>
<tr>
<td>E. amygdalina, 1-1(^2) by 1 mm</td>
<td></td>
</tr>
<tr>
<td>E. aggregata, 1-1(^2) by 1 mm</td>
<td></td>
</tr>
<tr>
<td>E. astringens, 1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. Behriana, 3-1(^2) by 3 mm.</td>
<td></td>
</tr>
<tr>
<td>E. bicolor, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. Bosistoana, 1-1(^2) by 1-1(^2) mm.</td>
<td>E. parvifolia, 1-1(^2) by 1 mm.</td>
</tr>
<tr>
<td>E. Caley, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. crebra, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. Dawsonii, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. Deanii, 1-1(^2) by 1-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. decipiens, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. erythronema, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. eugeniioides, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. fuscunda, 3-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. gracilis, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. Gunnii, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. leptophylla, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. leucoxylon, 1-1(^2) by 13 mm.</td>
<td></td>
</tr>
<tr>
<td>E. longifolia, 1-1(^2) by 1-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. longifolia var. multiflora, 1-1(^2) by 1-1 mm.</td>
<td>E. resinifera, 1-1(^2) by 1 mm.</td>
</tr>
<tr>
<td>E. melliodora, 1-1(^2) by 3-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. microcarpa, 3-1(^2) by 1-1(^2) mm.</td>
<td></td>
</tr>
<tr>
<td>E. Morrisii, 1-1(^2) by 1-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. neglecta, 3-1(^2) by 1-1(^2) mm.</td>
<td></td>
</tr>
<tr>
<td>E. notabilis, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. odorata, 3-1(^2) by 3-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. ocula var. camphora, 1-1(^2) by 3-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. parvifolia, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. platypus, 1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. polyanthemos, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. populifolia, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. rariflora, 1-1(^2) by 1-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. Ravertiana, 1-1(^2) by 3-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. resina, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. rostrata, 1-1(^2) by 3-1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. salmonophloia, 1-1(^2) by 1-1(^2) mm.</td>
<td></td>
</tr>
<tr>
<td>E. salubris, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. scoparia, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. siderophloia, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. siderophloia var. glauca, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. sideroxylon, 1-1(^2) by 1 mm.</td>
<td></td>
</tr>
<tr>
<td>E. vitrea, 1-1(^2) by 1-1(^2) mm.</td>
<td></td>
</tr>
<tr>
<td>E. Webstera, 1-1(^2) by 3-1 mm.</td>
<td></td>
</tr>
</tbody>
</table>

D
Not exceeding 2 mm. long.

<table>
<thead>
<tr>
<th>Species</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. acmenioides</em></td>
<td>2 by 1 mm</td>
</tr>
<tr>
<td><em>E. affinis</em></td>
<td>1½-2 by 1½ mm</td>
</tr>
<tr>
<td><em>E. Andrewsii</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. botryoides</em></td>
<td>1½-2 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. Camfieldi</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. cinerea</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. crucis</em></td>
<td>1½-2 by 1-2 mm</td>
</tr>
<tr>
<td><em>E. diversifolia</em></td>
<td>1½-2 by 1½ mm</td>
</tr>
<tr>
<td><em>E. dices</em></td>
<td>1½-2 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. eleo phora</em></td>
<td>1-2 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. fasciculosa</em></td>
<td>1-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. Gillii</em></td>
<td>2 by 1 mm</td>
</tr>
<tr>
<td><em>E. hemiphloia</em></td>
<td>1-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. intertexta</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. Kitsoniana</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. Lane-Poolci</em></td>
<td>2 by 1½ mm</td>
</tr>
<tr>
<td><em>E. Laseroni</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. linguastria</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. Macarthurii</em></td>
<td>1½-2 by 1-2 mm</td>
</tr>
<tr>
<td><em>E. maculosa</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. Moeric</em></td>
<td>2 by 1 mm</td>
</tr>
<tr>
<td><em>E. nitens</em></td>
<td>1½-2 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. nummrosa</em></td>
<td>1½-2 by 1 mm</td>
</tr>
<tr>
<td><em>E. obliqua</em></td>
<td>1½-2 by 1-1½ mm</td>
</tr>
</tbody>
</table>

Exceeding 2 mm., but less than 3 mm. long.

<table>
<thead>
<tr>
<th>Species</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. agglomerata</em></td>
<td>1½-2½ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. albens</em></td>
<td>1½-2½ by 1 mm</td>
</tr>
<tr>
<td><em>E. altior</em></td>
<td>1-2½ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. Clocziana</em></td>
<td>1½-2¼ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. coriacea</em></td>
<td>1½-2¼ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. cosmophylla</em></td>
<td>1-2½ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. doratyzon</em></td>
<td>2-2½ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. Dunnii</em></td>
<td>2-2½ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. goniocalyx</em></td>
<td>1½-2½ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. hemastoma</em></td>
<td>1½-2½ by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. macorrhyncha</em></td>
<td>1½-2½ by 2½-1 mm</td>
</tr>
</tbody>
</table>

Not exceeding 3 mm. long.

<table>
<thead>
<tr>
<th>Species</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. alpina</em></td>
<td>3 by 2 mm</td>
</tr>
<tr>
<td><em>E. de Beuzevillei</em></td>
<td>1½-3 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. Blazandii</em></td>
<td>1½-3 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. Burracopinensis</em></td>
<td>1½-3 by 1-2 mm</td>
</tr>
<tr>
<td><em>E. capitellata</em></td>
<td>1½-3 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. cladalcyx</em></td>
<td>3 by 1½ mm</td>
</tr>
<tr>
<td><em>E. Considieniana</em></td>
<td>1½-3 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. decidua</em></td>
<td>3 by 2 mm</td>
</tr>
<tr>
<td><em>E. diversicolor</em></td>
<td>3 by 2 mm</td>
</tr>
<tr>
<td><em>E. fastigata</em></td>
<td>1½-3 by 1 mm</td>
</tr>
<tr>
<td><em>E. fraxinoides</em></td>
<td>1½-3 by 1-1½ mm</td>
</tr>
<tr>
<td><em>E. gamophylla</em></td>
<td>3 mm. (original description)</td>
</tr>
<tr>
<td><em>E. gigantea</em></td>
<td>3 by 1-1½ mm</td>
</tr>
</tbody>
</table>
E. cornuta, 2-3 by 2 mm.
E. gomphocephala, 2-3 by 2 mm.
E. leptophleba, 3 by 2 mm.
E. lirata, 3 by 2 mm.
E. Luehmanni, 1\(\frac{1}{2}\)-3 by 2 mm.
E. Muelleriana, 2-3 by 1-2 mm.
E. ochrophorla, 1\(\frac{1}{2}\) by 1-1\(\frac{1}{2}\) mm.
E. Oldfieldi, 2-3 by 1-2 mm.
E. pachyloma, 2-3 by 2-3 mm.
E. patellaris, 3 by 1\(\frac{1}{2}\)-2 mm.
E. globulus, 1-3 by 1-2 mm.
E. pilularis var. pyriformis, 2-3 by 1-2 mm.
E. Preissiana, 3 by 2 mm.
E. similis, 3 by 2 mm.
E. Spenceriana, 3 by 3 mm.
E. torquata, 1\(\frac{1}{2}\)-3 by 1-2 mm.
E. unialata, 2-3 by 2 mm.
E. Woodwardi, 2-3 by 2 mm.

Exceeding 3 mm., but less than 4 mm. long.
E. canaliculata, 2-3\(\frac{1}{2}\) by 1-2 mm.
E. virgata, 2-3\(\frac{1}{2}\) by 1-1\(\frac{1}{2}\) mm.

Not exceeding 4 mm. long.
E. angulosa, 3-4 by 3 mm.
E. Isingiana, 3-4 by 3 mm.
E. lavopinea, 2-4 by 1-2 mm.
E. pyriformis, 3-4 by 3 mm.
E. Sieberiana, 2-4 by 1-2 mm.
E. tessellaris, 3-4 by 4 mm.
E. trachyphloia, 3-4 by 2-2\(\frac{1}{2}\) mm.

Not exceeding 5 mm. long.
E. citriodora, 4-5 by 2-2\(\frac{1}{2}\) mm.
E. eudesmiioides, 4-5 by 3 mm.
E. grandifolia, 4-5 by 4 mm.
E. macrocarpa, 4-5 by 4 mm.
E. maculata, 3-5 by 2 mm.
E. megacarpa, 4-5 by 2\(\frac{1}{2}\) mm.
E. papuanii, 4-5 by 3 mm.
E. peltata, 4-5 by 2-3 mm.
E. tetraptera, 4-5 by 4-5 mm.
E. Todiana, 4-5 by 3-4 mm.

Not exceeding 6 mm. long.
E. ferruginea, 4-6 by 4 (wing included).
E. Planchnoniana, 5-6 by 3 mm.
E. tetragona, 4-6 by 3.
E. tetrodonta, 4-6 by 4-6 mm.

Not exceeding 7 mm. long.
E. Bloxsomei, 5-7 by 3-3\(\frac{1}{2}\) mm.
E. latifolia, 5-7 by 3-4 (wing included).
E. marginata, 4-7 by 3-4 mm.
E. Nowraensis, 5-7 by 2-3 mm. (wing included).
E. sepulcralis, 5-7 by 4-5 mm.

Not exceeding 8 mm. long.
E. buprestium, 6-8 by 4-5 mm. (wing included).
E. Cliftoniana, 8 mm. (wing included).
E. corymbosa, 6-8 by 3 mm. (wing included).
E. erythrocorys, 5-8 by 4-7 mm.
E. eximia, 5-8, by 3\(\frac{1}{2}\) mm.

Not exceeding 9 mm. long.
E. miniata, 5-9 by 5-7 mm.
Not exceeding 10 mm. long.

E. Watsoniana, 5-10 by 3-4 mm.

Not exceeding 12 mm. long.

E. calophylla, var. rosea, 10-12 by 4-5 mm. E. setosa, 10-12 by 4 mm. (wing included).
E. dichromophloia, 8-12 by 2-3 mm. (wing included).

Not exceeding 14 mm. long.

E. ptychocarpa, 10-14 by 4-5 mm. E. terminalis, 10-14 by 4-5 mm. (wing included).

Not exceeding 15 mm. long.

E. Abergiana, 15 mm. (wing included). E. Foelscheana, 12-15 by 4-5 mm. (wing included).
E. ficifolia, 10-15 by 4-6 mm. E. perfoliata, 10-15 by 4-5 mm. (wing included).

Not exceeding 16 mm. long.

E. calophylla, 5-16 by 5-7 mm.

13.—SEEDS OF THE FOLLOWING SPECIES NOT SEEN BY ME.

E. cordata Labill.

"Sterile seeds much narrower than the fertile seeds, partly elongated, all without any appendage. Sterile seeds partly very short, partly slender, and rather above a line long; fertile seeds obtuse-angular, measuring \( \frac{1}{2} \) to nearly one line." ("Eucalyptographia," figs. 10 and 11.)

E. confluaus W. V. Fitzgerald.

"Fertile seeds wingless, minutely pitted, the sterile ones angular and many times smaller. Fertile seeds dark brown." (Original description.)

E. gamophylla F.v.M.

"The fertile, wingless seeds many times exceeding in size the sterile ones. . . Fertile seeds about 1\( \frac{1}{2} \) lines long, acute angled, compressed, bearing a very narrow membrane not quite encircling it." (Original description.)

"Fertile seeds, along their three sharp longitudinal angles lined with a narrow membrane, very much larger than the sterile seeds. . . Fertile seeds are rather dark-grey-brownish, twice or thrice as long as broad, measuring about 2 lines in length and are much less in number, and very remarkably larger than the always very short, light-brown sterile seeds." ("Eucalyptographia," figs. 9 and 10.)

E. Howittiana F.v.M.

"Sterile seeds extremely short. Fertile seeds very small, almost ovate, neither considerably angular nor provided with any membranous appendage." ("Eucalyptographia," figs. 10 and 11.)
E. incrassata Labill.

"Sterile seeds usually much narrower than the fertile seeds, all without appendage." ("Eucalyptographia," figs. 10 and 11.) (I have already stated that the type of this species is uncertain.)

E. pachyphylla F.v.M.

"The fertile seeds with narrow wings, rather light-coloured... Fertile seeds, with the wings added. 1½ lines long. Near to E. alpina." (Original description.)
"Seeds broad and flat, bordered by a narrow wing." (B.Fl. III, 237.)
"Sterile seeds slender; fertile seeds surrounded by a narrow membrane." ("Eucalyptographia," figs. 7 and 8.)

E. phanicea F.v.M.

"Ripe seeds not yet seen, but probably not provided with any appendage." ("Eucalyptographia.")

14.—DESCRIPTIONS OF SEEDS.

Series Terminaliptera (Winged Corymbosae).

Fertile seeds winged, light to reddish brown, 7–15 mm. long, including the well-developed, rather broad, oblique, semitransparent terminal wing. Hilum ventral.

Sterile seeds light to reddish brown, usually narrow, compressed and more or less hyaline, smaller than the fertile seeds.

E. setosa.  E. ficifolia.
E. latifolia.  E. perfoliata.
E. ferruginea.  E. ptychocarpa.
E. dichromophloia.  E. Foelscheana.
E. terminalis.

E. setosa.

"Perfect seeds large, broadly winged." (B.Fl. III, 254).
"Fertile seeds rather large, black-brown and shining, their appendage pale or dark brown... provided with a large terminal membranous appendage. Sterile seeds much smaller and narrow." (Figs. 8 and 9 "Eucalyptographia.")

With a flattened ovoid seed terminated by a long (slightly exceeding the length of the seed itself) membranous wing. Colour brown. Sterile seeds linear, numerous. Woolngi (Northern Territory, Dr. H. I. Jensen, July, 1916.)

? Var. The membranous wing is broader and shinier than the Woolngi specimen, but apparently not otherwise different. (Strelley River, Western Australia, Dr. J. B. Cleland.)

Fertile seeds somewhat dull, pale reddish-brown, 10–12 mm. long, including wing, 4 mm. the broad, rather plump, obtuse, moderately smooth on the back, wrinkled and somewhat ridged on the inner face, and more or less concave at the base of the wing, minutely pitted on both sides. Wing broad, oblique, obtuse. Hilum ventral, inserted on a level with the inner basal edge of the wing; testa thin, firm. Sterile seeds glossy, reddish-brown, all narrow, 4–6 mm. long, about ½ mm. broad. (Woolngi, Northern Territory, Dr. H. I. Jensen.)
E. latifolia.

"Seeds winged." (B.Fl. III, 255.)

Fertile seeds glossy, pale brown, 5–7 mm. long, including the short wing, 3–4 mm. broad, rather thick, obtuse, more or less keeled, and wrinkled on the back and sides, the wing small, usually concave near the endosperm, minutely pitted. Hilum ventral, usually about the centre of the endosperm, very small and narrow, testa thin.

Sterile seeds glossy, light reddish brown, compressed and hyaline, the narrow ones up to 5 mm. long, the broad ones sometimes 4 mm. long, 2 mm. broad.

Smaller and with a more lateral hilum than E. ferruginea.

E. ferruginea.

"Seeds winged." (B.Fl. III, 254.)

Fertile seeds (not seen ripe) glossy light brown, 8 to 10 mm. long, including the wing, 4 mm. broad, rounded or obtuse at the end, with a few irregular veins or ridges, the wing broad, rather oblique and usually turned upwards, very hyaline towards the top, the surface minutely pitted rugose. Hilum ventral, somewhat semi-terminal owing to the incurving of the top of the seed, small, testa thin, hard.

Sterile seeds glossy, light brown, 4–6 mm. long, the broadest rarely exceeding 1 mm., all more or less curved, compressed and somewhat hyaline.

Smaller than E. perfoliata, and with a more terminal hilum.

E. dichromophloia.

"Perfect seeds broadly winged on one side." (B.Fl. III, 257.)

Fertile seeds slightly glossy, light reddish brown, 8–12 mm. long, including the oblique, transparent wing, 2–3 mm. broad, the wing slightly broader and longer than the wrinkled endosperm; it is also more or less concave at its junction with the endosperm. Hilum ventral, usually somewhat distant from the edge, and on a level with the basal edge of the wing; testa thin and firm. Endosperm moderately hard.

Sterile seeds glossy, light reddish brown, compressed, narrow, 3–7 mm. long, \(\frac{1}{2}–1\) mm. broad, scale-like to somewhat hyaline.

Smaller and slightly more concave than E. terminalis.

E. ficifolia.

"Fertile seeds greyish-brown, with long wings in the fore part, most of the seeds sterile, narrow and elongated." (Original description.)

"... differ in no respect from E. calophylla, except that the seeds are of a pale colour, and the testa expanded at one end, or round one side into a broad, variously shaped wing. Further specimens may prove these differences not to be constant." (B.Fl. III, 256.)

"Fertile seeds pale brown, terminated by a long membranous appendage, much larger than the mostly narrow sterile seeds." ("Eucalyptographia," figs. 9 and 10.)

See notes on the contrasts between the two species in Part XLIII, p. 81.
Fertile seeds glossy, light brown, 10–15 mm. long, including the wing, 4–6 mm. broad, compressed, minutely wrinkled, acute or obtuse, the wing hyaline, oblique and usually gradually diminishing towards the apex, minutely pitted on both sides. Hilum ventral, ovate, small, usually closer to the lower edge of the endosperm than to the top; testa thin.

Sterile seeds glossy, reddish, 6–10 mm. long, narrow, the broadest 2 mm. long, somewhat soft and hyaline, and minutely pitted.

Larger and more compressed than E. ferruginea, and also more compressed than E. perfoliata, with a different hilum.

E. perfoliata.

"Seeds not seen." (B.Fl. III. 251.)

Fertile seeds glossy, light reddish brown, 10–15 mm. long, including the wing, 4–5 mm. broad, thickish, the wing sometimes slightly broader, in the middle very thin, hyaline towards the tip, somewhat venulose, with moderately straight veins near the base, the surface pitted rugose. Hilum ventral, closer to the lower edge of the endosperm, rather large, ovate-oblong, 2–3 mm. long, testa thin, hard.

Sterile seeds glossy, reddish brown, compressed, narrow, up to 5 mm. long.

E. ptychocarpa.

"Seeds winged." (B.Fl. III. 255.)

The fertile seeds produced into a rather large terminal appendage, the sterile seeds much narrower. Fertile seeds about 2 lines long, with an almost oval appendage, extending additionally to 3 lines, the appendage of the sterile seeds very narrow." ("Eucalyptographia," figs. 10 and 11.)

Fertile seeds glossy, reddish brown, 10–14 mm. long, including the wing, 4–5 mm. broad, obtuse or acute, convex on both sides, and more or less wrinkled-rugose; the oblique hyaline wing sometimes broader than the endosperm, usually obtuse, minutely pitted on both sides. Hilum ventral, on the upper half of the endosperm, rather large, usually ovate, paler than the hard thin testa.

Sterile seeds glossy, reddish brown, very narrow, 5–10 mm. long.

More compressed than E. Foelscheana, both in the endosperm and the wing, and also with a more terminal hilum.

E. Foelscheana.

"Fertile seeds large, terminated by a conspicuous membrane; sterile seeds very slender." ("Eucalyptographia," also figs. 9 and 10.)

Fertile seeds glossy, reddish brown, 12–15 mm. long, including the wing, 4–5 mm. broad, compressed to somewhat triangular, plump, or with a prominent keel and more or less rugose or wrinkled on both sides. Wing flat or concave, usually somewhat pointed towards the hyaline apex. Hilum ventral, large, about the centre of the endosperm; testa thin and hard.

Sterile seeds glossy reddish brown, narrow, 4–6 mm. long, more or less compressed and irregular in outline.

Thicker and with a more concave wing than E. ficifolia.
E. terminalis.

"Seeds with a rather long wing." (B.Fl. III, 257.)

Fertile seeds slightly glossy, light reddish brown, 10-14 mm. long, including the wing, 4-5 mm. broad, somewhat plump, wrinkled, and minutely pitted, obtuse or acute, the wing rarely broader than the endosperm, usually obtuse, hyaline and transparent, about the same length as the endosperm. Hilum ventral, rather large, usually inserted about the centre of the endosperm; testa thin, brittle.

Sterile seeds glossy, light reddish brown, compressed, narrow, 4-7 mm. long, 1-1½ mm. broad, very thin, scale-like to hyaline.

I have not seen the seeds of the following species:—

E. Abergiana.
E. Cliftoniana.
E. pyrophora.

E. Abergiana.

"Fertile seeds expanding from their summit into a long membrane, much longer than the slender sterile seeds. . . . very compressed, terminated by a semi-oval membrane, giving a length of about ¾ inch for the whole seed, including the appendage." ("Eucalyptographia.")

Figs. 6 and 7 of that work show the seed terminated by a long membrane about as long as the seed.

E. Cliftoniana.

"Fertile seeds brown, terminating in a membranous wing; barren seeds wingless, small and narrow. . . . Fertile seeds 2 lines long, the wings 3 lines in length." (Original description.)

E. pyrophora.

"Seeds apparently winged, but not seen perfect." (B.Fl. III, 258.)

At B. Fl. III, 188, Bentham makes the following observations on the seeds of the Corymbosæ at the conclusion of some notes on the genus:—

"The most remarkable are those of the majority of the Corymbosæ, which are large and more or less expanded into a membranous wing; but even that character would appear to be of little value if we consider that species so closely allied in every other respect as E. calophylla and E. ficiolia, or E. citriodora and E. corymbosa, only differ from each other in their wingless or winged seeds; that even this difference is proved only by the examination of seeds most probably derived from a single tree of each, and that the wing, when it exists, varies remarkably in size and shape in different seeds from the same specimen."

"Subseries VIII.—Corymbosæ."

"Seeds usually large, flat, with acute edges, often more or less expanded in a variously shaped wing." (B.Fl. III, 253.)
Series Naviculares (Non-winged Corymbose).

Fertile seeds without wings or sometimes with a very narrow dorsal or marginal rudimentary wing, narrow to broadly navicular, compressed laterally or dorsiventral, and with a more or less prominent keel. Hilum ventral.

Sterile seeds dark reddish brown to jet black, scale-like to somewhat flaky, smaller than the fertile seeds.

(a) *E. corymbosa.*
(b) *E. Watsoniana.*

*E. Novraensis.*
*E. eximia.*

*E. calophylla.*
*E. citriodora.*

*E. calophylla var. rosea.*
*E. peltata.*
*E. trachyphloia.*

(a) Fertile seeds 5-16 mm. long, narrow, navicular, compressed laterally into a very narrow membranous-like wing along the keel, which sometimes becomes slightly more elongated at both ends.

Sterile seeds dark brown to reddish brown, scale-like to somewhat flaky, smaller than the fertile seeds.

*E. corymbosa.*
*E. calophylla.*

*E. Novraensis.*
*E. calophylla var. rosea.*

*E. corymbosa.*

"Seeds large, ovate, more or less bordered by a wing, usually narrow." (B.Fl. III, 256).

"Fertile seeds large, provided with a narrow or short appendicular membrane; sterile seeds much smaller." ("Eucalyptographia," figs. 9 and 10.)

"Lance-shaped or lunate, thick, the thick portion with a hilum at the side, the keel continued into a narrow membrane. Fertile seeds brown, numerous." (J. H. Maiden, Como, Sydney, 1916.)

Fertile seeds dull, pale brown, 6-8 mm. long, 3 mm. broad, navicular, the ventral portion moderately straight, keeled on the back, the dorsal edge bordered by a narrow scarcely membranous wing. Sides moderately smooth, the inner edge rough and somewhat crested. Hilum ventral, rather large, usually in the centre of the endosperm; testa thin, very firm.

Sterile seeds glossy, reddish brown, very irregular, the majority compressed scale-like to flaky, 2-5 mm. long, \( \frac{1}{2} - 1\frac{1}{2} \) mm. broad.

Slightly longer and paler than *E. Novraensis,* and also with a more prominent dorsal wing.

*E. Novraensis* (not figured).

Fertile seeds shiny, dark reddish brown, 5-7 mm. long, 2-3 mm. broad, navicular, the dorsal keel more or less winged, especially at both ends, the face truncate, muricate or wrinkled-rugose, the sides moderately smooth. Hilum ventral, large, ovate, slightly depressed; testa thin, firm.

E.
Sterile seeds shiny, reddish brown, polymorphic or in irregular narrowish flakes 3–6 mm. long.

Deeper in colour, more rugose and broader on the face, and somewhat more winged on the ends than *E. corymbosa*.

*E. calophylla*.

"Seeds large, ovate, black, flat, or with a raised angle on one face, the edges acute but scarcely winged, the hilum large on the inner face." (*B.Fl. Ill*, 236.)

Bentham's contrast in the Key (*B.Fl. Ill*, 199) is—

Seeds large not winged... ... ... ... ... *E. calophylla*.

Seeds (very irregularly) winged ... ... ... ... ... *E. ficifolia*.

"Fertile seeds very large, black, at the dorsal edge acute, not produced into a membranous appendage; sterile seeds very much smaller, narrow." (*Eucalyptographia,* figs. 9 and 10.)

Fertile seeds glossy, jet black, like fragments of coal, 5–16 mm. long, 5–7 mm. broad, navicular, sharply keeled or winged, the margin almost transparent, smooth and minutely pitted on the sides; the face wrinkled with short irregular ridges and shallow depressions between them. Hilum ventral, scarcely in the centre of the endosperm, large, linear to ovate, much paler than the hard testa.

Sterile seeds glossy, dark brown, polymorphic, flaky to quadrangular, nearly all narrow.

Larger and darker and with a more conspicuous hilum than any of the allied species.

*E. calophylla* var. *rosea*.

Large percentage fertile, large, lance-headed, with a large, dull hilum near one margin, thin towards the edges, but not membranous. (Rydalmere, Sydney, Dr. Prior, 1918.)

Fertile seeds glossy, brown, 10–12 mm. long, 4–6 mm. broad, compressed navicular, the dorsal edge more or less winged, sometimes attenuated at one end and produced into a short semi-transparent wing, slightly wrinkled and pitted on the sides, rugose and wrinkled on the face or ventral portion. Hilum ventral, scarcely in the centre of the endosperm, large, ovate, paler than the thin firm testa. Sterile seeds glossy, reddish, narrow, somewhat flaky, 4–7 mm. long.

Paler and thinner and with a more oblique hilum, and also more prominently winged than *E. calophylla*.

(*b*) Fertile seeds reddish-brown to jet black, 3–10 mm. long, broadly navicular, compressed dorsiventrally into a more or less thickened keel, the margin usually acute or expanded into a narrow membranous-like wing as in *E. trachyphloia*.

Sterile seeds dark brown to reddish brown, polymorphic, somewhat scaly and resinous-like.

*E. Watsoniana.*

*E. eximia.*

*E. citriodora.*

*E. Bloxsomei.*

*E. maculata.*

*E. peltata.*

*E. trachyphloia.*
E. Watsoniana.

"Fertile seeds large, without any appendage. Sterile seeds much smaller." ("Eucalypto-graphia.""

Fertile seeds winged, greatly exceeding in size the sterile ones. Seeds brownish, shining; the fertile ones very much compressed, smooth, 2-3 lines long, margin acute. The species is called "Bloodwood" in its native place.

Strongly resemble E. eximia. Roughly lance-shaped, chocolate, shiny, inside concave, with a central hilum, the outside keeled (the incipient membrane?). Percentage of fertile seeds small, the small sterile seeds of the same colour. Two seeds, rather pale, with a curved, membranous wing. (Botanic Gardens, Sydney, cultivated, 1915.)

Fertile seeds glossy, reddish-brown to jet black, 7-10 mm. long, 3-4 mm. broad, compressed navicular, with a rather strong, thick, dorsal keel, the keel sometimes oblique, the dorsal surface glossy and minutely pitted. Inner face broad, usually concave, with several short obtuse, more or less flexuose, ridges. Hilum ventral, large, ovate to orbicular, usually depressed, paler than the thin firm testa.

Sterile seeds glossy, brownish, polymorphic, subulate, cubiform to flaky, somewhat resinous-like. Larger and darker than E. eximia.

E. eximia.

"Fertile seeds much larger than the sterile seeds, all without any appendage." ("Eucalypto-graphia," figs. 9 and 10.)

Gently lanceolate, large, though smaller than E. calophylla, dark reddish-brown, shiny, small hilum in the centre of the flatish face, the other face with a longitudinal keel or ridge. No membrane. Percentage of fertile seeds very high. (Berowra, J. L. Boorman.)

Fertile seeds glossy, reddish brown, 5-8 mm. long, 3-5 mm. broad, compressed to broadly navicular, oblong to ovate, with a rather strong thickish keel, the margin more or less expanded into a narrow, sometimes semi-transparent, thickish wing, lateral and dorsal surface moderately smooth, minutely pitted rugose, the broad face somewhat wrinkled rugose, or a few seeds with 4-7 short obtuse ridges extending from the somewhat raised edge of the hilum to the margin. Hilum ventral, large, usually ovate and depressed, paler than the rather hard resinous-like testa.

Sterile seeds glossy, brown, polymorphic, more or less muricate, thick and brittle.

Broader than E. corymbosa and more reddish in colour.

E. citriodora.

"Distinguished from E. corymbosa by . . . the seeds almost equally large, but very obscurely or not at all winged." (B. Fl. III. 257.)

Hardly to be distinguished from E. maculata (Liverpool, New South Wales), sterile seeds in greater proportion. (Queensland, A. Murphy, 1917.)

Fertile seeds glossy, jet black, 4-5 mm. long, 2-2½ mm. broad, compressed to navicular, ovate oblong to nearly orbicular, the majority ovate, acute, dorsal surface smooth, minutely pitted, the keel sometimes very prominent. Inner face usually broad, the margin forming a raised ridge around the hilum, and is more or less wrinkled. Hilum ventral, large, ovate to orbicular, paler than the thin testa.

Sterile seeds glossy, brownish, polymorphic, the majority flaky, resinous-like. Similar, but slightly more uniform than E. maculata.
E. maculata.

"Fertile much larger than the sterile seeds, all without appendage. Fertile seeds black and somewhat shining, about \(\frac{1}{2}\) inch long, almost dimidiate-ovate, the often acute edge turned inward."

("Eucalyptographia," figs. 9 and 10.)

Fertile seeds somewhat irregular in shape, tending to be irregularly ovate to lanceolate, smaller than E. eximia, blackish, shiny, with hilum and corresponding keel or ridge, sterile seeds smaller and mostly reddish-brown. (Liverpool, J. L. Boorman, 1917.)

Fertile seeds glossy, jet black, 3–5 mm. long, 2 mm. broad, compressed to navicular, the majority with a rather strong keel, the surface minutely pitted. Inner face rather broad, except in a few seeds, the hilum usually surrounded by a raised thickened ridge continuous with the margin. Hilum ventral, rather large, ovate to orbicular, usually much depressed, paler than the firm thin testa.

Sterile seeds glossy, brownish, thickish, resinous-like, the largest about 4 mm. long.

Darker and more variable than E. eximia, also smaller.

E. peltata.

"Seeds (which I have not seen) smooth and not winged, according to F. Mueller." (B.Fl. III, 255.)

"Seeds without any appendage. Ripe fertile seeds have not yet come under observation." ("Eucalyptographia," fig. 9, sterile seeds.)

Fertile seeds glossy, light to dark brown, 4–5 mm. long, 2–3 mm. broad, compressed ovate to navicular, with or without a dorsal keel, the back smooth and minutely pitted, the inner face flat or concave with several very small, faint, somewhat flexuose ridges. Hilum ventral, rather large, ovate to orbicular, paler than the thin, firm testa.

Sterile seeds glossy, brownish, very variable, resinous-like, all less than half the size of the fertile seeds.

Thinner and more compressed than E. eximia.

E. trachyphloia.

"Seeds without any appendage, the sterile much smaller than the fertile seeds. Seeds not very numerous, the fertile seeds in proportion to the capsular part of the fruit rather large, about 1 line long, ovate, plane-convex, fixed at the centre." ("Eucalyptographia," figs. 10 and 11.)

Fertile seeds dark brown, roughly ovate, with a central hilum and a very narrow encircling membrane, which expands at one end. The sterile seeds very numerous and small, and reddish-brown in colour. (Forestry Commission, Narrabri, N.S.W., September, 1918.)

Fertile seeds glossy, light brown, 3–4 mm. long, 2–2\(\frac{1}{2}\) mm. broad, compressed to broadly navicular, with or without a dorsal keel, the back moderately smooth and minutely pitted, the margin surrounded by a narrow, upturned, membranous wing, the inner face slightly concave, marked by several very short, thin, flexuose ridges, which connect with the narrow wing. Hilum ventral, usually large, ovate to orbicular, more or less depressed, paler than the very thin testa.

Sterile seeds glossy, reddish-brown, the majority small and thick and somewhat obtusely angular.

Differing from the other members of this section in being smaller, and in the minute membranous wing.
E. Bloxsomei (not figured).

Fertile seeds glossy, reddish-brown, 5–7 mm. long, 3–4 mm. broad, compressed dorsiventrally, navicular with or without a strong dorsal keel, the surface minutely pitted, the ventral face marked with irregular, more or less shallow, roundish depressions, the margin sometimes tipped with a rudimentary wing at one end. Hilum ventral, large, usually ovate, paler than the thin testa.

Sterile seeds glossy, reddish-brown, polymorphic, many curved and twisted, all considerably smaller than the fertile seeds. Smaller than E. Watsoniana.

Hippong, Queensland, Dr. T. L. Bancroft.

Series Scutiformes.  
E. grandifolia.  
E. tessellaris.  
E. papuana.

Series Kochioides.  
E. macrocarpa.  
E. pyriformis.  
E. Isingiana.  
E. angulosa.

Series Scutiformes.  
E. grandifolia.  
E. tessellaris.  
E. papuana.  
E. clavigera.

Fertile seeds, reddish to light brown, 4–5 mm. long, compressed, orbicular, somewhat shield-shaped, with slightly upturned margins, the testa microscopically pitted. Hilum ventral, orbicular. Sterile seeds reddish-brown, about 1 mm. long, somewhat cubiform.

E. grandifolia.

E. tessellaris.

Series Heteroptera.

E. eudesmioides.  
E. tetragona.  
E. tetroptera.

Series Curviptera.

E. Burracoppinensis.  
E. Oldfieldii.

A few fertile seeds not seen ripe. These are pale brown, very concave and nearly circular in outline. Hilum in centre, with one or more faint ribs radiating to an intramarginal rib or rim. The intramarginal space, while thin, is of the same texture as the rest of the seed, and cannot be termed a membrane. (Reid River, Townsville, Queensland, N. Daley, January, 1912, No. 1.)
Fertile seeds red brown, about 4 mm. long, 4 mm. broad, thin, ovate to scutiform, more or less muricate, the margin sometimes very thin or membranous, the back microscopically pitted. Hilum ventral, ovate to orbicular, rather small. Sterile seeds not seen.

*E. papuana.*

Fertile seeds light brown. 5 mm. long, 3 mm. broad, thin, ovate to scutiform, more or less rugose, the inner face microscopically reticulate. Hilum ventral, orbicular, rather large.

Sterile seeds light brown, about 1 mm. long, cubiform.

*E. clavigera.*

"Seeds without any appendage." ("Eucalyptographia," figs. 9 and 10.)

**Series Kochioides.**

Fertile seeds light to dark brown, 4–5 mm. long, the majority with a distinct narrow, circular, marginal membranous wing surrounding the endosperm, and usually with 3–5 more or less prominent radial ridges on the ventral surface. Hilum ventral.

Sterile seeds dark to reddish brown, cubiform, subulate to clavate, smaller than the fertile seeds, except a few in *E. macrocarpa*, which are considerably longer.

*E. macrocarpa.*

*E. Isingiana.*

*E. pyriformis.*

*E. angulosa.*

**E. macrocarpa.**

"Fertile seeds much larger than the partly very narrow sterile seeds, and edged by a broadish marginal membrane. . . . Fertile seeds radiating-angular from the hilum to the membranous margin, the whole measuring 2–3 lines, some of the sterile seeds quite as long or even longer, but remarkably slender." ("Eucalyptographia."")

Fertile seeds light brown, 4–5 mm. long, about 4 mm. broad, ovate to somewhat pyramidal or conical, surrounded by a thin, more or less reticulate membrane, about 1 mm. broad, or sometimes broader on the end of the seed, and with two or more short, narrow, radial ridges extending from the hilum to the outer membrane. Hilum ventral, very small, and partly hidden by the thin radial ridges, dark or light coloured.

Sterile seeds of two types, one awl-shaped to clavate, 5–10 mm. long, and the other in short irregular cubes 3–4 mm. long and about 2 mm. broad, both kinds are of a reddish-brown colour, with the scar of attachment rather conspicuous on one end.

*E. pyriformis.*

"Fertile seeds much larger than the partly very narrow sterile seeds, and edged by a broadish marginal membrane. . . . Fertile seeds generally 1½–1⅓ lines long, with radiating angles from the hilum. Sterile seeds very much narrower, though many of them not shorter." ("Eucalyptographia."")

[In some rather poor seeds of var. *Kingsmilli* there is a narrow, rather inconspicuous margin.]
Fertile seeds dark brown, 4 mm. long, 3 mm. broad, ovate, flattish to somewhat conical in outline, surrounded by a slightly thickened membrane, which is narrower and thicker than the membrane surrounding the seed of *E. macrocarpa*. The more conical seeds have also the same very narrow radial ridges extending from the hilum to the outer edge, the whole seed is minutely pitted-rugose; the flat seeds have scarcely any ridges. Hilum ventral, ovate, very small.

Sterile seeds dark brown to reddish-brown, polymorphic, the short ones angular and more or less cubiform, about 3 mm. long, the narrow ones linear, quadrangular, straight or curved, awl-shaped to somewhat clavate, while some are chisel-shaped at the top. In the sample examined, the sterile seeds are fully twice as numerous as the fertile seeds.

*E. Isingiana.*

Fertile seeds pale brown, about 4 mm. long, 3 mm. broad, somewhat orbicular to ovate in outline, flat or nearly so, more or less pitted-rugose, the thin membrane sometimes forming a minute wing-like expansion around the edge of the seed, the back slightly convexed, with a few shallow depressions. Hilum ventral, circular, very small, light or dark coloured.

Sterile seeds very numerous, and variable in shape, all minutely pitted-rugose, angular and cubiform to linear, awl-shape or clavate.

*E. angulosa.*

Fertile seeds dark brown, rather dull, 4 mm. long, 3 mm. broad, more or less compressed ovate to orbicular, with or without a very narrow membrane surrounding the seed, the inner face pitted and also more or less alveolate in appearance, owing to the short, irregular, radiating ridges surrounding the hilum; some seeds are, however, almost plain, the back convexed, minutely striate. Hilum ventral, small, orbicular, paler than the seed, the attachment scar sometimes rather broad and edged with a thin, sharp, irregular ridge.

Sterile seeds reddish-brown, polymorphic, 1–3 mm. long, about 1 mm. broad, the longest usually awl-shaped. The percentage of sterile seeds appears to be fully 80 per cent.

**Series Heteroptera (Eudesmiæ in part.)**

Fertile seeds usually dark-brown, 4–6 mm. long, broadly ovate to oblong, surrounded by a fairly well developed membranous-like wing, and with 2–4 smaller, more or less transverse hyaline wings. Hilum ventral.

Sterile seeds reddish brown, subulate to cubiform, 1–4 mm. long.

*E. eudesmioides.*
*E. tetragona.*
*E. tetraptera.*
E. eudesmioides.

Large, black, irregular in shape, with a distinct hilum, the margin encircled with a narrow membrane. Sterile seeds many, brown. (Minginew, W.A., J.H.M.)

Fertile seeds dark brown, 4–5 mm. long, 3 mm. broad, usually oblong or ovate in outline, surrounded by a pale, thin, membranous wing and sometimes with another irregular membrane extending partly over the centre of the endosperm, which is rather soft, protected by a very thin testa-like membrane, which is more or less reticulate in appearance, the inner face marked with slight depressions, the back moderately smooth, and slightly pitted. The seeds are very light for their size. Hilum ventral, rather large, ovate to orbicular, lighter in colour than the seed.

Sterile seeds red brown, less than 2 mm. long, usually quadrangular or cubiform, very numerous.

E. tetragona.

"Fertile seeds surrounded by a narrow, tender membrane . . . very angular, much larger than the sterile seeds." ("Eucalyptographia."")

Fertile seeds dark brown, 4–6 mm. long, 3 mm. in diameter, ovate, surrounded by a pale, thin, but very distinct membranous wing, which sometimes is fully half as broad as the endosperm; the inner face is often marked with an irregular longitudinal membrane, and 3–4 smaller transverse ones, the back smooth and shiny, more or less concave, owing to the upturned outer membrane. The seed is very light for its size; it is also soft. Hilum ventral, usually ovate, rather large, paler than the seed.

Sterile seeds red-brown, very angular, 1½–2 mm. long, glossy, pitted rugose, very numerous.

E. tetraptera.

"Seeds without any broad membranous appendage. Sterile seeds variable in width, but usually much more slender than the fertile seeds." ("Eucalyptographia."")

Comparatively few fully-developed seeds, which are broad, irregular in thickness and outline, dull black, dotted; thinnish round the edge, but without membrane. The numerous sterile seeds shiny, narrow, reddish-brown to black. (Near Stirling Range, Cape Riche, 5622/18.)

Fertile seeds very dark brown or nearly black, 4–5 mm. long, and about as broad, ovate to nearly orbicular in outline, surrounded by a thin, undulate membrane, which is about half as broad as the endosperm; the inner face somewhat alveolate, with cell-like depressions or short, irregular, rudimentary wings or ridges, the back moderately smooth, but distinctly marked with reticulate veins. The wing-like membrane is so thin that it rolls over with the slightest touch or pressure. Hilum ventral, usually orbicular, rather small and often concealed by a thin membrane.

Sterile seeds oblong to awl-shaped, 2–4 mm. long, of a reddish-brown colour.
Series Curviptera.

Fertile seeds greyish to dark brown, 1$\frac{1}{2}$–3 mm. long, including the wing, somewhat tadpole-like, or obliquely ovate to compressed quadrangular, with a small incurved wing at the base, and with 1–4 more or less prominent longitudinal ridges. Hilum terminal.

Sterile seeds light to dark brown, polymorphic, the narrow ones subulate to clavate, the longest about 4 mm.

_E. Burracoppinensis_ n. sp. E. _Oldfieldii_.

_E. Burracoppinensis_ n. sp. (inedit.).

Fertile seeds dull, greyish-brown, 1$\frac{1}{2}$–3 mm. long, including the wing, which is about 1 mm. long, 1$\frac{1}{2}$–2 mm. broad, tadpole-like, ovate or obliquely ovate, truncate, with three or four prominent ridges, and one to three faint lines or ridges, the rather narrow, firmly winged margin terminating in a small, broadish, incurved, tail-like wing, and more or less covered with a very thin, transparent, deciduous, hyaline membrane; ridges usually following the curvature of the seed, the more prominent ones with a very narrow rudimentary wing, differing in colour to the thin, minutely pitted testa; endosperm dark coloured (white in all the other species). Hilum terminal, rather small, the scar surrounding it usually obliquely truncate, with or without a shallow depression.

Sterile seeds glossy, polymorphic, the broad ones very angular and curved somewhat similar to the fertile, light brown, 2–3 mm. long, mostly compressed. The narrow ones dark brown, 2–4 mm. long, quadrangular clavate to subulate, about as numerous as the broader ones.

The terminal hilum is unusual in a winged seed. Its position is near the winged Corymboseae.

The long or longish wing of the fertile seeds, and the long narrow, sterile seeds and hyaline membrane readily distinguish this species from all the others.

_E. Oldfieldii_ (not figured).

"Fertile seeds imperfectly and quite narrowly membranous at the margin, larger than the partly narrow sterile seeds. Ripe fertile seeds black, scarcely above 1 line long; sterile seeds unequal in size." ("Eucalyptographia.")

Fertile seeds glossy, dark brown, 2–3$\frac{1}{2}$ mm. long, 1–2 mm. broad, polymorphic, compressed quadrangular, somewhat pyramidal to navicular, all more or less wrinkled on the face and back, the thin testa pitted rugose, sometimes expanded into a thin membrane along the edge and at both ends, so as to form a rudimentary wing. Hilum terminal, small.

Sterile seeds glossy, dark brown to dark reddish-brown, polymorphic, the narrow ones clavate up to 4 mm. long.
Smaller and more polymorphic than *E. Burracoppinensis*, and with a much smaller rudimentary wing.

**Series Micromembranae.**

- *E. Lehmanni.*
- *E. cornuta.*
- *E. occidentalis.*
- *E. gomphocephala.*

**Series Scutelliformes.**

- *E. Spenceriana.*
- *E. cladocalyx.*
- *E. Baileyana.*
- *E. decurva.*

**Series Striolatae.**

(a) Prominently striate.

- *E. erythronema.*
- *E. astringens.*
- *E. platypus.*
- *E. torquata.*

(b) Large—striate longitudinally.

- *E. ochrophloia.*
- *E. Staigeriana.*

**Series Micromembranace.**

Fertile seeds light to dark brown, 1\(\frac{1}{2}\)–3 mm. long, thickish, ovate to somewhat obtusely triangular, sometimes surrounded by a very narrow microscopic membrane, and more or less slightly ribbed on the inner face. Hilum ventral.

Sterile seeds reddish-brown, polymorphic, the narrow ones subulate, a few slightly longer than the fertile seeds.

- *E. Lehmanni.*
- *E. cornuta.*
- *E. occidentalis.*
- *E. gomphocephala.*

**E. Lehmanni.**

Fertile seeds dark brown to black, 1\(\frac{1}{2}\)–3 mm. long, about 2 mm. broad, ovate to somewhat triangular, rather thick, sometimes surrounded by a very thin membrane, more or less slightly ridged on the inner face, moderately smooth and striate on the back. Hilum ventral., usually ovate, paler than the seed.

Sterile seeds glossy, reddish-brown, varying from quadrangular to subulate, the latter sometimes longer than the fertile seeds.

**Thicker than E. cornuta.**

**E. cornuta.**

"Seeds without any appendage, the sterile seeds not very narrow." ("Eucalyptographia," figs. 8 and 9.)
Fertile seeds dark brown, 2–3 mm. long, less than 2 mm. broad, thin, ovate, oblong to slightly elliptical, sometimes terminating in a sharp point, the margin occasionally with a minute membrane, pitted and faintly ribbed on the inner face, the back convex and minutely striate. Hilum ventral, depressed, orbicular, rather small.

Sterile seeds red-brown, polymorphic, smaller and more numerous than the fertile seeds.

*E. occidentalis.*

"Seeds without appendage. the sterile seeds numerous, very small, but comparatively not very narrow. Fertile seeds few, about \( \frac{1}{2} \) line long; testa from fine streaks and minute dots densely reticulated." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds light brown, about 2 mm. long, 1 mm. broad, very variable in shape, the majority however, appear to be somewhat trigonous, thick, and more or less scurfy, membranous on the edges, the face with a few faint radiating ridges, the back faintly rugose. Hilum ventral, orbicular, very small.

Sterile seeds light to bright reddish-brown, 1–3 mm. long, usually subulate, very numerous.

*E. gomphocephala.*

"Seeds without any appendage, the sterile not much or hardly smaller than the fertile seeds and few of them narrow." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds glossy, dark brown, 2–3 mm. long, 2 mm. broad, rather irregular in shape, varying from ovate or orbicular to triangular or D-shaped, the inner face more or less marked with three to five faint irregular radial ridges, which extend from the hilum to the outer edge, which is sometimes membranous, the back slightly convex, and minutely striate. Hilum ventral, usually near the upper end of the endosperm, very small, slightly depressed.

Sterile seeds sometimes slightly longer than the fertile seeds, red-brown, quadrangular to linear oblong, rather numerous.

More distinctly striate than *E. cornuta* and *E. Lehmanni.*

*Series Scutelliformes.*

Fertile seeds light to dark brown, 3–4 mm. long, compressed, orbicular, ovate to rhomboidal, and somewhat scutelliform; the testa microscopically pitted, or quite smooth. Hilum ventral, the depression surrounding it sometimes broad and shallow.

Sterile seeds polymorphic, the majority narrow, smaller than the fertile seeds.

*E. Spenceriana.*

*E. lirata.*

*E. cladocalyx.*

*E. similis.*

*E. Baileyana.*

*E. diversicolor.*

*E. decurrea.*
E. *Spenceriana*.
Fertile seeds light brown, about 3 mm. long and as broad, thin, more or less scutelliform, slightly wrinkled on both sides, testa very thin. Hilum ventral, small, ovate, darker than the testa.

Sterile seeds not seen.

E. *cladocalyx*.
"Seeds without any membranous appendage, the sterile seeds mostly broad." (*Eucalyptographia," as *corynocalyx*, figs. 8 and 9.)

Fertile seeds light brown, 3 mm. long, about 1½ mm. broad, oblong, ovate to somewhat rhomboidal, slightly wrinkled on both sides, the very thin testa sometimes forming a very minute membranous margin around the endosperm. Hilum ventral, sometimes closer to the lower end of the endosperm, usually orbicular, dark or light coloured; testa thin.

Sterile seeds very numerous, mostly forming irregular cubes about half the size of the fertile seeds.

E. *Baileyana*.
"Seeds without any appendage." (*Eucalyptographia," fig. 9 for fertile seeds.)

Fertile seeds rounded (i.e., not angular), flattened-ovoid, convex surface without a keel and the whole seed without a trace of membrane, inconspicuous hilum on other surface, dull black, finely granular. Sterile seeds very abundant, dull brown. (Copmanhurst, J. L. Boorman, 1916.)

Fertile seeds dark brown to black, 3–4 mm. long, 3 mm. broad, rather thick, ovate and sometimes slightly angular, somewhat muricate and minutely pitted on both sides. Hilum ventral, ovate to orbicular, lighter than the seed-coat.

Sterile seeds very numerous, polymorphic, light reddish brown, the scar of attachment terminal or nearly so.

E. *lirata*.
Fertile seeds ovate, slightly compressed, dark brown, punctate, the sterile ones very much smaller, narrow and angular."

Fertile seeds light brown, 3 mm. long, 2 mm. broad, rather thin, ovate, the edge sometimes very sharp, pitted and more or less wrinkled on both sides. Hilum ventral, very small, usually orbicular, darker than the testa.

Sterile seeds pale to dark reddish-brown, usually triangular or quadrangular, flat, about half the size of the fertile seeds.
E. similis.

"The seeds are not winged."

Fertile seeds dark brown, 3 mm. long, 2 mm. broad, thin, usually ovate, slightly concave or scutelliform, slightly wrinkled, and minutely pitted on both sides. Hilum ventral, very small, usually in the centre of the endosperm, sometimes slightly raised, darker than the testa.

Sterile seeds reddish-brown, very numerous, the majority linear, about 2 mm. long.

E. diversicolor.

"Seeds without appendage." ("Eucalyptographia," figs. 11 and 12.)

Fertile seeds light to dark brown, 3 mm. long, 2 mm. broad, ovate to obliquely ovate, rather thin and slightly scutelliform, both surfaces more or less wrinkled. Hilum ventral or nearly so, very small, usually orbicular, darker than the testa.

Sterile seeds very numerous, reddish-brown, cubiform to awl-shaped, smaller than the fertile seeds.

E. decurca.

"Wingless seeds. Fertile seeds much larger than the sterile ones, blackish, nearly oblique-tetrahedric." (Mueller.)

Fertile seeds dark brown, 3 mm. long, 2 mm. broad, ovate to acutely ovate or elliptical, rather thick, wrinkled, and with a few shallow depressions on both sides, the thin testa more or less membranous on the dorsal margin. Hilum ventral, ovate or elliptical, rather small, the attachment scar surrounding it very conspicuous.

Sterile seeds reddish-brown, very numerous, usually quadrangular-oblong, about half the length of the fertile seeds.

Series Striolatae.

Fertile seeds light to dark brown, usually compressed ovate to orbicular, with a small ventral hilum, and both surfaces deeply to finely striate. In a few cases the striae is more or less transverse, or radiating from the hilum. This series includes the Boxes and Ironbarks.

(a) Prominently striate:—

E. erythronema. E. platypus.

E. astringens. E. torquata.

(b) Large—striate longitudinally:—

E. ochrophyloia. E. Staigeriana.
(a) Prominently striate.

Fertile seeds light to dark brown, 1½–3 mm. long, ovate, and more or less obtusely angled to somewhat triangular, inclines to be deeply pitted-striate on both surfaces. Western species.

- *E. erythronema*.
- *E. astringens*.
- *E. Websteriana*.

*E. erythronema.*

"Fertile seeds considerably larger than the sterile seeds, all without any appendage." ("Eucalyptographia," figs. 9 and 10).

Fertile seeds glossy, light brown, 1–1½ mm. long, about 1 mm. broad, very irregular, ovate, oblong or triangular, somewhat thick, minutely longitudinally pitted-striate, rather plump, many acutely angled. Hilum ventral, rather small, usually ovate; testa thin.

Sterile seeds very numerous, very glossy, bright to reddish brown, angular, quadrangular to oblong, the majority shorter and narrower than the fertile seeds.

*E. astringens.*

Fertile seeds light to dark brown, 1½ mm. long, 1 mm. broad, oblong to irregularly ovate, minutely longitudinally pitted, striate on both surfaces. Hilum ventral, ovate to orbicular, the depression surrounding it sometimes rather broad; testa thin.

Sterile seeds glossy, reddish-brown, very numerous, and very irregular in shape, the majority about half the size of the fertile seed.

Differing from *E. platypus* in being more irregular, and in the hilum being more in the centre of the endosperm.

*E. platypus.*

"Sterile seeds varying in form; the fertile ones about half a line long, black, ovate-rotund. Seeds wingless, the fertile ones faintly clathrate.

"Seeds all without any appendage, the fertile seeds blunt-angled, dotted streaked, the sterile seeds mostly shorter and always narrower. Fertile seeds not fully a line long; some of the sterile seeds considerably longer than the rest." ("Eucalyptographia," as *E. obcordata*, figs. 8 and 9).

Fertile seeds glossy, dark brown, 1½ mm. long, 1 mm. broad, ovate to somewhat oblong, minutely striate all over. Hilum ventral, scarcely in the centre of the endosperm. small, ovate to orbicular, sometimes oblong, deep sunk; testa very thin.

Sterile seeds glossy, reddish-brown, the broad ones shorter than the fertile seeds, the narrow or subulate ones sometimes longer than the fertile seeds, and more numerous than the broad ones.
E. torquata.

Fertile seeds glossy, light to dark brown, 1½-3 mm. long, 1-2 mm. broad, somewhat irregular in shape, varying from ovate oblong to somewhat triangular, moderately thick, minutely longitudinally pitted striate. Hilum ventral, small, the depression surrounding it rather large and irregular in outline; testa very thin.

Sterile seeds glossy, reddish-brown, cubiform to awl-shaped, 1-2 mm. long, very numerous.

E. Websteriana (not figured).

Fertile seeds glossy, dark brown, the longest slightly more than 1 mm. long, and slightly less than 1 mm. broad, oblong to somewhat triangular, a few D-shaped, rather plump, minutely pitted striate all over. Hilum ventral, small, paler than the very thin testa.

Sterile seeds glossy, light to dark reddish-brown, the majority narrow subulate, about 2 mm. long, a few longer and more than twice the length of the fertile seeds.

White Hope, via Kalgoorlie, Western Australia (R. J. Larsen).

E. facunda (not figured).

"Fertile seeds conspicuously larger than the sterile seeds, all without any appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, light brown, ¾ to slightly over 1 mm. long and about as broad in proportion, ovate, oblong to rhombic, compressed or slightly pyramidal, slightly wrinkled, minutely striate on the back. Hilum ventral, small, paler than the thin testa, the depression surrounding it sometimes very obscure in the angular seeds, more prominent in the compressed seed.

Sterile seeds shiny, slightly darker than the fertile seeds, very angular, a few more elongated than the rest and nearly as long as the fertile ones.

More orbicular and slightly thicker than E. salubris.

Southern Cross, Western Australia (J.H.M.).

(b) Large, striate longitudinally.

Fertile seeds light to dark brown, 2-3 mm. long, minutely striate to almost smooth.

E. ochrophloia.  
E. Staigeriana.
E. ochrophloia.

Fertile seeds rather dull, light to dark brown, 1½-3 mm. long, 1-1½ mm. broad, the majority very thin, somewhat compressed or slightly concave on the inner face, with a small shallow depression surrounding the hilum, slightly convexed on the back, and minutely wavy-striate longitudinally. Hilum ventral or nearly so, very small pale-coloured, the small depression surrounding it shallow and darker than the remainder of the thin testa.

Sterile seeds glossy, dark reddish-brown, polymorphic, the broad ones more numerous than the thickish narrow ones, all considerably shorter than the fertile seeds.

Differing from E. pruinosa in the somewhat narrower seeds.

E. Staigeriana.

"Seeds disk-like." (Mueller.)

Fertile seeds dull to slightly glossy, light to dark brown, 1½-2 mm. long, about 1 mm. broad, oblong, ovate, obtuse, or acute, a few somewhat triangular with rounded angles, thickish, the back convexed and minutely striate longitudinally to almost smooth. Hilum ventral, very small, whitish, sometimes the depression surrounding it rather broad and shallow, and as long as the face of the seed; testa thin.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, the narrow ones awl-shaped, about as numerous as the broad ones and rarely as long as the fertile seeds.

Somewhat similar to E. populifolia, but larger and thicker.

(Continued in Part LXIV.)
EXPLANATION OF PLATES (256-259).

In these Plates the enlargement bears a number; thus No. 1 is *E. setosa* (natural size), while No. 1α shows the same form (very much enlarged). The same method has been followed throughout. All seeds drawn by camera-lucida, except those of natural size.

PLATE 256.

1. *E. setosa* Schauer, natural size.
   1a. Enlarged, showing the broad terminal wing and the large hilum. Woolngi, Northern Territory (Dr. H. I. Jensen, July, 1916).

2. *E. setosa* Schauer var., natural size.
   2a. Enlarged, showing a broad terminal wing. The seeds are immature. 40 miles north-north-west of Meyer’s Hill, Northern Territory (G. F. Hill, No. 241).

   3a. Enlarged, showing the ventral face and hilum.

3b. Enlarged, showing the reverse side of the same seed. Mataranka Station, Roper River, Northern Territory (C. E. F. Allen, November, 1922).

   4a. Enlarged, showing the prominent, somewhat lateral, hilum. The seed is immature. Frew’s Ponds, Parallel 17, Northern Territory (C. E. F. Allen, No. 653, July, 1922).

   5a. Enlarged, showing the broad, obtuse wing and the wrinkled endosperm. Eidsvold, Queensland (Dr. T. L. Bancroft, May, 1919).

   6a. Enlarged, showing the broad, semi-transparent wing; the hilum is on the opposite side. The seeds are very much compressed laterally, and in some cases the hilum is slightly lateral, as in 6a Cultivated, Mount Lofty, near Adelaide, South Australia (Dr. R. Pulleine, October, 1920).

   7a. Enlarged, showing (a) hilum, (b) terminal wing. Lennard River, East Kimberley, N.W. Australia (W. V. Fitzgerald).

   8a. Enlarged, showing the broad terminal wing, which is broader than the endosperm. Near Pine Creek Northern Territory (C. E. F. Allen, No. 481, January, 1921).

   9a. Enlarged, showing the long terminal wing and the attenuated endosperm.

9b. Enlarged, showing a much broader seed and the large hilum. Stapleton, Northern Territory (G. F Hill, October, 1910).

    10a. Enlarged, showing the position of the hilum.

10b. Enlarged, showing the hilum, which is almost in the centre of the ventral and the transparent wing. Darwin, Northern Territory (C. E. F. Allen, October, 1921.)
PLATE 257.

1. *E. corymbosa* Sm., natural size. Pale-brown, winged seed. The membranous parts much wrinkled and scaly; hilum ventral.

1a. Enlarged, showing the hilum, which is rather large and almost in the centre of the endosperm.

1b. Enlarged, showing a broader seed; (a) hilum. (b) Membranous keel, note the irregular, rudimentary wing.

1c. Enlarged, showing the dorsal membrane or rudimentary wing. Eden, N.S.W., near south-eastern coastal border to Victoria (Forest Guard H. H. Rose, 1918).


2a. Enlarged; a very handsome, shining, black seed, with very large hilum; (a) the large ventral hilum; (b) the semi-transparent keel; (c) lower portion of the ventral surface, showing the irregular ridges and depressions. “Red Gum,” Big Brook, Warren district, S.W. Australia (Max Koch, No. 1855).


3a. Enlarged; (a) ventral hilum; (b) semi-transparent membranous keel.

3b. Enlarged; the same seed viewed from the opposite side. The seeds are furnished with a rudimentary wing along the dorsal, and extending slightly to both ends. Rydalmere, Parramatta River, Sydney (cultivated by Dr. G. P. U. Prior, 1918).


4a. Enlarged, showing the broad ventral surface with the hilum towards the lower end.

4b. Enlarged; (a) hilum, which is almost in the centre of the endosperm; (b) ventral view, showing the keel.

4c. Enlarged; brown, boat-shaped seed, keeled at the back. Note also the rudimentary wing on the lower end of 4a and 4b. Cultivated, Botanic Gardens, Sydney (J. L. Boorman, 1918).

5. *E. citriodora* Schauer, natural size.

5a. Enlarged, showing the broad ventral surface and the large hilum.

5b. Enlarged, showing the hilum closer to the lower edge, and the upper end with a rudimentary wing.

5c. Enlarged; back view, showing the obtuse keel.

The seeds flat on one side, irregularly ribbed, the hilum large and ventral (5a and 5b). The back is arched, smooth (5c), and having a pronounced spine. One end of the seed is thin, and marked off by a line. Hornsby, a few miles north of Sydney (W. F. Blakeley and D. W. C. Shiress, May, 1919).

6. *E. citriodora* Hook, natural size. Thick, shiny, black seeds; not winged, or a few only with a rudimentary wing.

6a. Enlarged, showing the ventral and the broad, orbicular hilum. Also the very thin margin on the upper portion of the seed.

6b. Enlarged, showing the ventral and the depressed orbicular hilum. The seed is thicker than 6a, but the lower margin is very sharp.

6c. Enlarged, showing the dorsal keel and the slightly wrinkled sides. The ventral face is usually moderately smooth and even, not with numerous irregular depressions like 4a and 5a. Cultivated, Brooklyn, Hawkesbury River, N.S.W. (W. F. Blakeley and D. W. C. Shiress, April, 1919).


7a. Enlarged; side view of seed showing a marginal membrane.

7b. Enlarged, showing the depressed ovate hilum, and a somewhat elongated depression surrounding it.
7c. Enlarged, showing a larger and more central hilum than 7b, with scarcely any depression.
7d. Enlarged; dorsal view, showing the thin, expanded keel. Liverpool, N.S.W. (J. L. Boorman, 1917).
8a. Enlarged, showing the broad, uneven ventral surface, and the smallish, ovate hilum.
8b. Enlarged, showing the ventral surface without prominent ridges and a depression around the hilum.
8c. Enlarged; dorsal view showing the obtuse keel. Seeds thinner and flatter than those of E. macrodonta.
9a. Enlarged, showing the irregular ventral surface and the small hilum.
9b. Enlarged, differing from 9a in shape and in the slightly broader marginal membrane or wing.
9c. Enlarged, similar to 9b, but with a more uniform marginal membrane and a slightly larger hilum.
9d. Enlarged; dorsal view showing the obtuse keel.
9e. Enlarged, showing the dorsal surface with only a faint line, and indicating the keel. Note also the back view of the marginal membrane. The thin rudimentary marginal wing is slightly more developed in this species than in the others. Narrabri, N.S.W. (District Forester Gordon Burrow, July 1917).

PLATE 258.

Series Scutiformes.

1. E. grandifolia R.Br., natural size.
1a. Enlarged, showing the slightly concave ventral surface, and the scarcely distinct hilum.
1b. Enlarged, showing the distinct hilum and the very thin margin.
1c. Enlarged, showing the smooth convex dorsal surface. Darwin, Northern Territory (Dr. H. I. Jensen, 5th November, 1915).
2a. Enlarged, showing the raised smooth ventral, and the small orbicular hilum, also the thin margin.
2b. Enlarged, showing the raised, slightly wrinkled, ventral and larger hilum.
2c. Enlarged, showing a more irregular shaped seed with a large hilum.
2d. Enlarged; dorsal view of 2b. Reid River, via Townsville, Queensland (Nicholas Daley, January, 1912).
3a. Enlarged, showing the ventral and the large, scarcely central, hilum.
3b. Enlarged, showing the convexed dorsal view of 3a. Stannary Hills, Northern Queensland (Dr. T. L. Bancroft.)

Series Kochioideae.

4. E. macrocarpa Hook, natural size.
4a. Enlarged; showing the dorsal and the circumferential wing or membrane.
4b. Enlarged; ventral view of 4a, showing the small hilum in the centre and the radiating lines or ridges, and also the irregular circumferential wing.
4c. Enlarged; ventral view showing the hilum and the radiating ridges, and also a very rudimentary marginal membrane. Northern district, Western Australia (D. A. Herbert).
5. E. pyriformis Turcz., natural size.
5a. Enlarged, showing the ventral hilum, and the rudimentary wing.

5b. Enlarged, dorsal view of 5a, showing the rudimentary wing and the somewhat depressed back.

5c. Enlarged, showing a more angular seed with a rather prominent hilum and a narrow longitudinal membrane; also the slightly upturned marginal wing.

5d. Enlarged, showing a pyramidal seed with acute ridges and a slightly undulate marginal wing. There is also a wing-like expansion near the hilum. Ooldea Soak, South Australia (Collector, Dr. R. H. Pulleine, 14th September, 1920).


6a. Enlarged; ventral view, showing the small hilum in the centre and three or four faint radial lines; also the very thin circumferential wing.

6b. Enlarged; ventral view of a more acute seed, showing the irregular marginal wing.

6c. Enlarged; ventral view, showing the hilum, which is scarcely in the centre of the endosperm, and two obtuse ridges, also the formation of a rudimentary wing on the lower portion.

6d. Enlarged; dorsal view, showing the wrinkled back and the very irregular wing. At 407 miles (from Port Augusta), near Ooldea, on the Transcontinental Railway, South Australia (E. H. Ising, September, 1920).


7a. Enlarged; ventral view, showing the hilum and the circumferential wing.

7b. Enlarged; ventral view of another seed, showing the hilum and six radiating ridges, also a more perfect circumferential wing.

7c. Enlarged, showing the smooth dorsal surface and the circumferential wing, which is broader on one side.

7d. Enlarged, showing the very irregular ventral surface and a much reduced circumferential wing.

These were drawn from specimens cultivated in the Botanic Gardens, Sydney (origin uncertain); they match seeds from Bremer Bay (S.W. Australia), which were not fully drawn.

**Series Heteroptera.**

Seeds very light, and surrounded by a thin membrane.


8a. Enlarged; ventral view, showing the small hilum in the centre of the endosperm, which is partly obscured by a very thin membrane, and also the very irregular circumferential wing.

8b. Enlarged; dorsal view of 8a, showing the rudimentary wing on the back and the circumferential wing.

8c. Enlarged; dorsal view of seed, showing the transverse rudimentary wings and the irregular circumferential wing.

8d. Enlarged; dorsal view of 8c, showing the longitudinal dorsal wing and the circumferential wing, also two short lateral wings, the latter more rudimentary than the others. The membranous wing has an almost white, transparent edge. Minginew, Western Australia (J. H. Maiden).


9a. Enlarged; dorsal view, showing the longitudinal wing and the broader circumferential wing.

9b. Enlarged; ventral view of 9a, showing the hilum and a short longitudinal wing, and also the broad circumferential wing.

9c. Enlarged; dorsal view of another seed, showing a longitudinal ridge instead of a wing, and also the broad, scarcely entire, circumferential wing. (Closely resembling *E. eudesmioides.*) Hopetoun, Western Australia (S. W. Australia) (J. H. Maiden, 1909).

10a. Enlarged; dorsal view, showing the very thin circumferential wing. The wing of this species appears to be of a more delicate texture than any other species.

10b. Enlarged; ventral view showing the small hilum in the centre of the endosperm and the net-like ridges or rudimentary wings almost surrounding it, and which connect with the circumferential wing.

10c. Enlarged; dorsal view of a very thin seed, showing the delicate nature of the wing, which is so thin that a very slight pressure causes it to roll over. Note also the four faint ridges on the back.

10d. Enlarged; dorsal view of another seed, showing the expanded, undulate, circumferential wing, with an inner rudimentary wing on the back of the endosperm. Coastal South-West Australia (D. A. Herbert).

**Series Curviptera.**

11. *E. Burracoppinensis* n.sp., natural size.

11a. Enlarged; vertical position of seed, showing the nerve-like wings on the side and the smooth space between them.

11b. Enlarged, showing a quadrangular seed, with longitudinal ridges, which end in a short curved wing.

11c. Enlarged, showing twin seeds, with a very narrow circumferential rudimentary wing.

11d. Enlarged; a triangular seed, showing the hilum and the curved wing.

11e. Enlarged; another view of 11d.

11f. Enlarged; a more D-shaped seed, showing the confluent rudimentary wing, lateral wing, and the curved terminal wing, also a faint line down the centre of the seed.

11g. Enlarged; a somewhat triangular seed, with the small curved terminal wing and two sharp lateral ridges. Burracoppin, 192 miles east of Perth, Western Australia (Forester F. M. C. Schock, July, 1917).

**PLATE 259.**

**Series Micromembrane.**

1. *E. Lehmanni* Preiss, natural size. Black seeds, with slight evidence of membranous edge.

1a. Enlarged; ventral view, showing the small hilum and the very faint radiating ridges, and also the membranous margin.

1b. Enlarged; ventral view of a more uniform seed, showing the obscure hilum and the slightly raised radiating ridges, also the circumferential membrane.

1c. Enlarged; ventral view of a more triangular seed, with a prominent hilum and stronger nerves. It is much thicker than 1a and 1b.

1d. Enlarged; dorsal view of a more orbicular seed, showing the slightly convex back and the marginal membrane.

1e. Enlarged; ventral view of a very compressed seed, showing the depressed hilum. It is abruptly truncate at one end, while the opposite end is expanded for a short distance into a thin membrane. Cultivated (?) near Albany, Western Australia (J. Wellstead, January, 1920).


2a. Enlarged; ventral view of a somewhat triangular seed, showing the small hilum and a slightly toothed margin.

2b. Enlarged; ventral view of an ovate seed, which is obliquely truncate at one end.

2c. Enlarged; ventral view of an oblong seed.

2d. Enlarged; ventral view of an orbicular seed.

2e. Enlarged; ventral view of an orbicular seed, showing slight radiating ridges.

2f. Enlarged; dorsal view of a seed showing the smooth back. King George's Sound, South-West Australia: (C. E. Lane-Poole, September, 1915).

3. *E. occidentalis* Ennll., natural size, with slight indications of a ragged membranous edge.

3a. Enlarged; ventral view of a somewhat ovate seed, showing the large hilum and the faint, radiating ridges, also a thin membrane.
3b. Enlarged; ventral view showing the hilum and the thin membrane.
3c. Enlarged; ventral view of an ovate seed, which is somewhat obliquely truncate.
3d. Enlarged; ventral view of an oblong seed, showing the small hilum and the thin membrane on the lower edge only.
3e. Enlarged; dorsal view of a sterile seed.
3f. Enlarged; ventral view of a very thin oblong seed, showing the slightly depressed hilum and the thin membrane on the upper edge only.
3g. Enlarged; dorsal view of 3f, showing the smooth convexed back. King George’s Sound, Western Australia (collected for Andrew Murphy).

**Series Scutelliformes.**

Seeds smooth, not winged.

4a. Enlarged; ventral view, showing the depressed hilum.
4b. Enlarged: dorsal view of 4a, showing the faint, irregular lines on the back. Stapleton, Northern Territory (G. F. Hill, No. 448).
5a. Enlarged; ventral view, showing the very small, almost obscure hilum.
5b. Enlarged; ventral view of a more elongated seed, showing the hilum and the acute point.
5c. Enlarged; ventral view of an oblong-ovate seed.
5d. Enlarged; ventral view of an ovate seed, with the hilum very close to one end.
5e. Enlarged; ventral view of somewhat D-shaped seed.
5f. Enlarged; dorsal view of 5d.
5g. Enlarged; dorsal view of a more compressed seed. South Australia (collected by Andrew Murphy, 1916).
6a. Enlarged; ventral view of a large orbicular seed, showing the depressed hilum.
6b. Enlarged; ventral view of a smaller orbicular seed.
6c. Enlarged; dorsal view of 6a.
6d. Enlarged; ventral view of an orbicular seed.
6e. Enlarged; dorsal view of a D-shaped seed. Summit of Bold Bluff, Kimberleys, North-West Australia (Coll. W. V. Fitzgerald).
7a. Enlarged; ventral view, showing the small hilum.
7b. Enlarged; ventral view of a thicker and more angular seed.
7c. Enlarged; ventral view, showing the very small hilum in the centre.
7d. Enlarged; ventral view, showing the hilum closer to one side.
7e. Enlarged; dorsal view of 7d. Desert country, west of Emerald, Queensland (G. H. Carr, March 1908).
8a. Enlarged; ventral view, showing the almost obscure hilum in the centre.
8b. Enlarged; ventral view of a smaller and more ovate seed, with a conspicuous hilum in the centre of a shallow depression.
8c. Enlarged; ventral view of a slightly thicker seed.
8d. Enlarged; dorsal view of a large seed. Near Perth, Western Australia (H. Steedman, No. 2, November, 1921).

9a. Enlarged; ventral view, showing the large scar or depression in the centre of the seed. The hilum is obscure and near the upper end of the scar.

9b. Enlarged; dorsal view, showing the slightly wrinkled back.

9c. Enlarged; ventral view, showing the small hilum at the lower end of the central depression.

9d. Enlarged; ventral view of another seed.

9e. Enlarged; dorsal view, showing a moderately smooth surface.

9f. Enlarged; dorsal view, showing a slight furrow down the centre of the seed. Kalgan Plains, South-West Australia (Dr. F. Steward, 1917).


10a. Enlarged; ventral view, showing the rather large hilum, which is scarcely in the centre of the seed.

10b. Enlarged; ventral view of a more uniform seed with the hilum in the centre.

10c. Enlarged; ventral view, showing the hilum much smaller than in 10a and 10b.

10d. Enlarged; dorsal view, showing the smooth back. Copmanhurst, Clarence River, New South Wales (J. L. Boorman, 1916).

**Series Striolata.**

(a) Prominently striate.


11a. Enlarged; ventral view showing the somewhat obscure hilum and the irregular ventral surface.

11b. Enlarged; ventral view of a larger and more compressed seed, showing a more distinct hilum.

11c. Enlarged; ventral view of a smaller seed, showing a distinct hilum and a moderately smooth surface.

11d. Enlarged; ventral view of another seed, showing a truncate scar on the upper edge.

11e. Enlarged; dorsal view, showing the strie.

11f. Enlarged; dorsal view of a D-shaped seed, showing the strie. South-West Coastal Australia (H. Steedman).


12a. Enlarged; ventral view, showing the hilum and the prominent striae.

12b. Enlarged; dorsal view, showing the thickness and the striate surface.

12c. Enlarged; dorsal view of a broader seed than 12b.

12d. Enlarged; dorsal view of a triangular seed.

12e. Enlarged; ventral view, showing a slight obtuse ridge down the centre of the seed, and the almost obscure hilum.

12f. Enlarged; dorsal view of a more compressed seed.

12g. Enlarged; dorsal view of a reniform seed.

12h. Enlarged; dorsal view of an ovate seed. Kellerberrin, Western Australia (H. Steedman, 1920).


13a. Enlarged; ventral view, showing the large hilum, and the striate surface.

13b. Enlarged; ventral view, showing the hilum at the upper end of the rather large depression, and also the striate surface.

13c. Enlarged; ventral view of another seed, showing the hilum without any depression.

13d. Enlarged; ventral view, showing the hilum near the upper edge of a rather large shallow depression, the surface of which is striate.

13e. Enlarged; ventral view of a large seed, showing the hilum in the centre of the striate surface.
13f. Enlarged; dorsal view, showing the striate surface. Near State Nursery, Hamel, Western Australia (D. Berthoud).


14a. Enlarged; ventral view, showing the hilum near the lower end of the seed, also the striae.

14b. Enlarged; ventral view, showing the hilum in the centre of the seed.

14c. Enlarged; ventral view, of a different shaped seed to 14a and 14b, with the hilum close to the lower edge of the seed.

14d. Enlarged; ventral view of an elliptical seed, with the hilum in the centre and the striae radiating from it.

14e. Enlarged; dorsal view of 14d, showing the longitudinal striae.

14f. Enlarged; ventral view, showing the obscure hilum. Hopetoun, south coast of Western Australia (J.H.M., 1909).


15a. Enlarged; ventral view, showing the hilum and the prominent striae.

15b. Enlarged; ventral view, showing the hilum in the centre of the seed and a scar on the side of the seed.

15c. Enlarged; ventral view of a more elongated seed.

15d. Enlarged; ventral view, showing a large hilum.

15e. Enlarged; ventral view, showing the hilum near the lower edge of a rather oblique depression.

15f. Enlarged; dorsal view, showing the striate surface.

15g. Enlarged; dorsal view of a large seed, showing the longitudinal striae. From cultivated plants collected by H. Steedman, near Perth, Western Australia.

(b) Large, striate longitudinally.


16a. Enlarged; ventral view, showing the hilum near the lower edge of the somewhat uneven surface, which is finely striate, but not shown, only in 16b.

16b. Enlarged; ventral view, showing the hilum towards the upper end of the seed, and with a slight furrow on the lower end, also the striate surface.

16c. Enlarged; dorsal view, showing the very fine striae and a scar on the upper edge of the seed.

16d. Enlarged; ventral view of a rather thick seed, showing the small hilum and the minute striae.

16e. Enlarged; ventral view, showing the position of the small hilum.

16f. Enlarged; dorsal view, showing an irregular wrinkle on the back of the seed. Wanaaring, North-West New South Wales (J. L. Boorman, 1917).


17a. Enlarged; ventral view, showing the small hilum in the centre of the seed.

17b. Enlarged; ventral view of a more acute seed.

17c. Enlarged; ventral view, showing the almost obscure hilum.

17d. Enlarged; ventral view, showing hilum more obscure than in 17c.

17e. Enlarged; ventral view of a larger seed, showing the position of the hilum.

17f. Enlarged; ventral view, showing the hilum in the centre of the seed.

17g. Enlarged; ventral view of a somewhat angular seed.

17h. Enlarged; dorsal view, showing the longitudinal striae.

17i. Enlarged; dorsal view of 17a, showing the striae.

17j. Enlarged; dorsal view, showing the striae. Palmer River, Northern Queensland (no collector stated).
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:

- *acciodes* A. Cunn. (xlviii).
- *acmenioides* Schauer (xxxi).
- *affinis* Deane and Maiden (lvi).
- *amygdalina* Labill. (xvi).
- *Andrei* Maiden (xxi).
- *Baker* Maiden (lxx).
- *Baueriana* Schauer (lvii).
- *Baueriana* Schauer var. *conica* Maiden (lviii).
- *bicolor* A. Cunn. (xlv).
- *Boopmani* Deane and Maiden (xlv).
- *Caleyi* Maiden (lv).
- *capitellata* Sm. (xxvi).
- *conica* Deane and Maiden (lviii).
- *Consideniana* Maiden (xxvii).
- *cornicata* A. Cunn. (xv).
- *corymbosa* Sm. (xii).
- *Dalrympleana* Maiden (lxiv).
- *dives* Schauer (xix).
- *dumosa* A. Cunn. (lxv).
- *eugenioides* Sieber (xxix).
- *globosus* Labill. (lxxii).
- *hamastoma* Sm. (xxxvii).
- *longifolia* Link and Otto (iii).
- *maculata* Hook. (vii).
- *melliodora* A. Cunn. (ix).
- *Muelleriana* Howitt (xxx).
- *numerosa* Maiden (xxvii).
- *ochrophloia* F.v.M. (i).
- *odorata* Behr and Schlectendal (xiii).
- *paniculata* Sm. (viii).
- *pilularis* Sm. (xxxi).
- *piperita* Sm. (xxiii).
- *polyanthemos* Schauer (lx).
- *populifolia* Hook. (xlvi).
- *propinqua* Deane and Maiden (li).
- *punctata* DC. (x).
- *radiata* Sieb. as *amygdalina* (xvi).
- *resinifera* Sm. (iii).
- *robusta* Sm. (lxiii).
- *rostrata* Schlecht. (lxii).
- *rubida* Deane and Maiden (xlxi).
- *saligna* Sm. (iv).
- *siderophloia* Benth. (xxxi).
- *sideroxylon* A. Cunn. (xxiii).
- *Smithii* R. T. Baker (lxx)
- *stelulata* Sieb. (xv).
- *tereticornis* Sm. (xi).
- *viminalis* Labill. (lxiv).
- *virgata* Sieb. (xxv).
- *vitrea* R. T. Baker (xxiii).

* Government Printer, Sydney. 4s. Each part contains 4 plates and other illustrations.

Note by Government Printer.

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

Sydney: Alfred James Kent, Government Printer—1924.
EUCALYPTUS SETOSA SCHAUER (1).
E. LATIFOLIA F.V.M. (3)
E. DICHROMOPHLOIA F.V.M. (5)
E. PERFOLIATA R. BR. (7)
E. FOELSCHEANA F.V.M. (9).

E. SETOSA SCHAUER var. (2).
E. FERRUGINEA SCHAUER. (4).
E. FICIFOLIA F.V.M. (6).
E. PYCHOCARPA F.V.M. (8).
E. TERMINALIS F.V.M. (10).
EUCALYPTUS CORYMBOSA Sm. (1).
E. CALOPHYLLA R. Br. var. rossa Maiden. (3).
E. EXIMIA Schauer. (5).
E. MACULATA Hook. (7).

F. TRACHYPHLOIA F.v.M. (9).
Crit. Rev. Eucalyptus.

Pl. 258.

EUCALYPTUS GRANDIFOLIA R. Br. (1).
E. PAPUANA F.v.M. (2).
E. PYRIFORMIS Turcz. (3).
E. ANGULOSA Schauer. (7).
E. TETRAGONA F.v.M. (9).

E. BURRACOPPINENSIS Maiden. (11).

E. MACROCARPA Hook. (4).
E. ISINGIANA Maiden. (6).
E. EUDESMIOIDES F.v.M. (8).
E. TETRAPTERA Turcz. (10).
INDEX OF PARTS PUBLISHED—continued.

II. The Bark (and Habit)—continued.
1. Leptopilo (Smooth-Barks or Gums).
2. Hemiopilo (Half-barks).
3. Rhynophilo (Rough-barks).
4. Parakilopilo (Stringbarks).
6. Lyridopilo (Barks friable and Immellar).

PART LII.

190. E. amplifolia Naudin.
203. E. antirrhinophila Trubat.
234. E. Bournieri Trubat.
235. E. Coddieri Trubat.
236. E. gomphorcusa Trubat.
237. E. insignis Naudin.
238. E. occidentalis Endl., var. orangensis Trubat.
239. E. pseudo-globulus (Hort.) Naudin.
239. E. Trubati Vilunin.
240. E. Sturtiana x globulus Trubat.
240. E. Eucalyptus Maiden n.sp.

II. The Bark—continued.

3. Classification of Trees in General by Means of their Barks.
4. Variation in Barks of the same Species.
5. Bark in Relation to Heat and Cold.
6. Adventitious Shoots.
7. Ringbarking.
11. Microscopic Characters of Bark.
12. Calcium Oxalate.
13. Tannin.
14. Oil in Bark.
15. Fibre in Bark.

Plates, 212-215. (Issued April, 1922.)

PART LIII.

301. E. Barnychuanaeus Maiden n.sp.
302. E. Tenuadensn Maiden n.sp.
303. E. Penechplio Maiden n.sp.
304. E. Stopfordia Maiden n.sp.
305. E. Forsythia Maiden n.sp.
306. E. Aubraunensis Maiden n.sp.
307. E. Yangelbli Maiden n.sp.
308. E. Richteriana Maiden.
309. E. Studencyus Maiden n.sp.

III. Timber—continued.

Microscopic Structure—Crystals (Calcium Oxalate).
A Warning Note in regard to Undue Reliance on (1) Structure for Diagnostic Purposes.
Paper Pulp.
Heartwood and Sapwood. Seasoning.
Specific Gravity. Hardness.
Flexibility and Interlockedness. Inflammability. Destructive Distillation.

Plates, 220-223. (Issued July, 1922.)

PART LV.

Fossil Plants Applied to Eucalyptus.

A. E. octacans Ungar.
B. E. Haeringiana Ettingshausen.
C. E. Auge Ungar.
D. Myrtophyllum (Eucalyptus ?) Geinitzii Heer.
E. Myrtophyllum (Eucalyptus ?) Schubleri Heer.
F. E. sibirica Heer.
G. E. (? americanas Lesq.
H. E. boria Ungar.
I. E. angust ratio Velenovsky.
J. E. dubia Ettingshausen.
K. E. daubienii Lesquerx.
L. E. Gouldi Ward.
M. E. proto-Geinitzii Saporta.
N. E. Choffai Saporta.
O. E. (? ) angustifolia Newberry.
P. E. (? ) nervosa Newberry.
Q. E. (? ) perfolium Newberry.
R. E. lotifolia Hollick.
T. E. Wardiana Berry.

Microx avarinensis Berry.

IV. The Root.

Adventitious Roots.

V. Exudates.

a. Kinos.
b. Mannas.

Plates, 224-227. (Issued August, 1922.)

PART LVI.

330. E. Jensii varp.
331. E. Umbrockiensus n.sp.
332. E. leptophylla f.v.M.
333. E. moorii Maiden var.
334. E. angusta n.sp.
21. E. marginata Sm.
22. E. suprestum f.v.M.
41. E. Housstana F.v.M.
213. E. altior (Deane and Maiden).
334. E. longifolia (l.B.), Maiden.
335. E. scapulae Schauer.
346. E. Johnstoni n.sp.

VI. The Leaf.


Plates, 298-301. (Issued September, 1922.)

PART LVII.

336. E. agglomerata Maiden.
337. E. simmondsii n.sp.
28. E. septimaria F.v.M.
29. E. formosa Lechmann.
338. E. Kalpanus n.sp.
339. E. melaleuca n.sp.
240. E. leuconitico n.sp.
334. E. aggregata Deane and Maiden.

VI. The Leaf—continued.


Plates, 292-235. (Issued January, 1923.)

PART LVIII.

341. E. collina W. V. Fitzgerald, n.sp.
342. E. Flockenica Maiden.
343. E. Shirleyi n.sp.
344. E. Herwartiana n.sp.
345. E. Combis-valley n.sp.
346. E. Iongolphi Link and Otto.
346. E. citrodora Hooker.
347. E. hemophila F.v.M.
348. E. albisa n.sp.

VII. In florescence.


Plates, 228-230. (Issued February, 1923.)

PART LIX.

54. E. pruinosa Schauer.
65. E. melanophila F.v.M.
139. E. Gunner Hook, f.
211. E. longicornis F.v.M.
152. E. proptima Deane and Maiden, var.
35. E. haugetosona Sm.
349. E. mirabilis DC.
350. E. Shrooiif and Blackey, n.sp.
353. E. erucis, n.sp.
212. E. Flockenica Maiden.

VII. Inflorescence (part)—continued.


Plates, 240-243. (Issued April, 1924.)

PART LIX.

VIII. The Fruit.


Plates, 244-247. (Issued, June, 1923.)

PART LXI.

326. E. festivula Deane and Maiden.
335. E. saitohoua Turczaninow.
354. E. Schlechteri Diels.
29. E. apiculata Baker and Smith.
331. E. leucobasii F.v.M.
29. E. virginia Sieb.
46. E. acadiensis A. Cunn.
56. E. Naudiniana F.v.M.
38. E. Colei Sm.
64. E. Baurianae Schauer.
75. E. ficuln Turcz.
194. E. Spenceriana Maiden.
201. E. radiata Sieb.
203. E. nitida Hook, f.
252. E. nongophila Maiden, var. grandiflora n.v.

Eucalyptus.

VIII. The Inflorescence and

VIII. The Fruit (concluded).

Deciduous Staminate or Ring, Disc of the lower Disc of the Fruit.

Plates, 248-251. (Issued September, 1923.)

PART LXII.

355. E. Gardnuri n.sp.
356. E. aistrigera n.sp.
357. E. Sergeria n.sp.
358. E. Chisholmi Maiden and Blackey, n.sp.
359. E. Thogleri Link.
73. E. oleosa F.v.M.
350. E. Novarensis n.sp.

Plates, 252-255. (Issued March, 1924.)
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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


PART LXIV OF THE COMPLETE WORK.

(WITH FOUR PLATES.)

Price Three Shillings and Sixpence.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER.

1925.
INDEX OF PARTS PUBLISHED.

<table>
<thead>
<tr>
<th>PART I</th>
<th>1. E. pilularis Sm., and var. Muelleriana Maiden. Plates, 1-4. (Issued March, 1903.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART II</td>
<td>2. E. obliqua L. Héritier. Plates, 5-8. (Issued May, 1903.)</td>
</tr>
<tr>
<td>PART IV</td>
<td>1. E. incarnata Labillardière. Plates, 13-14. (Issued June, 1904.)</td>
</tr>
<tr>
<td>PART X</td>
<td>32. E. piperita Sm. Plates, 48-50. (Issued February, 1910.)</td>
</tr>
<tr>
<td>PART XI</td>
<td>41. E. Bartistiana Fr.M. Plates, 83-86. (Issued December, 1916.)</td>
</tr>
</tbody>
</table>

| PART XII | 50. E. ravenniana F.V.M. Plates, 87-90. (Issued July, 1911.) |
| PART XIII | 60. E. affinis Deane and Maiden. Plates, 1-4. (Issued March, 1903.) |
| PART XIV | 66. E. multiformis A. Cunn. Plates, 7-10. (Issued November, 1904.) |
| PART XV | 73. E. osten F.V.M. Plates, 59-62. (Issued July, 1912.) |

| PART XVI | 76. E. Le Soefi Deane and Maiden. Plates, 1-4. (Issued March, 1912.) |
| PART XVII | 89. E. salmonophila F.V.M. Plates, 73-76. (Issued February, 1913.) |
| PART XVIII | 95. E. macrocarpa Hook. Plates, 77-80. (Issued July, 1913.) |
| PART XX | 100. E. gigantea Hook. i. Plates, 81-84. (Issued December, 1913.) |
| PART XXI | 113. E. cineerea F.V.M. Plates, 85-88. (Issued March, 1914.) |
| PART XXIII | 125. E. robusta Smith Plates, 97-100. (Issued July, 1915.) |
| PART XXVI | 138. E. Perniamana F.V.M. Plates, 110-111. (Issued April, 1917.) |
| PART XXVIII | 145. E. cornicula Hook. i. Plates, 117-120. (Issued February, 1917.) |
| PART XXIX | 155. E. resinafera Sm. Plates, 121-127. (Issued April, 1917.) |
A Critical Revision of the genus Eucalyptus

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Part LXIV of the Complete Work.

(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

PRICE THREE SHILLINGS AND SIXPENCE.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1925.
The Seed.

(Continued from Part LXIII, page 124.)

Series Striolatæ (concluded).

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>c. Large, somewhat transversely striate</td>
<td></td>
<td>133</td>
</tr>
<tr>
<td>d. Medium in Size, longitudinally striate</td>
<td></td>
<td>135</td>
</tr>
<tr>
<td>e. Intermediate in Size, compressed ovate to orbicular, finely striate</td>
<td></td>
<td>137</td>
</tr>
<tr>
<td>f. Intermediate, acute</td>
<td></td>
<td>143</td>
</tr>
</tbody>
</table>

Series Levispermæ |   | 144 |

Series Foveolatæ.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Mostly compressed, ovate, acute</td>
<td></td>
<td>145</td>
</tr>
<tr>
<td>b. Compressed ovate to somewhat triangular or quadrangular, thickish</td>
<td></td>
<td>148</td>
</tr>
<tr>
<td>c. Orbicular to ovate, thickish</td>
<td></td>
<td>148</td>
</tr>
<tr>
<td>d. Ovate to ovate-oblong, moderately thick</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

Series Alveolatæ |   | 151 |

Series Rufispermæ |   | 152 |

(Differs from Foveolatæ mainly in size and colour.)

Series Lepidotæ—Fimbriatæ.

A. Hilum ventral—

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Fertile Seeds dark brown, 2-3 mm. long, slightly scurfy and minutely fringed</td>
<td></td>
<td>153</td>
</tr>
<tr>
<td>b. Fertile Seeds not exceeding 2 mm. long, slightly fringed</td>
<td></td>
<td>156</td>
</tr>
<tr>
<td>c. Densely scurfy and fringed</td>
<td></td>
<td>158</td>
</tr>
<tr>
<td>d. Slightly scurfy and minutely fringed</td>
<td></td>
<td>160</td>
</tr>
<tr>
<td>e. Obscurely scurfy and minutely fringed</td>
<td></td>
<td>161</td>
</tr>
<tr>
<td>f. Small, slightly fringed</td>
<td></td>
<td>162</td>
</tr>
</tbody>
</table>

B. Hilum terminal |   | 163 |
Series Pachyspermæ .......... 167
Series Cochleatae .......... 168
Series Neuroptera .......... 169
Series Muricatae .......... 170

Series Pyramidales—D-shaped.

a. Large, elongated-pyramidal .......... 172
b. Moderately large, triangular to compressed D-shaped .......... 173
c. Large and thick .......... 174
d. Medium, fertile seeds, dark brown to jet black .......... 175
e. Medium, fertile seeds, light to dark brown .......... 179
f. Medium, with scarcely prominent ridges .......... 183
g. Small .......... 183
h. Somewhat elongated to obliquely pyramidal .......... 187

Explanation of Plates (260-263) .......... 190
SEEDS.
Series Striolatae. (concluded).

(c) Large—somewhat transversely striate:
   E. patellaris.
   E. leptophleba.

(d) Medium in size—longitudinally striate:
   E. hemiphloia.
   E. albens.
   E. affinis.
   E. intertexta.

(e) Intermediate in size—compressed-ovate to orbicular, finely striate:
   E. leucoxylon.
   E. Caleyi.
   E. sideroxylon.
   E. siderophloia.
   E. siderophloia var. glauca.
   E. Dawsoni.
   E. polyanthemos.
   E. populifolia.
   E. rariiflora.

(f) Intermediate—acute.
   E. Raveretiana.

Continued from Part LXIII, p. 124, "E. populifolia, but larger and thicker."

(c) Large. Fertile seeds 2-3 mm. long, somewhat transversely striate.
   E. patellaris.
   E. leptophleba.

E. patellaris.

Fertile seeds glossy, dark brown, 3 mm. long, 1½-2 mm. broad, oblong to acutely ovate, compressed, the back slightly convex, minutely pitted, striate on both sides, the striae longitudinal on the dorsal surface, and more or less radiating from the hilum on the inner face, or transversely. Hilum ventral, almost in the centre of the endosperm, very small and often indicated by a slight depression only; testa thin.
Sterile seeds glossy, pale brown, quadrangular to compressed, about half the size of the fertile seeds.

Somewhat similar in shape to *E. microcorys*, but differing in colour and in the texture of the testa. Mataranka Station, Roper River, Northern Territory (C. E. F. Allen, No. 683).

*E. pruinosa.*

"Fertile seeds without any appendage, their testa not veined; sterile seeds smaller, the majority broad and short, some narrow and more elongated." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, pale to dark brown, 1½ to nearly 2½ mm. long, 1½ mm. broad, thin and more or less compressed, ovate, oblong to obtusely quadrangular, the face sometimes concave, the back convex and minutely striate transversely, so as to appear somewhat reticulate and seurfy. Hilum ventral, very small, ovate, scarcely differing in colour from that of the thin testa, with or without a somewhat shallow oblique depression, surrounding it.

Sterile seeds glossy, light reddish-brown, polymorphic, the broad ones more numerous than the narrow ones, the latter sometimes as long as the fertile seeds.

S scarcely differing from *E. leptophaelea.* Armstrong River, North Queensland, (R. J. Winters).

*E. leptophaelea.*

Seeds dark brown, bluntly triangular to thick cuneate and furrowed, about 1 line long.

Fertile seeds rather dull, light brown, 3 mm. long, nearly 2 mm. broad, ovate to obliquely ovate, obtuse or acute, thin, concave on the inner face, minutely transversely striate. Hilum ventral, small, ovate, slightly raised, or surrounded by two or three shallow pits, usually lighter in colour than the thin testa.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, a few of the narrow ones as long as the fertile seeds; these are usually subulate to clavate, straight or curved. Stannary Hills, North Queensland (Dr. T. L. Bancroft, September, 1909).
(d) Medium. Fertile seeds more or less striate longitudinally, 1½–2½ mm. long.

- *E. hemiphloia.*
- *E. microtheca.*
- *E. albens.*
- *E. fasciculosa.*
- *E. affinis.*
- *E. paniculata.*
- *E. siderophloia* var. (Capertee).

*E. hemiphloia.*

"Seeds without any appendage; the fertile much larger than the short sterile seeds." ("Eucalyp-ography," figs. 9 and 10.)

Fertile seeds rather dull, light to dark brown, 1 to 2 mm. long, about 1 mm. broad, thickish, broadly ovate to nearly orbicular, usually much convex on the back, the face sometimes with a broad depression surrounding the hilum, minutely longitudinally striate on the back, and also on the face, but less prominent. Hilum ventral, fairly large, darker than the thin testa.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, the majority broad and much smaller than the fertile seeds, the narrow ones subulate, the longest about 2 mm.

Somewhat similar to *E. albens*, but apparently more uniform. Liverpool (J. L. Boorman, 1918).

*E. albens.*

Fertile seeds rather dull, light to dark brown, 1½ to sometimes slightly more than 2 mm. long, and sometimes exceeding 1 mm. broad, thickish, compressed, broadly ovate to somewhat rhomboid, a few narrow and also D-shaped, longitudinally striate on both surfaces, but more conspicuous on the somewhat convexed back. Hilum ventral, almost in the centre of the endosperm, small, darker than the thin testa, the depression also small and wrinkled around the edge.

Sterile seeds glossy, light to dark reddish-brown, the majority broad, very angular, the narrow ones subulate to clavate, a few as long as the fertile seeds. Mumbil (J. L. Boorman, 1912).

*E. affinis.*

Fertile seeds rather dull, light to dark brown, 1 to 2 mm. long, about 1 mm. broad, the majority are roughly 1½ mm. long, polymorphic; the most common forms appear to be ovate-acute to oblong, rather thick; all are minutely striate longitudinally, the back is occasionally wrinkled into shallow broadish pits, which may be due to unripe seeds. Hilum ventral, small, light coloured, the depression sometimes black; testa thin.
Sterile seeds glossy, light to dark reddish-brown, polymorphic, the majority broad, rarely exceeding 1 mm., the narrow ones sometimes more than 1 mm. long.

Differing from *E. albescens* and *E. hemiphloia* in being slightly smaller and to some extent more polymorphic. Stuart Town (A. Murphy).

**E. intertexta.**

Fertile seeds rather dull, light to dark-brown, 1½-2 mm. long, about 1 mm. broad, rather thin, with slightly revolute margins, oblong to ovate-acute, with somewhat obtuse angles, the very thin ones concave and much wrinkled on the back, all striate longitudinally. Hilum ventral, almost in the centre of the endosperm, rather large, and also the shallow depression surrounding it; testa thin.

Sterile seeds glossy, pale brown, all very small and more or less cubiform, the majority about 1/4 mm. long.

Differing from *E. albescens* and its allies in the thinner fertile seeds and in the smaller sterile seeds. Broken Hill (E. C. Andrews 1919).

**E. microtheca.**

"Fertile seeds considerably larger than the sterile seeds, all without any appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile and sterile seeds alike, warm-brown, small, rice-like (? unique).

Fertile seeds rather dull, light brown, 1½-2½ mm. long, about 1 mm. broad, ovate oblong to nearly orbicular, a few slightly angular and oblique; some are also acute at both ends, and occasionally the margin is membranous, but in the majority of cases it is thick; back convex, minutely striate longitudinally. Hilum ventral, ovate to orbicular, pale or dark coloured, usually surrounded by a large depression in the large seeds, and a very small, often quite obscure, depression in the small seeds, which are more conical; testa thin.

Sterile seeds glossy, yellowish-brown, very small, polymorphic, the majority shrivelled and scale-like, a few of the larger ones about 1 mm. long.

Differ from *E. intertexta* and its allies in the rudimentary membrane, and in the lighter colour of the fertile seeds. Bourke (A. Murphy, 1915.)

**E. fasciculosa.**

Fertile seeds rather dull, dark brown, 1 to 2 mm. long, 1 mm. broad, ovate, orbicular to obtusely triangular, rather thin and somewhat concave, the back convex, minutely striate longitudinally, the striae very distinct. Hilum ventral, very small, the depression surrounding it rather large, sometimes darker than the thin testa.
Sterile seeds glossy, dark reddish-brown, very acutely angled, the majority broad and plump.

"Seems to be intermediate between E. hemiphloia and E. albens." W. Gill, (Woods and Forests Department, Adelaide.)

**E. paniculata.**

"Seeds all without appendage, the sterile seeds exceedingly short, angular and comparatively broadish; testa of fertile seeds reticulated." ("Eucalyptographia," figs. 10 and 11.)

Fertile seeds rather dull, light to dark brown, 1½ to 2 mm. long, 1 mm. broad, oblong, ovate to somewhat D-shaped, rather thick, wrinkled and minutely striate longitudinally on the back, and sometimes with three or four broad, shallow pits. Hilum ventral, almost in the centre of the endosperm, small, paler than the thin testa, the depression surrounding it usually large and shallow.

Sterile seeds glossy, reddish-brown, polymorphic, usually about half the size of the fertile seeds.

Seems to be closely alllied to E. affinis. Dungog (W. F. Blakely).

**E. siderophloia var.**

Fertile seeds rather dull, light to dark brown, 1½ to 2 mm. long, about 1 mm. broad, thickish, oblong to orbicular, a few acute at one end, and with a very thin marginal membrane, sometimes the face concave, and the back more or less convex, minutely pitted, striate longitudinally. Hilum ventral, very small, usually whitish, the depression surrounding it shallow, either small or large; testa thin.

Sterile seeds glossy, light to dark reddish-brown, the majority broad, cubiform to subulate, much shorter and narrower than the fertile seeds.

Broader and more prominently striate than E. Staigeriana Capertee (J. L. Boorman, 1917).

(e) Intermediate—Ovate to orbicular.

Fertile seeds light to dark brown, 1-1½ mm. long, compressed, usually ovate to orbicular; the testa finely striate Hilum ventral.

- E. leucoxylon.
- E. Calcei.
- E. sideroxylon.
- E. siderophloia.
- E. siderophloia var. glauca.
- E. Dawsoni.
- E. polyanthesmos.
- E. populifolia.
- E. rariflora.
- E. microcarpa.
- E. crebra.
- E. Bosistoana.
- E. Behriana.
- E. bicolor.
- E. melliodora.
- E. odorata.
- E. odorata var. calcicultrix.
- E. gracilis.
E. leucoxylon.

"Fertile seeds finely net-veined, as well as the much narrower sterile seeds, usually very small and without any expanding membrane." ("Eucalyptographia," figs. 11 and 12).

Fertile seeds rather dull, dark-brown, 1 to 1½ mm. long, nearly 1½ mm. broad, ovate to orbicular, compressed, but slightly thicker than E. Dawsoni, the back minutely longitudinally striate, the face slightly pitted rugose, and with one or two obtuse ridges. Hilum ventral, rather large, usually orbicular, paler than the thin testa, the depression surrounding it not large, rather shallow, and sometimes oblique.

Sterile seeds glossy, dark reddish-brown, the broad ones cubiform to triangular; the narrow ones, which are more numerous, subulate, clavate, and usually as long as the fertile seeds. Near Myponga, South Australia (W. Gill, April, 1918).

E. Caleyi.

Fertile seeds rather dull, light to dark brown, 1 to 1½ mm. long, about 1 mm. broad, ovate angular to somewhat triangular, a few rather thick and somewhat pyramidal, with obtuse ridges radiating from the vicinity of the hilum, the back convex and minutely striate longitudinally. Hilum ventral very small, the depression surrounding it very often obscure; testa thin.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, the broad ones more numerous than the narrow, subulate ones, the former often about ½ mm. long, the latter sometimes 1½ mm. long.

Differing from E. albens in being smaller and more angular. 7 miles from Ashford (Forestry Commission of New South Wales).

E. sideroxylon.

Fertile seeds rather dull, dark-brown, 1-1½ mm. long, about 1 mm. broad, rather thick, ovate, oblong to D-shaped, a few somewhat orbicular, moderately compressed to very slightly pyramidal, convex and minutely striate longitudinally on the back. Hilum ventral, very small, and also the shallow depression surrounding it; testa thin.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, the narrow ones 1-2 mm. long, the broad ones usually shorter than the fertile seeds, both forms apparently of equal proportions.


E. siderophloia.

"Seeds all without appendage, the sterile seeds not very narrow." ("Eucalyptographia," figs. 10 and 11.)
Fertile seeds rather dull, light to dark brown, 1 to 1½ mm. long, 1 mm. broad, rather plump, ovate, oblong to orbicular, a few somewhat rounded triangular, usually with broad, shallow pits or wrinkles on both sides, minutely striate on the back. Hilum ventral very small, the depression surrounding it sometimes extending over the face of the seed, but in the majority of cases it is small and shallow; testa thin.

Sterile seeds glossy, dark reddish-brown, usually curved and angular, the small broad ones more numerous than the narrow awl-shaped ones, the latter sometimes 1½ mm. long. (Near E. sideroxyylon.) Parramatta River, Parramatta (W. F. Blakely and D. W. C. Shiress, June, 1919).

*E. siderophloia* var. *glauca*.

Fertile seeds rather dull, dark-brown, 1 to 1½ mm. long, 1 mm. broad, ovate to somewhat obtusely triangular, more or less compressed, the back minutely striate longitudinally. Hilum ventral, very small, darker than the thin testa, the depression surrounding it usually small and shallow.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, many of the narrow ones curved, about 1 mm. long, scarcely as numerous as the thin, angular broad ones.

Scarcely differing from the typical form. Dubbo (J. L. Boorman).

*E. Dawsoni*.

Fertile seeds rather dull, light brown, 1 to 1½ mm. long, about 1 mm. broad, ovate to nearly orbicular, a few oblong, all compressed, flat or concave, minutely longitudinally striate on the back. Hilum ventral, small, paler than the thin testa, the depression surrounding it sometimes large and elongated.

Sterile seeds glossy, dark reddish-brown, more or less cubiform and about half the size of the fertile seeds.

Differing from *E. leucoxylon* in the narrow and more acute fertile seeds and in the broad sterile seeds. Merindee (A. Murphy, 1916).

*E. polyanthemos*.

"Seeds without any appendage." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds glossy, light to dark brown, 1 to 1½ mm. long, about 1 mm. broad, ovate to somewhat orbicular, thickish, slightly angular, minutely striate longitudinally on the back. Hilum ventral rather small, paler than the thin testa, the depression surrounding it very shallow.

Sterile seeds glossy, deep reddish-brown, very variable in shape, the narrow ones as long as the fertile seeds, and nearly as numerous as the broad, angular ones. Bumberry (J. L. Boorman, 1916).
E. populifolia.

"Seeds minute, without any appendage." ("Eucalyptographia," figs. 9 and 10).

Fertile seeds rather dull, light to dark brown, 1–1½ mm. long, about 1 mm. broad, thickish, ovate-acute, oblong to somewhat triangular, wrinkled and longitudinally striate on the back, and somewhat faintly ridged and rugose on the inner face, the edge rather blunt. Hilum ventral, small, more or less depressed, sometimes darker than the thin testa.

Sterile seeds glossy, reddish-brown, the majority narrow, subulate to clavate, a large number as long as the fertile seeds.

Differing from E. polyanthemos in being more acute. (Coolabah (J. L. Boorman 1915).

E. rariflora.

Fertile seeds rather dull, dark brown, 1 to about 1½ mm. long, ½–1 mm. broad, more or less compressed, ovate, oblong to somewhat rhomboidal in outline, the edge sometimes produced into a thin, narrow membrane, minutely striate longitudinally on the back. Hilum ventral very small, often paler than the thin testa, the depression usually shallow.

Sterile seeds glossy, yellowish-brown, polymorphic, the majority broad and less than half the size of the fertile seeds; a few of the clavate ones about 1 mm. long.

Perhaps slightly smaller than E. populifolia. Eidsvold, Queensland (Dr. T. L. Bancroft).

E. microcarpa.

Fertile seeds somewhat shiny, light to dark brown, 2½–1½ mm. long, ½ to ¾ mm. broad, very irregular in outline, varying from ovate, oblong to somewhat rhomboid, a few obliquely triangular, rather plump, minutely striate longitudinally on both surfaces, the striae not very close. Hilum ventral, rather small, depressed or slightly raised; testa thin.

Sterile seeds glossy, yellowish-brown, polymorphic, the majority broad, many shell-like, the largest nearly as long as the fertile seeds.

The fertile seeds are considerably smaller than those of E. hemiphloia. State Forest No. 199, county of Forbes (per Forestry Commission, May, 1919.)

E. crebra.

"Seeds all without any appendage, the sterile considerably smaller than the fertile seeds, and mostly broadish." ("Eucalyptographia," fig. 9.)
Fertile seeds rather dull, light to dark-brown, 1-1\(\frac{1}{2}\) mm. long, about 1 mm. broad, somewhat compressed-ovate, acute to imperfectly rounded-triangular, the angular ones usually smaller and thicker than the morp exactly shaped ovate compressed ones, all minutely striate on the back, the striae sometimes appearing transverse on the face. Hilum ventral, very small, the depression surrounding it usually small and shallow; testa thin.

Sterile seeds glossy, reddish-brown, the majority narrow, and more numerous than the very broad small ones, all smaller or shorter than the fertile seeds. Dubbo (A. Murphy).

*E. Bosistoana.*

Fertile seeds rather dull, dark brown, 1-1\(\frac{1}{2}\) mm. long, and about as broad, compressed or plump, ovate to orbicular to obtusely triangular, the angles more prominent on the face, minutely striate longitudinally, the striae more or less wavy. Hilum ventral, very small, the depression surrounding it usually shallow and orbicular, sometimes elongated and extending across the face of the seed; testa thin.

Sterile seeds glossy, light brown, polymorphic, the narrow, subulate ones almost as numerous as the broad ones, the former often as long as the fertile seeds.

Somewhat similar to *E. microcarpa*, but more definite in shape. Wyndham (J. L. Boorman, 1916).

*E. Behriana.*

"Seeds without any appendage, the fertile considerably larger than the sterile seeds." (*Eucalyptographia,* figs. 9 and 10.)

Fertile seeds rather dull, light brown, 3-4 mm. long, about 3 mm. in diameter, rather plump-ovate, orbicular to rhomboidal, minutely striate longitudinally. Hilum ventral, inserted in a rather small depression, darker than the thin testa.

Sterile seeds glossy, yellowish-brown, polymorphic, or the majority broad, oblong or D-shaped, usually shorter than the fertile seeds.

Somewhat similar to *E. salmonophloia*, but slightly smaller. Wyalong (J. L. Boorman, 1918).

*E. bicolor* (as *largetiflora*).

"Seeds minute, without appendages." (*Eucalyptographia,* figs. 12 and 13.)

Fertile seeds light to dark brown, 1 or nearly 1\(\frac{1}{2}\) mm. long, about 1 mm. broad, thickish, ovate to obliquely ovate, a few acute, wrinkled and microscopically striate longitudinally on the back, the striae finer and closer than in *E. polyanthemos* and others in this group. Hilum ventral very small, and also with a small depression.
Sterile seeds glossy, light yellowish-brown, polymorphic, the majority narrow, curved, shorter than the fertile seeds.

Differing from *E. melliodora* in the small sterile seeds, and in the finer stria of the fertile seeds. On the whole, the seeds of both species are very similar. Koondrook State Forest, No. 625 (Forest Guard McCormick).

*E. melliodora.*

"Seeds very small, without any expanding membrane." ("Eucalyptographia," fig. 9.)

Fertile seeds rather dull, light to dark brown, 1 to barely 1½ mm. long, often less than 1 mm. broad, thickish, ovate to nearly orbicular, the more irregular-shaped ones with obtuse angles, flattish to slightly concave, the back convex and minutely striate longitudinally. Hilum ventral, very small, usually darker than the thin testa, the depression surrounding it obscure or elongated according to the thickness of the seed.

Sterile seeds glossy, light reddish-brown, very variable, the majority narrow, subulate, often as long as the fertile seed.

Smaller and less acute than *E. populifolia.* Grattai (J. L. Boorman, 1917).

*E. odorata.*

"Seeds very small, without any appendage, the sterile seeds not very narrow." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, light to dark brown, plump, ½ to slightly more than 1 mm. long, ⅔ to 1 mm. broad, somewhat orbicular, D-shaped to somewhat triangular, with rounded angles, minutely striate longitudinally or transverse, according to the shape. Hilum ventral, very small, usually inserted in a very narrow depression; testa thin.

Sterile seeds glossy, light to dark brown, polymorphic, the majority broad, much smaller than the fertile seeds. Belair, Mount Lofty Ranges, South Australia (Walter Gill).

*E. odorata* var. *calcicultrix.*

Fertile seeds rather dull, dark-brown, compressed or plump, ⅔ to 1 mm. long and about as broad, ovate to somewhat orbicular and slightly angular, especially on the face, a few D-shaped and also obtusely triangular, all minutely striate longitudinally, the striae moderately distinct. Hilum ventral, rather small, raised, or in a slight shallow, usually small, depression; testa thin.

Sterile seeds glossy, light to reddish-brown, oblong, triangular to clavate subulate, the narrow ones about as numerous as the broad ones, and many fully 1 mm. long, a few 1½ mm. long.
Only one sample examined, and it seems to differ from *E. odorata* in the more distinct longitudinal striae, and in the longer sterile seeds. Miss Flockton states that this single specimen does not show any difference from var. *cajuputea*. Minnipa, Eyre’s Peninsula, South Australia (W. J. Spafford).

**E. gracilis.**

"Seeds without appendage, the sterile much smaller than the fertile seeds. Sterile seeds extremely minute." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds shiny, light to dark brown, rather thick, usually 1 mm. by 1 mm., ovate to orbicular, a few obtusely triangular, minutely striate longitudinally on the back, the striae on the face indistinct and somewhat transverse. Hilum ventral, small, inserted in a shallow depression, or sometimes raised, usually darker than the thin testa.

Sterile seeds glossy, light to very dark brown, polymorphic, the narrow ones 1 mm. long, usually darker than the broad thin ones, and about as numerous.

Very similar to *E. Behriana*, but differing mainly in being more orbicular and in the more distinct striae. Wyalong (J. L. Boorman, 1918).

(f) Intermediate—acute.

Fertile seeds light brown, 1–1½ mm. long, rather plump, acutely ovate to elliptical. Hilum ventral.

**E. Raveretiana.**

**E. salmonophloia.**

"Seeds without any membranous appendage. Sterile seeds narrower, but hardly shorter than the fertile seeds." ("Eucalyptographia," figs. 11 and 12.)

Fertile seeds shiny, light brown, 1 to barely 1½ mm. long, ½–⅔ mm. broad, ovate, acute to attenuate-ovate, rather plump, minutely striate longitudinally. Hilum ventral, small, the depression surrounding it usually small and shallow, and more or less elongated; testa thin.

Sterile seeds glossy, yellowish-brown, thin and very irregular in outline, the majority broad, about half the size of the fertile seeds, or even less.

Differing from *E. crebra* in size and also in the smaller sterile seeds. Rockhampton, Queensland (J.H.M., March, 1909).

**E. salmonophloia.**

"Fertile seeds very small, not prominently angular, nor provided with any appendage, sterile seeds very minute . . . Fertile seeds mostly ellipsoid, only about ½ line long, slightly concave on the inner side." ("Eucalyptographia," figs. 9 and 10.)
Fertile seeds rather dull, light brown, 1 to 1½ mm. long, ½ to ¾ mm. broad, ovate to elliptical, somewhat wheat-like, thickish, wrinkled and very minutely striate longitudinally on the back, the ventral with a rather large depression. Hilum ventral, very small and almost obscure.

Sterile seeds glossy, light to reddish brown, polymorphic, the small broadish ones more numerous than the clavate or subulate ones, the latter sometimes 1½ mm. long. Western Australia (C. A. Gardner).

Series Levispermae.

Fertile seeds small, light-brown, dimple-like, rarely exceeding 1 by 1 mm., broadly ovate to orbicular, rather thick and depressed, with faint obtuse angles; testa smooth, without striae. Hilum ventral, conspicuous. Differing mainly from the preceding series in being non-striate and thicker.

_E. reduna._

"Fertile seeds broader but hardly longer than the sterile seeds." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, light brown, 1 mm. long, about as broad, thick, flattish, globose to ovate, wrinkled on the back, or with a few shallow, irregular pits, otherwise smooth, without any trace of striae. Hilum ventral, small, whitish, partly surrounded by a dark zone, the depression very obscure.

Sterile seeds glossy, pale to reddish brown, polymorphic, the majority more or less clavate, angular, about 1 mm. long.

Seeds very plump, resembling those of _E. Behriana_, but larger and non-striate, also somewhat similar to _E. odorata_ and _E. gracilis_, but non-striate and thicker. Western Australia (C. A. Gardner).

Series Foveolatae.

Fertile seeds compressed or with somewhat obscure radiating ridges, the testa microscopically pitted or imperfectly striate. Hilum ventral.

Sterile seeds polymorphic, shell-like to clavate, subulate, all smaller than the fertile seeds.

(a) Mostly compressed, ovate, acute.

_E. Perriniana._
_E. rubida._
_E. scoparia._
_E. maculosa._
_E. ovata_ var. _camphora._
_E. aggregata._
_E. neglecta._
_E. parvifolia._
_E. Kruseana._
(b) Compressed ovate to somewhat triangular or quadrangular, thickish.
   E. ovata.                                    E. Gunnii.

(c) Orbicular to ovate, thickish.
   E. Lane-Poolei.                              E. uncinata.
   E. crucis.                                  E. decipiens.
   E. Gillii.                                  E. quadrangulata.
   E. oleosa.

(d) Ovate to ovate-oblong, moderately thick.
   E. doratoxylon.                             E. leptophylla.

(a) Mostly compressed, ovate, acute.
Fertile seeds 1-2½ mm. long, mostly ovate, acute, moderately compressed, minutely pitted rugose. Hilum ventral, usually surrounded by a broad, shallow depression.

   E. Perriniana.                               E. aggregata.
   E. rubida.                                  E. neglecta.
   E. scoparia.                                E. parvifolia.
   E. maculosa.                                E. Kruseana.

   E. ovata var. camphora.

E. Perriniana.

Fertile seeds shiny, dark brown to almost jet black, 1½-2½ mm. long, 1 mm. broad, the majority oblong, a few somewhat triangular to ovate, all thin and wrinkled, the back usually marked with a few shallow, irregular pits, the face more or less concave. Hilum ventral, fairly large, with a distinct, shallow, somewhat minutely pitted rugose depression surrounding it; testa thin.

Sterile seeds glossy, light brown to reddish brown, much wrinkled, curved, the majority narrow, about 1½ mm. long, the broader ones sometimes shell-like.

Differing from E. rubida in size and in the shape of their sterile seeds. The Dee, Tasmania (J.H.M., February, 1918).

E. rubida.

Fertile seeds dull, dark brown, 1½-2½ mm. long, 1 mm. broad, acutely ovate, ovate-oblong, to somewhat triangular, with rounded corners, a few somewhat orbicular, compressed, slightly concave, wrinkled on the back, minutely pitted rugose on both surfaces. Hilum ventral, very small, orbicular; testa thin, the depression rather large and shallow.
Sterile seeds glossy, reddish-brown, the majority narrow, flexuose, or awl-shaped, the broad ones more irregular and compressed, all smaller than the fertile seeds.

Scarcely differing from *E. maculosa*. Wingello (J. L. Boorman, 1918).

*E. scoparia*.

Fertile seeds dark brown, rather dull, 1–1.5 mm. long, 1 mm. broad, ovate and very irregular in outline, compressed and wrinkled on both face and back, slightly muricate. Hilum ventral, very small, the depression surrounding it very irregular, sometimes long and narrow, but usually very broad; testa thin.

Sterile seeds reddish-brown, glossy, very irregular in shape, rarely exceeding ½ mm. long, very numerous. Wallangarra (J. L. Boorman, 1917).

*E. maculosa*.

Fertile seeds rather dull, dark brown, 1½–2 mm. long, 1 mm. broad, compressed, ovate, oblong, to somewhat triangular, a few somewhat quadrangular, wrinkled, or with three or more shallow depressions on the back, the face somewhat concave, minutely pitted rugose all over. Hilum ventral, orbicular, usually with a broad, shallow depression surrounding it; testa thin.

Sterile seeds usually glossy, reddish-brown, the majority very narrow, awl-shaped, the broad ones compressed, ovate to tri- or quadrangular, all smaller than the fertile seeds. Wingello (J. L. Boorman).

*E. ovata* var. *camphora*.

Fertile seeds rather dull, dark brown, 1–1½ mm. long, ½–1 mm. broad, polymorphic, ovate, oblong, somewhat triangular to nearly globose, usually compressed, wrinkled, and minutely striate on the back. Hilum ventral, very small, paler than the thin testa, the depression broad and shallow.

Sterile seeds glossy, dark reddish-brown, the majority very narrow, more or less wrinkled and curved, rather thin, 1–1½ mm. long, the broader ones thicker and smaller, except in a few cases.

Very similar to *E. maculosa*, but slightly smaller. Wingello (A. Murphy, 1916).

*E. aggregata*.

Fertile seeds shiny, light to dark brown, 1–1½ mm. long, ½–1 mm. broad, usually compressed, somewhat concave, broadly ovate to oblong, a few nearly orbicular to obtusely triangular, all more or less wrinkled and minutely pitted rugose, the margin not fringed. Hilum ventral, very small, paler than the thin testa, the depression surrounding it large and shallow.
Sterile seeds glossy, light brown, the majority very narrow, wrinkled, curved and channelled, sometimes as long as the fertile seeds.

Smaller than *E. rubida* and *E. maculosa*. Wallerawang (J. L. Boorman, 1917).

*E. neglecta*.

Fertile seeds rather dull, light brown, \(\frac{3}{4}\) to sometimes slightly over 1 mm. long, \(\frac{1}{2}\) to \(\frac{3}{4}\) mm. broad, ovate, acute, or obliquely ovate, slightly compressed, wrinkled on both sides, the depression surrounding the pale hilum rather broad. Hilum ventral; testa thin.

Sterile seeds glossy, a little paler than the fertile seeds, polymorphic, many thin and shell-like, a few of the narrowest nearly as long as the fertile seeds.

Slightly smaller than *E. aggregata* and differing also from it in the sterile seeds. Spring Creek, Cobungra, Victoria (H. B. Williamson, October, 1922).

*E. parvifolia*.

Fertile seeds dark brown to nearly black, somewhat dull, 1-1½ mm. long, 1 mm. broad, plump, ovate to nearly orbicular, with slightly acute angles, the inner face with a somewhat broad depression, the back with 2-5 shallow depressions. Hilum ventral, small, orbicular, usually central, paler than the testa, which is very thin, the depression small or large.

Sterile seeds light to dark reddish-brown, very numerous, angular and polymorphic, the majority not half the length of the fertile seeds.

Differing from *E. neglecta* in the more numerous shallow pits. Nimmitabel (J. L. Boorman, 1916).

*E. Kruseana*.

Fertile seeds rather dull, light to dark brown, 1 mm. long, ½-1 mm. broad, ovate to somewhat orbicular, or perhaps more rhomboidal, plump or compressed, and slightly concave, wrinkled on both sides, back very finely striate, hilum ventral, very small, the depression surrounding it sometimes rather deep, and moderately broad; testa thin.

Sterile seeds very glossy, pale to deep reddish-brown, polymorphic, the narrowest one nearly as long as the fertile seeds, and the broad ones less than half.

(b) Compressed, ovate to somewhat triangular or quadrangular, thickish.

Fertile seeds 1½–2 mm. long, thickish, compressed to somewhat quadrangular, microscopically rugose. Hilum ventral, small, depression small or obscure. 

*E. ovata.*

*E. Gunnii.*

*E. ovata.*

Fertile seeds light brown, rather dull, 1½–2 mm. long, about 1 mm. broad, ovate to obliquely ovate, sometimes very acute at one end, thickish, more or less wrinkled on both sides, the inner face often with a broad depression extending to the rather sharp edges of the seed, the back scarcely convexed, with one or two shallow depressions, minutely rugose. Hilum ventral, small, usually central, paler than the thin testa.

Sterile seeds reddish-brown, very numerous, ovate to awl-shaped, the broad ones very coneave, the narrow ones curved or straight, and usually channelled on the inner face, 1–1½ mm. long. Hilum terminal in the narrow ones, ventral in the broad ones. Wyndham (J. L. Boorman, August, 1915).

*E. Gunnii.*

"Seeds all without appendages." ("Eucalyptographia," figs. 10 and 11.)

Fertile seeds light brown, rather dull, 1–1½ mm. long, 1 mm. broad, oblong to elliptical, more or less angular and thickish, the face with a rather long shallow depression, the back convex, somewhat wrinkled, minutely rugose on both surfaces. Hilum ventral, very small and very hard to distinguish; testa thin.

Sterile seeds reddish-brown, rather glossy, polymorphic in form, the longest of the narrow ones about as long as the fertile seeds. Great Western Mountain, Tasmania (L. Rodway).

(c) Orbicular to ovate, thickish.

Fertile seeds 1–2 mm. long, orbicular to ovate, thickish to moderately compressed, minutely and obscurely pitted. Hilum ventral, small, but distinct, the depression surrounding it usually small and obscure.

*E. Lane-Poolei.*

*E. crucis.*

*E. Gillii.*

*E. quadrangulata.*

*E. Lane-Poolei.*

Fertile seeds light to dark brown, rather dull, 2 mm. long, 1–1½ mm. broad, ovate to almost orbicular, a few somewhat triangular, thin, slightly coneave, wrinkled, and with one or two slight angles, the back striate. Hilum ventral, small, paler than the thin testa, the depression sometimes very small.
Sterile seeds pale to deep reddish-brown and very glossy, the small broad ones about half the size of the fertile seeds, the filiform ones 3–5 mm. long, slightly channelled, not quite as numerous as the broad ones.

Differing from *E. crucis* in the thinner seeds. Near Beenup, Western Australia (E. C. Lane-Poole, July, 1919).

*E. crucis.*

Fertile seeds light to dark brown, dull, 1½–2 mm. long, and nearly as broad, ovate to orbicular, rather plump, slightly wrinkled, minutely striate on the back. Hilum ventral, very small, with or without a depression surrounding it; the testa thin, albumen rather hard.

Sterile seeds glossy, reddish-brown, the broad ones somewhat similar to the fertile seeds, the narrow ones filiform, slightly clavate, 2–4 mm. long.

In this species the narrow sterile seeds appear to be more numerous than the broad ones. The percentage of fertile seeds is very low. Yorkrakine Rocks, Westonia, Western Australia (C. A. Gardner).

*E. Gillii.*

Fertile seeds shiny, greyish-brown, 2 mm. long, about 1 mm. broad, ovate to elliptical, a few slightly somewhat triangular, somewhat compressed, the margins sometimes faintly membranous, surface moderately smooth, with one or two irregular channels. Hilum ventral, ovate or elongated, darker than the thin testa, the depression very shallow, small or sometimes as long as the face of the seed.

Sterile seeds glossy, reddish-brown, polymorphic, the broad ones more numerous than the narrow ones, and always smaller than the fertile seeds, a few of the narrow ones fully 3 mm. long. Broken Hill (E. C. Andrews, January, 1919).

*E. oleosa.*

"Seeds without any appendage, the fertile broader than the sterile seeds." (*Eucalyptographia,* figs. 9 and 10.)

Fertile seeds shiny, greyish-brown or mouse-coloured, 2 mm. long, 1 mm. broad, ovate to obliquely ovate, the angles and edges obtuse, compressed, slightly wrinkled, otherwise smooth, the back very minutely striate. Hilum ventral, orbicular, very small, whitish, the depression very shallow and sometimes on one side of the hilum only.

Sterile seeds glossy, very angular, a few narrow and longer than the fertile seeds, the majority about 1 mm. long.

Differing from *E. Gillii* in being less angular and more obtuse. Cobar (J. L. Boorman, May, 1918).
E. uncinata.

"Seeds minute, without any appendage. The sterile seeds are partly narrow, but all very short; the fertile seeds are almost oval and rather plano-convex." ("Eucalyptographia," figs. 10 and 11.)

Fertile seeds rather dull, dark-brown, 1½–2 mm. long, about 1 mm. broad, ovate to somewhat attenuated-ovate, compressed, a few slightly concave, wrinkled, and with a few shallow pits on the back, the edges somewhat obtuse. Hilum ventral, small, orbicular, not conspicuous, the depression either small or large, not deep; testa thin.

Sterile seeds glossy, reddish-brown, very irregular, the narrow ones sometimes exceeding 2 mm., awl-shaped to clavate, the broad ones more numerous and sometimes less than half the size of the fertile seeds. Bremer Bay, Western Australia (J. Wellstead, December, 1919).

E. decipiens.

"Fertile seeds much larger than the sterile narrow seeds, all without any appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, dark brown or lead-coloured, 1–1½ long, about 1 mm. broad, ovate to somewhat oblong, a few nearly orbicular, compressed, wrinkled on the face and back; minutely and obscurely pitted rugose. Hilum ventral, ovate, small, somewhat deeply depressed; testa thin.

Sterile seeds glossy, reddish-brown, the majority cubiform and very much smaller than the fertile seeds, the narrow ones awl-shaped, the longest nearly 3 mm. long. 40 miles north of Rosemel, Western Australia (B. R. Lucas).

E. quadrangulata.

Fertile seeds shiny, light-brown, 1–2 mm. long, 3–1 mm. broad, very variable, usually compressed, orbicular, ovate, oblong to somewhat triangular with rounded corners, wrinkled and minutely pitted rugose all over, the edge minutely fringed, but only to be distinguished with the aid of a strong lens. Hilum ventral, very small, paler than the thin testa.

Sterile seeds glossy, light brown to reddish-brown, very narrow, a few about as long as the fertile seeds.

Much lighter in colour than E. maculosa and E. rubida, and somewhat thicker. Nundle State Forest (Forest Overseer Mattson, per Forestry Commission).

(d) Ovate to ovate-oblong, moderately thick.

Fertile seeds 1½–2½ mm. long, moderately thick, ovate to oblong-ovate, minutely and obscurely striate. Hilum ventral, almost obscure.

E. doratoxylen.
E. leptophylla.
E. doratoxylon.

"Seeds extremely small, all without appendage, the sterile seeds not very narrow." ("Eucalyptographia," figs. 10 and 11)

Fertile seeds rather dull, of a moderately dark brown colour, 2-2½ mm. long, up to 1½ mm. broad, ovate to oblong, slightly rounded at each end, smooth or with one or two longitudinal wrinkles on the back, and obscurely pitted striae longitudinally, larger than E. leptophylla. Hilum ventral or nearly so, very small, the depression surrounding it rather large, usually much elongated; testa firm, thicker than in most seeds.

Sterile seeds not seen. Stirling Range, Western Australia (C. A. Gardner).

E. leptophylla.

Fertile seeds light brown, rather dull, 1 to nearly 1½ mm. long, 1 mm. broad, ovate to oblong-ovate, sometimes acute or nearly so at both ends, imperfectly striae on the convex back, the face more or less concave. Hilum ventral, very small, usually lighter in colour than the very thin testa, often rather deeply depressed, the depression sometimes nearly as long as the seed.

Sterile seeds very numerous, reddish-brown, the majority very narrow, shorter than the fertile seeds, somewhat sticky.

Smaller and more variable than E. doratoxylon. West Ballandry, near Griffith (W. D. Campbell, July, 1919).

Series Alveolate.

Fertile seeds light yellowish-brown, 2-2½ mm. long, compressed, ovate to elliptical, rather thin; the testa alveolate, and appearing somewhat fringed on the thin margin. Hilum ventral, minute.

E. microcorys.

E. microcorys.

"Fertile seeds broader and less angular than the sterile seeds, without any membranous appendage." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds dull, yellowish-brown, 2-2½ mm. long, 1½ mm. broad, very thin, ovate, oblong to somewhat elliptical, the attenuated portion sometimes acute, the ventral portion sometimes with one or two faint ridges, the back usually slightly convexed. Hilum ventral, minute, the depression surrounding it usually very shallow; testa honeycombed, rather thin but tough.

Sterile seeds glossy, light yellowish-brown, usually cubiform in shape, the majority broad and considerably smaller than the fertile seeds.
The persistent alveolate vestiture of the testa readily distinguishes this species from all others, except, perhaps, *E. pellita*, the testa of which is apparently more persistent than that of its allies.

**Series Rufispermæ.**

Fertile seeds glossy, red-brown, 2–3 mm. long, very irregular and somewhat angular, the surface obscurely pitted-striate. Hilum ventral, very small.

Sterile seeds red-brown, 3 mm. long, subulate to cubiform. Differs from *Series Foveolatae* mainly in size and colour.

*E. Woodwardi.*

Fertile seeds red-brown, shiny, 2–3 mm. long, 2 mm. broad, very irregular in outline, varying from oblong to somewhat triangular to pentagonal, the inner face more or less roughened with irregular short ridges, the surface obscurely pitted-striate. Hilum ventral, very small and scarcely visible under the lens, the scar depressed, and about the same colour as the thin testa.; endosperm brittle.

Sterile seeds red-brown, 3 mm. long, subulate to cubiform, very numerous.

Both the fertile and the sterile seeds are a peculiar reddish-brown colour and not unlike a fragment of red-brown kino.

It is somewhat similar in shape to *E. globulus* and *E. Maideni*, but the glossy surface is totally free from scurfiness.

**Series Lepidotæ-Fimbriatæ.**

Fertile seeds light brown to jet black, 1–3 mm. long, slightly or densely beset with minute deciduous scales, which are somewhat more persistent on the margin and form a minute fringe, compressed pyramidal, with three to five prominent or moderately distinct radiating ridges, to somewhat compressed orbicular to obtusely quadrangular. Hilum ventral or terminal, usually small.

Sterile seeds glossy, not scurfy, somewhat acutely angled, the majority subulate to clavate, smaller than the fertile seeds.
(a) Fertile seeds dark brown, 2–3 mm. long, slightly scurfy and minutely fringed:—

E. unialata.
E. globulus.
E. Maideni.
E. goniocalyx.
E. Stuartiana.
Euc. sp., Kalangadoo.

(b) Fertile seeds not exceeding 2 mm. long, slightly fringed:—

E. Smithii.
E. elæophora.
E. Macarthuri.
E. Dunnii.
E. viminalis.
E. Kilsoniana.
E. cinerea.
E. nitens.

(c) Densely scurfy and fringed:—

E. canaliculata.
E. cosmophylla.
E. pumila.
E. punctata.
E. Shiressii.

(d) Slightly scurfy and minutely fringed:—

E. botryoïdes.
E. resinifera.
E. Deanei.
E. saligna.

(e) Obscurely scurfy and minutely fringed:—

E. resinisha.
E. Deanei.

(f) Small, slightly fringed:—

E. salubris.
E. propinquua.

B.—Hilum terminal.

Fertile seeds fringed, tri- or quadrangular to more or less elongated-pyramidal, 1–2 mm. long.

E.pellita.
E. longisphēa.
E. longisphēa var. multiflora.
E. robusta.
E. Parramattensis.
E. tereticornis.
E. excerta.
E. dealbata.
E. rostrata.
E. rudis.
E. Morrisii.
E. Studleyensis.

A.—Hilum ventral.

(a) Fertile seeds dark brown, 2–3 mm. long, slightly scurfy and minutely fringed, compressed pyramidal, usually with 3–5 faint radiating ridges. Hilum ventral, surrounded by a moderately large, shallow depression.

E. unialata.
E. globulus.
E. Maideni.
E. goniocalyx.
E. Stuartiana.
Euc. sp. Kalangadoo.
E. unialata.

Fertile seeds dark brown, about 3 mm. long, 2 mm. broad, ovate to orbicular in outline, more or less slightly rugose or muriculate, rather thin, the inner face with a rather large, usually elongated depression surrounding the hilum, the back slightly pitted rugose, the edge minutely fringed. Hilum ventral, and sometimes deeply depressed, whitish, the testa very thin and firm.

Sterile seeds red-brown, 1–2 mm. long, triangular, quadrangular and awl-shaped, the attachment scar central on the broad seeds and terminal or on the end of the narrow seeds; very numerous. The Domain, Hobart, Tasmania (L. Rodway, February, 1918).

E. globulus.

"Seed horizontal, flattened, compressed and angled laterally or dorsally into very various shapes; testa deep brown or black; hilum ventral, paler in colour than the rest of the seed." "On Seedlings;" (Lubbock, I, 530).

"Seeds all without any appendage, the sterile much narrower than the fertile seeds." ("Eucalyptography," figs. 9 and 10).

Contrasting the seeds of E. globulus and E. alpina, Mueller says:—

"... the seeds of the two are visibly different, those of E. alpina being sharply angular, more shining and perceptibly wrinkled-streaked, while most of the sterile seeds are far less narrow; thus fertile seeds can be easily sifted from sterile seeds of E. globulus, whereas the separation of them in E. alpina would by the sifting process be as difficult as in E. obliqua, E. macrorrhyncha, and many other species. ..." ("Eucalyptography," under E. globulus.)

Fertile seeds shiny, dark brown to black, 1–3 mm. long, 1–2 mm. broad, polymorphic, the majority somewhat compressed pyramidal to ovate, all more or less angular, with 1–4 scarcely prominent radiating ridges extending from the hilum to the edge, the back flattish, somewhat wrinkled, and with a few broad, shallow pits, the whole surface covered with a minute, jet black, scurfy, deciduous substance, which is fringe-like on the ribs and margins. Hilum ventral, large, much paler than the thin testa.

Sterile seeds glossy, reddish-brown, the majority narrow, subulate to clavate, more or less quadrangular, 2–4 mm. long, the broad ones shorter and more cubiform to D-shaped.

Differs from E. Maideni in being slightly larger, and in the longer sterile seeds. Tumberumba (per Forestry Commission, September, 1918).

E. Maideni.

Fertile seeds shiny, dark brown to black, 1–2 1/2 mm. long, 1–2 mm. broad, polymorphic, somewhat angular, compressed pyramidal, ovate-oblong, with 1–5 slightly raised radial ridges extending from the hilum to the edge, more or less wrinkled, or with
shallow depressions on the back, the whole surface infested with a jet black, scurfy, deciduous substance, which gives the margins a fringed appearance. The surface beneath is smooth and glossy. Hilum ventral, rather large, paler than the thin testa.

Sterile seeds glossy, reddish-brown, the majority subulate to clavate, more or less quadrangular, the longest about as long as the fertile seeds, the broad ones shorter, shell-like to cubiform. Wingello (A. Murphy, 1916).

_E. goniocalyx._

"Seeds without any appendage, the sterile mostly narrower than the fertile seeds." ("Eucalyptographia," fig. 10.

Fertile seeds rather dull, dark brown to black, 1-2$\frac{1}{2}$ mm. long, 1-1$\frac{3}{4}$ mm. broad, compressed, somewhat angular, ovate, oblong to nearly orbicular, with or without radiating ridges, smooth to slightly wrinkled on the back, the whole surface covered with a minute, black, scurfy, deciduous substance, which gives the margin a fringed appearance. Hilum ventral, rather large, paler than the thin testa.

Sterile seeds glossy, reddish-brown, the majority narrow, clavate to subulate quadrangular, the longest about 2 mm. long, the broad ones usually thicker and very irregular.

More compressed and less angular than _E. claophora._ Marulan (A. Murphy, 1916).

_E. Stuartiana._

"Seeds small, and without any appendage." ("Eucalyptographia," figs. 11 and 12.)

Fertile seeds shiny, dark brown to black, 1-2$\frac{1}{2}$ mm. long, 1-2 mm. broad, compressed pyramidal, ovate, oblong to somewhat triangular, more or less obtusely angled, and with 1-4 scarcely prominent ridges on the face, radiating from the hilum to the edge, the back wrinkled, or with a few broad, shallow pits, the whole surface of the seed covered with a minute, jet-black, or black, scurfy, deciduous substance, which gives the edges and the ribs a fringed appearance. Hilum ventral, sometimes very large for the size of the seed, paler than the thin testa.

Sterile seeds glossy, reddish-brown, the majority narrow, clavate to subulate, the longest rarely exceeding the fertile seeds, the broad one compressed, often shell-like.

Differing from _E. Maideni_ in being smaller and in the larger hilum. Marulan (A. Murphy, 1916).
Euc. sp., Kalangadoo.

Fertile seeds dark brown, rather dull, 2–2½ mm. long, 1–1½ mm. broad, oblong to obliquely ovate, a few somewhat orbicular, and even oblong, very thin, wrinkled on both sides, and sometimes with a few faint ridges on the face and one on the back, minutely scurfy all over. Hilum ventral, ovate, rather large, the shallow depression surrounding it also large; testa very thin.

Sterile seeds glossy, light-yellowish to reddish-brown, the majority narrow, shorter than the fertile seeds. Kalangadoo, South Australia (Prof. J. B. Cleland).

(b) Fertile seeds not exceeding 2 mm. long, dark-brown; hilum ventral, usually surrounded by a moderately large, shallow depression.

- E. Smithii.
- E. elaophora.
- E. Macarthurii.
- E. Dunnii.

E. Smithii.

Fertile seeds dull, light to dark brown, 1–2 mm. long, 1 mm. broad, oblong to somewhat triangular in shape, compressed, one end sometimes very acute, the other rounded with a few faint ribs, or radial ridges, but not as prominent or as acutely angled as E. Dunnii, more or less wrinkled on both sides, the back minutely pitted. Hilum ventral, rather small, nearly the same colour as the thin testa, the depression varying according to the shape of the seed, but usually shallow and rather large.

Sterile seeds glossy, reddish-brown, usually very narrow and shorter than the fertile seeds. Wingello (A. Murphy, 1916).

E. elaophora.

Fertile seeds shiny, dark brown, 1–2 mm. long, 1–1½ mm. broad, somewhat compressed-pyramidal to compressed-ovate or orbicular, with 1–4 very faint ridges extending from the hilum to the edge, the back and sometimes the face with shallow wrinkles, the surface covered with a minute, black, scurfy substance, which is fringe-like on the ridges and margin. Hilum ventral, usually large, orbicular, paler than the thin testa.

Sterile seeds glossy, reddish-brown, the majority narrow, subulate to oblong, straight or curved, the broad ones more irregular, but shorter, the former rarely exceeding 2 mm. long.

Smaller, less angular and more orbicular than E. Stuartiana. Marulan (J. L. Boorman, 1916).
E. Macarthuri.

Fertile seeds shiny, dark brown to black, 1$\frac{1}{2}$-2 mm. long, 1-2 mm. broad, compressed, slightly angular, ovate, oblong to somewhat triangular, the face usually with 1-4 faint ridges, extending from the hilum to the edge, wrinkled and more or less pitted on the back, the whole surface infested with a minute, dark, scurfy, deciduous substance, which is somewhat fringe-like on the margin. Hilum ventral, large, paler than the thin testa.

Sterile seeds glossy, reddish-brown, the majority narrow-subulate to clavate, quadrangular, 1$\frac{1}{2}$-2$\frac{1}{2}$ mm. long, the broad ones shell-like to cubiform.

More angular than E. goniocalyx, and slightly smaller. Berrima (J. L. Boorman, 1918).

E. Dunnii.

Fertile seeds rather dull, dark brown, a little over 2 mm. long, 1 to slightly more than 1 mm. broad, ovate to oblong, somewhat compressed, with slightly raised, more or less radial ridges, the outer edge minutely fringed, the back minutely pitted and slightly wrinkled. Hilum ventral, ovate or orbicular, rather large, whitish, the depression surrounding it also large; testa thin.

Sterile seeds glossy, reddish-brown, the majority very narrow, straight or curved, about 1$\frac{1}{2}$ mm. long. Acacia Creek, Macpherson Range (W. Dunn, May, 1905).

E. viminalis.

"Sterile seeds much narrower than the fertile seeds, all without any appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds dull or slightly glossy, dark brown, 1$\frac{1}{2}$-2 mm. long, about 1 mm. broad, compressed, ovate, oblong, somewhat angular, some with a few faint radial ridges, wrinkled and minutely scurfy all over, the edge sometimes with a rudimentary fringe. Hilum ventral, ovate, rather large, the shallow depression surrounding it usually elongated; testa thin.

Sterile seeds glossy, reddish-brown, the majority narrow, awl-shaped and somewhat clavate, straight or curved, a few as long as the fertile seeds. Marulan (J. L. Boorman, 1917).

E. Kitsoniana.

Fertile seeds rather dull, dark-brown, 1$\frac{1}{2}$-about 2 mm. long, 1 mm. broad, very irregular in outline, reniform, ovate, oblong to somewhat triangular, plump or thin, the latter concave, with a broad depression surrounding the hilum, much wrinkled, the back finely striate. Hilum ventral, orbicular to ovate, very small, testa very thin.
Sterile seeds glossy, light to dark reddish-brown, mostly narrow, straight or curved, somewhat clavate, angular, 1-2 mm. long, very numerous. Stony Creek, South Gippsland, Victoria (P. R. H. St. John, February, 1919).

_E. cinerea_ (as _pulverulenta_).

"Sterile seeds numerous, much narrower and mostly shorter than the fertile seeds, the latter not sharply angular, all without any appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, dark brown, 1½-2 mm. long, 1 mm. broad, oblong to somewhat orbicular, and somewhat anguler, thin, concave on the inner face, or the depression surrounding the hilum rather large, wrinkled and minutely striate on the back. Hilum ventral, small, lighter in colour than the thin brown testa.

Sterile seeds light to dark reddish-brown, the majority very narrow, straight or curved, usually angular and scarcely longer than the fertile seeds, very brittle. Parish Nundialla, county Camden (per Forestry Commission, 1919).

_E. nitens._

Fertile seeds rather dull, dark brown, 1½-2 mm. long, 1 to a little over 1 mm. broad, ovate to oblong, a few nearly orbicular, and obliquely triangular, with a rather acute termination, compressed, more or less wrinkled on both surfaces, and minutely somewhat scurfy, so that the outer margin is somewhat rough. Hilum ventral, more or less conspicuous, small, ovate, the depression shallow, and as long as the inner face of the seed; testa thin.

Sterile seeds glossy, very small, polymorphic, the narrow ones slightly more numerous than the small broad ones. Parish Oronmear, county Murray (Forest Guard Blacket, per W. A. W. de Beuzeville, March, 1921).

(c) Densely scurfy and fringed.

Fertile seeds dark brown to jet black, 2-3½ mm. long, somewhat stellate to broadly compressed pyramidal, usually with 2-5 radiating ridges, the whole surface minutely but densely scurfy, the margins fringed.

_E. canaliculata._
_E. cosmophylla._
_E. pumila_ (less angular than the four preceding species).
E. canaliculata.

Fertile seeds glossy, dark-brown to jet-black, 2–3½ mm. long, 1–2 mm. broad, somewhat compressed pyramidal to ovate, with 3–7 rather prominent radiating ridges, extending from the hilum to the fringed edge, the back convex, the whole surface covered with a minute, dark, scurfy deciduous substance. Hilum ventral, rather large, about the same colour as the thin testa.

Sterile seeds glossy, the narrow or clavate ones reddish, about as long as the fertile ones, the broad ones pale-brown, compressed, angular, the longest about 2 mm. long.

Larger and more acutely angled than E. punctata. 7 miles from Dungog on the Booral-road (J. L. Boorman, September, 1920).

E. cosmophylla.

"Seeds without appendage, the fertile broader than most of the sterile seeds, but not longer, and very angular. Fertile seeds black, slightly rough, hardly or not fully one line long." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds glossy, dark-brown to jet-black, 1–2½ mm. long, 1–1½ mm. broad, polymorphic, the majority somewhat compressed, pyramidal to obliquely pyramidal or quadrangular, with 2–5 prominent radiating ridges extending from the hilum to the fringed margin, the back slightly convexed, sometimes wrinkled, the entire surface infested with a minute dark, deciduous, scurfy substance. Hilum ventral, very small or obscure; testa thin.

Sterile seeds glossy, the narrow or subulate ones reddish, 2–3 mm. long, the broad ones light brown, oblong to cubiform, 1–1½ mm. long.

Smaller and less prominently angled than E. canaliculata. South Australia (W. Gill, March, 1918).

E. punctata.

"Seeds all without appendage, the sterile seeds much smaller, but mostly not very narrow." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds shiny, dark brown to black, 1½–2 mm. long, 1–1½ mm. broad, very angular, somewhat pyramidal, oblong to ovate, with three or five rather sharp ridges extending from the hilum to the fringed margin, the back convexed, the whole invested with a dark, scurfy, deciduous substance. Hilum ventral, small or very obscure.

Sterile seeds glossy, light brown to reddish-brown, the subulate to clavate ones about as numerous as the broad cubiform ones, the former reddish, 2–3 mm. long, the latter brown, very hard, 1 mm. long.

Smaller and more angular than E. globulus and its allies. State Forest No. 423, Nowra district (Forest Guard Gallagher, March, 1919).
E. Shiressii.

Fertile seeds glossy, dark brown to black, $1\frac{1}{2}$–2 mm. long, 1–$1\frac{1}{2}$ mm. broad, somewhat stellate on the face with rather acute angles, to compressed pyramidal, a few ovate, acute, without ridges; radial ridges 3–7, the margin somewhat prominently fringed, the surface infested with a minute, dark, scurfy, deciduous substance. Hilum ventral, small, often very indistinct, paler than the thin testa.

Sterile seeds glossy, the subulate or clavate ones reddish-brown, as long as the fertile seeds, the broad ones light brown, cubiform, about 1 mm. long.


E. pumila.

Fertile seeds shiny, dark brown to black, $1\frac{1}{2}$–2$\frac{1}{2}$ mm. long, 1–$1\frac{1}{2}$ mm. broad, somewhat compressed pyramidal, with two or three slight ridges extending from the hilum to the fringed margin, or ovate acute without any ridges, a few more or less triangular, back convexed, minutely scurfy, the substance deciduous. Hilum ventral, very small, sometimes in the centre of a large shallow depression; testa thin.

Sterile seeds glossy, the clavate or subulate ones reddish-brown, 1$\frac{1}{2}$–2 mm. long, the broad, more or less compressed, ones light to dark brown, about 1 mm. long and broad, a few smaller.

More ovate and less angular than E. punctata, also less scurfy. Pokolbin (R. H. Cambage, No. 1506).

(d) Slightly scurfy and minutely fringed. Hilum ventral.

Fertile seeds light brown, 1$\frac{1}{2}$–2 mm. long, orbicular to compressed pyramidal, with 3–5 radiating ridges.

E. botryoides.

E. saligna.

E. botryoides.

"Seeds all without appendage, the sterile much narrower than the fertile seeds." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, pale-brown, 1$\frac{1}{2}$–2 mm. long, 1–$1\frac{1}{2}$ mm. broad, somewhat compressed pyramidal, oblong to ovate, usually with 3–5 slightly acute ridges extending from the hilum to the minutely fringed margin, the back slightly convex, sometimes wrinkled, or with a few shallow, irregular depressions. Hilum ventral, small, testa thin.
Sterile seeds glossy, pale to dark reddish-brown, the narrow ones subulate to oblong, the broad ones compressed, tri- or quadrangular, more numerous than the former. Manly (J. L. Boorman, 1917).

E. saligna.

"Seeds without any expanding membrane." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds dull, light brown, 1½-2 mm. long, 1-1½ mm. broad, compressed pyramidal, oblong, ovate to somewhat triangular with scarcely prominent ridges, and a very minute marginal fringe, wrinkled and minutely pitted rugose on the back. Hilum ventral small; testa thin.

Sterile seeds glossy, light to dark brown, the majority small, cubiform or polymorphic, or smaller and somewhat similar in shape to the fertile seeds.

Similar, but slightly less angular than E. botryoides. A large number of the valves of the capsule are mixed with the seed. Wyong (J. L. Boorman, 1917).

(c) Obscurely scurfy and minutely fringed. Hilum ventral.

Fertile seeds light brown, 1-1½ mm. long, orbicular to somewhat compressed quadrangular, with 1-3 scarcely prominent ridges.

E. resinifera.  
E. Deanei.

E. resinifera.

"Seeds without any expanding membrane, the fertile much broader than the sterile seeds, and very angular." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, light brown, 1-1½ mm. long, 1 mm. broad, somewhat plump, more or less orbicular in outline, with rounded angles, a few ovate or oblong, with 1-3 slightly raised ridges, the margin with a minute fringe. The surface at first covered with a very minute deciduous, scurfy substance, which is more microscopic and paler than that of E. punctata. Hilum ventral, very small; testa thin.

Sterile seeds glossy, the narrow ones reddish-brown, usually subulate to clavate, 2-3 mm. long, the broad ones fewer, and rarely exceeding 1 mm. long.

The vestiture is much finer than in E. punctata and its allies.

E. notabilis.

Fertile seeds rather dull, light brown, 1-1½ mm. long, 1 mm. broad, somewhat angular, with rather obtuse angles, and rather thick, ovate, oblong, to somewhat...
triangular, with 1–3 scarcely prominent ridges, and a minutely fringed margin, the surface covered with a minute, light brown, scurfy, deciduous tomentum, which when rubbed off leaves a smooth, glossy surface. Hilum ventral, very small; testa thin.

Sterile seeds glossy, the narrow ones reddish-brown, subulate to clavate, 1–3 mm. long, the broad ones light brown, thin and more or less quadrangular, rarely exceeding 1 mm. long, less numerous than the former.

Slightly thicker than E. resinifera.

E. Deanei.

Fertile seeds rather dull, light to dark brown, 1–1½ mm. long, ½ to 1 mm. broad, ovate, oblong, D-shaped to obtusely triangular, more or less wrinkled and with a minute, deciduous, marginal fringe, the surface somewhat minutely scurfy. Hilum ventral, very small, sometimes in the centre of a fairly large shallow depression; testa very thin.

Sterile seeds glossy, light reddish-brown, sand-like, the majority narrow, rarely as long as the fertile seeds.

Smaller and more irregular in outline than E. resinifera, and slightly different in the sterile seeds.

(f) Small, fringed. Hilum ventral.

Fertile seeds orbicular to compressed pyramidal, 1–1½ mm. long. Hilum ventral.

E. salubris.
E. propinqua.

E. salubris.

"Fertile seeds very small, not very angular, without any appendage; sterile seeds extremely minute. Fertile seeds hardly above half a line long, the sterile seeds still shorter." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, light brown, 1 to slightly more than 1 mm. long, about 1 mm. broad, thickish, compressed, with one or two faint, angular ridges, usually somewhat orbicular in outline, a few more or less triangular, the angles not very acute or prominent, minutely rugose, the margin fringed. Hilum ventral, very small, darker than the thin testa.

Sterile seeds glossy, light reddish-brown, very angular, the majority about half the size of the fertile seeds, only a few long and narrow, about 1 mm. long.

Differing from E. rudis in the more compressed seeds, with a ventral hilum. Kellerberrin, Western Australia (F. H. Vachell, December, 1903).
E. propinqua.

Fertile seeds rather dull, 1 mm. long, barely 1 mm. broad, ovate to somewhat orbicular, thick, a few faintly ribbed towards the hilum, finely striate, the rather obtuse edge minutely fringed. Hilum ventral or nearly so, very small, darker than the thin testa.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, the narrow ones, which are more numerous than the broad ones, often as long as the fertile seeds.

Smaller and more glabrous than E. punctata. Woy Woy (A. Murphy, 1917).

B.—Hilum terminal.

Fertile seeds light to dark brown, 1–2 mm. long, slightly scurfy and minutely fringed, somewhat oblong, triangular to quadrangular, more or less pyramidal, with scarcely acute ridges, and a small terminal, or slightly oblique hilum.

This group appears to be allied to the pyramidal D-shaped series in the terminal hilum.

E. pellita. E. dealbata.
E. longifolia. E. exserta.
E. longifolia var. multiflora. E. rostrata.
E. robusta. E. rudis.
E. Parramattensis. E. Morrisii.
E. tereticornis. ×E. Studleyensis.

E. pellita.

Fertile seeds dull, light brown, 1½–2 mm. long, ⅔–1 mm. broad, somewhat narrow pyramidal to D-shaped, with rather acute angles, and often with a shallow wrinkle or depression between them, the whole surface minutely spongy rugose, the margin more or less fringed. Hilum terminal or semi-terminal, very small; testa thin.

Sterile seeds glossy, brown to reddish-brown, the majority narrow, oblong to subulate, the latter sometimes 3½ mm. long, the broad ones compressed, angular to narrow pyramidal, smaller and harder than the fertile seeds.

Larger and more densely scaly than E. longifolia, also paler in colour. The tomentum appears to be somewhat similar to that of E. acmenioides. Wyong (J. L. Boorman, October, 1920).
E. longifolia.

"Seeds without any appendage, the sterile seeds mostly narrow." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds shiny, dark brown to black, 1-1½ mm. long, ½-1 mm. broad, somewhat tri- or quadrangular or narrow pyramidal to reniform, the margins minutely fringed, more or less grooved and wrinkled on the face and back, also minutely pitted rugose. Hilum terminal or semi-terminal, very obscure; testa thin.

Sterile seeds glossy, the narrow ones reddish, subulate, up to 2½ mm. long, the broad ones brown to dark reddish-brown, somewhat similar to the fertile seeds, but smaller, more numerous than the narrow ones.

Similar to E. tereticornis, but larger. Rookwood (J. L. Boorman, December, 1917).

E. longifolia var. multiflora.

Fertile seeds shiny, light brown to black, 1-1½ mm. long, ½-1 mm. broad, somewhat obtusely tri- or quadrangular to narrow pyramidal, a few somewhat ovate, rather plump, the slightly raised longitudinal angles minutely fringed with a deciduous substance, wrinkled and minutely pitted on the back. Hilum terminal or semi-terminal, very indistinct; testa thin.

Sterile seeds glossy, light to dark reddish-brown, the majority narrow, subulate, oblong, rarely 2 mm. long, the broad ones shorter and more compressed.

Slightly smaller than the typical form both in the fertile and the sterile seeds. Kincumber (J. L. Boorman and A. Murphy, December, 1920).

E. robusta.

"Seeds small, all without appendage, the fertile much broader than most of the sterile seeds. Ripe seeds brown, hardly 1 line long, or even less." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds dull, light brown, 1-2 mm. long, ¾-1 mm. broad, obtusely tri- or quadrangular, narrow pyramidal to somewhat D-shaped, a few ovate, almost smooth, the very fine angles microscopically fringed. Hilum terminal or semi-terminal, very obscure; testa thin.

Sterile seeds glossy, dark reddish-brown, the majority narrow, quadrangular, oblong to subulate, the broad ones somewhat similar to the fertile seeds, and often quite as long.

Seeds paler and less angular than E. longifolia. Nowra (Forest Guard Gallagher, 1919).
E. Parramattensis.

Fertile seeds glossy, light brown, 1 mm. long, \( \frac{1}{2} - \frac{3}{4} \) mm. broad, ovate, triangular to D-shaped, wrinkled, with scarcely acute angles, the surface more or less minutely scurfy, rugose. Hilum terminal, very small; testa firm and thin.

Sterile seeds glossy, light to dark reddish-brown, the majority narrow, awl-shaped to somewhat clavate, angular and minutely pitted rugose, 1–2 mm. long, very numerous. Liverpool (J. L. Boorman, 1918).

E. tereticornis.

"Seeds small, all without any appendage, the sterile seeds very narrow." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds shiny, dark brown to black, 1 mm. long, \( \frac{1}{2} - 1 \) mm. broad, somewhat obtusely tri- or quadrangular, ovate to oblong pyramidal, or narrowed towards the hilum, somewhat wrinkled, the surface minutely rugose with a dark, deciduous, scurfy substance, which is fringe-like on the angles. Hilum terminal or nearly so, very small, obscure; testa thin.

Sterile seeds glossy, light to dark reddish-brown, the majority narrow, subulate, clavate to compressed oblong.

Smaller and more scurfy than E. Morrisii, and scarcely differing from E. exserta. Gosford (A. Murphy, 1917).

E. exserta.

Fertile seeds shiny, dark brown to black, 1 mm. long, \( \frac{1}{2} - 3 \) mm. broad, oblong somewhat quadrangular, triangular to reniform, often narrow towards the hilum, the minute sharp angles fringed with a microscopic, deciduous, scurfy substance. Hilum terminal, obscure; testa thin.

Sterile seeds glossy, light yellowish-brown to reddish-brown, the majority narrow, subulate to clavate, 1–2\( \frac{1}{2} \) mm. long.

Smaller and more uniformly narrower than E. Morrisii. Barakulla, west of Chinchilla, Queensland (J. G. Young, July, 1919).

E. dealbata.

Fertile seeds glossy, dark brown, \( \frac{1}{2} - 1 \) mm. long, \( \frac{1}{2} - \frac{3}{4} \) mm. broad, plump, triangular, rounded, quadrangular, and somewhat D-shaped, minutely muricate all over, slightly wrinkled, the edges not very sharp, minutely fringed. Hilum terminal, microscopic; testa thin.
Sterile seeds glossy, reddish-brown, the majority narrow, awl-shaped, angular or channelled, longer than the fertile seeds, and also more numerous.

Much thicker than *E. Parramattensis*. Coonabarabran (J. L. Boorman, 1916).

*E. rostrata.*

"Seeds small, all without any appendage, the sterile seeds very narrow." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds rather dull, light yellowish-brown, 1 to nearly 1 ½ mm. long, about 1 mm. broad, 3–4 angled, turbinate to D-shaped, more glossy on the back than on the sides. Hilum terminal, very small, often slightly oblique; testa very thin.

Sterile seeds glossy, pale brown, polymorphic, many similar in shape to the sterile seeds, but not quite so plump, only a small percentage smaller than the sterile seeds, many, however, are much narrower and more pointed, usually awl-shaped. Near Condobolin (R. J. Fawcett, March, 1919.)

*E. rudis.*

"Fertile seeds broader, but mostly not longer than the sterile seeds, all without any appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, pale to dark brown, 1 mm. long, nearly 1 mm. broad, thickish, triangular to somewhat orbicular, obtusely angled, with one or two faint ridges extending from the hilum; these are usually more or less pyramidal, or wedge-shaped, the whole surface minutely scurfy rugose, the margin minutely fringed. Hilum terminal, very small; testa thin.

Sterile seeds glossy, light to dark reddish-brown, 1–2 mm. long, the narrow ones usually more numerous than the broad ones, awl-shaped to somewhat clavate, very numerous. Near Pelican Point, Swan-road, Western Australia (C. E. Lane-Poole, October, 1917).

*E. Morrisii.*

Fertile seeds shiny, light to dark brown, 1–1 ½ mm. long, ½–1 mm. broad, obtusely oblong pyramidal to triangular, a few reniform to ovate, usually contracted or narrower towards the hilum, the angles minutely fringed, the surface rugose with a minute, dark, deciduous, scaly substance; testa terminal, somewhat obscure.

Sterile seeds glossy, light to reddish brown, the majority narrow, subulate to clavate, 1 ½–2 ½ mm. long, the broad ones compressed, quadrangular, rarely exceeding 1¼ mm. long. Girilambone (J. L. Boorman, 1918).
×E. Studleyensis.

Fertile seeds glossy, dark brown, 1 mm. long, 3/4-1 mm. broad, rather plump, grain-like, ovate orbicular to oblong, with somewhat rounded angles, the margin minutely fringed. Hilum terminal or nearly so, very small or obscure; testa very thin.

Sterile seeds glossy, light reddish-brown, the majority narrow, subulate, rarely exceeding 1 mm. long.

Smaller and more globose than E. tereticornis, and also with a much smaller fringe. Studley Park, Kew, Victoria (A. D. Hardy, May, 1919).

Series Pachyspermae.

Fertile seeds brown, 4-9 mm. long, and 4-7 mm. broad, thickish, somewhat compressed pyramidal, with moderately prominent radiating ridges, and usually with a large depressed orbicular ventral hilum. Sterile seeds subulate to D-shaped, 4-6 mm. long.

E. miniata.
E. tetrodonta.

E. erythrocorys.

"Fertile seeds large, without any appendicular membrane; sterile seeds comparatively small and partly very narrow. Fertile seeds 2½-4 lines long, angular and often truncated, convex on the outer face, edged around the large circular hilum, thence radiating-streaked to the acute margin of the seed; testa neither much shiny or distinctly reticulated. Sterile seeds 1-1 ½ lines long, mostly only between ½ and ¾ line broad." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds dull, dark brown, 5-9 mm. long, 5-7 mm. broad, moderately thick, very irregular and somewhat angular in outline, oblong to quadrangular, the ventral raised or depressed, usually marked with 4-5 rather acute radial ridges, which sometimes give the dorsal margin a toothed appearance. Dorsal smooth or wrinkled, much convexed. Hilum ventral, raised or depressed, usually large, ovate to orbicular; the rather firm testa somewhat finely scurfy.

Sterile seeds glossy, brown to reddish-brown, polymorphie, the narrow ones subulate to clavate, the broad ones compressed D-shaped, 3-4 mm. long. Darwin, Northern Territory (H. Brown, per D. W. C. Shiress, March, 1920).

E. erythrocorys.

"Sterile seeds partly narrow, fertile seeds without any membranous appendage. Fertile seeds much broader than most of the sterile seeds." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds 5-8 mm. long, 4-7 mm. broad, a dark glossy brown, very angular in shape, rather thick, marked with 4-5 thin, but prominent radiating ridges, the
space between the ridge uneven, or irregularly rugose, sometimes showing traces of very fine striae, the back slightly convexed, glossy and faintly rugose. Hilum ventral, orbicular, large, much depressed, usually whitish.

Sterile seeds 4–6 mm. long, red-brown, very variable, the broad ones thin, nearly as broad as long, the narrow ones terete or nearly so; some, however, are more or less triangular. Dongarra, Western Australia (E. W. Clarkson).

E. tetrodonta.

"Sterile seeds not much narrower than the fertile seeds, all without any membranous appendage, sterile seeds often narrow-pyramidal and truncated, fertile seeds mostly oblique-oval." ("Eucalyptographia," figs. 6 and 7.)

Only two good seeds seen, and these are fertile ones, sub-hexagonal or nearly circular, slightly convex, brownish-black, no wing. In the middle of the concave side a hexagonal hilum, with six slightly raised ribs, radiating to the circumference.

Fertile seeds dull, brown, 4–6 mm. long and about as broad, orbicular to somewhat quadrangular in outline, compressed but moderately thick, the ventral marked with 5–7 radiating ridges, the space between them concave and minutely pitted rugose, the dorsal much convexed, smooth or slightly rugose. Hilum ventral, orbicular, rather large and sometimes deeply depressed, or much lower than the somewhat ridged surface surrounding it.

Sterile seeds glossy, dark brown, compressed, usually angular, the broad ones somewhat pyramidal, the longest rarely exceeding 3 mm.

Fertile seeds smaller and more compressed than those of E. crythrocorys. Darwin (N. Holtze, 1905).

Series Cochlaceae.

Fertile seeds light to dark brown, 2–8 mm. long, more or less D-shaped to triangular; the thin firm testa expanded from the dorsal into a narrow or broadish membrane or wing; the ventral usually marked with two or three well-defined ridges. Hilum terminal, rather small.

Sterile seeds angular, subulate to broadly D-shaped.

E. buprestium.

E. pachyloma.

E. buprestium.

"Perfect seeds very few, large, very irregularly shaped, the acute edge sometimes expanded into a narrow wing." (B.Fl. III, 206.)

Fertile seeds very angular, not much differing in size from the rather large and broad sterile seeds, but edged by a rather conspicuous membrane." ("Eucalyptographia," figs. 8 and 9.)
Fertile seeds glossy, light to dark brown, 6–8 mm. long, 4–5 mm. broad, very light, ovate to triangular; the thin testa expanded into a broadish membranous marginate wing, and sometimes two of the outer ventral ridges are also winged; back smooth, very convex owing to the incurving of the winged margin. Hilum terminal, usually narrow, paler than the thin, firm testa. Endosperm albuminous, rather soft, the basal portion usually terminating in a very fine hyaline wing or membrane; the hilum large and darker than the endosperm.

Sterile seeds angular, somewhat subulate to broadly D-shaped, smaller than the fertile seeds, and very numerous.

Wing broader than the wing of *E. Todtiana* and *E. pachyloma*. Bremer Bay, Western Australia (J. Wellstead).

*E. pachyloma.*

Fertile seeds glossy, light brown, 2–3 mm. long, 2–3 mm. broad, more or less D-shaped, to somewhat ovate; the firm, but thin testa expanded into a narrow, marginal wing surrounding the seed, the inner face with two to three prominent ridges extending from the hilum to the outer margin, the broad back very convexed, and slightly rugose. Hilum terminal, very small, orbicular, paler than the testa, the space surrounding it nearly flat.

Sterile seeds glossy, very pale-brown, 3 mm. long, 1–2 mm. broad, somewhat triangular to D-shaped with very sharp edges, and more or less depressed on both sides, the inner face usually straight, the back convexed, very numerous. In texture they are much thicker and harder than the fertile seeds. Kalgan Plains, Western Australia (J. H. Maiden, 1909.)

*Series Neuroptera.*

Fertile seeds light brown, 4–5 mm. long, somewhat triangular; the testa expanded circumlaterally into a conspicuous concave wing, supported on the ventral by four or more diverging nerves. Hilum terminal, very narrow.

Sterile seeds polymorphic, the broad ones more or less D-shaped.

*E. Todtiana.*

"Fertile seeds expanding laterally into a broadish transparent membrane. Sterile seeds rather large, not very numerous, generally not much longer than broad, brown or blackish, angular, often compressed, 1–1½ lines long. Fertile seeds very few, pale-brown, measuring, with addition of the membranous expansion, 2–2½ lines; the surrounding membrane on the summit of the nucleus very short or there not developed." ("Eucalyptographia," figs. 9 and 10.)
Fertile seeds glossy, light brown, 4–5 mm. long, 3–4 mm. broad, somewhat triangular to D-shaped; the testa expanded circumferentially into a narrow hyaline, concave wing, and supported on the ventral side by three or four prominent spreading nerves, and sometimes with a distant intramarginal nerve, the dorsal convex, smooth or slightly wrinkled. Hilum terminal, situated on a very narrow ridge, paler than the thin, brown testa.

Sterile seeds glossy, light to dark brown, polymorphic, all angular, the narrow ones compressed elavate, the broad ones D-shaped, without wings, flat or conave on one side, and usually with a moderately broad convexed back, the largest 5 mm. long, 3–4 mm. broad. The sterile seeds are much more numerous than the fertile seeds.

Differing from *E. pachyloma* in the broader and more circumferential nerved wing; narrower hilum and larger seed. Perth, Western Australia (Dr. J. B. Cleland).

**Series Muricatae.**

Fertile seeds glossy, jet black, 5–7 mm. long, elongated, pyramidal to triangular, with 3–5 prominent radiating ridges extending from the conspicuous terminal hilum; the testa muricate.

Sterile seeds polymorphic, all somewhat obtusely angled and finely striate, the broad ones oblong-D-shaped. *E. sepulcralis.*

*E. sepulcralis.*

"Fertile and sterile seeds of nearly the same size, very angular, without any membranous appendage. Seeds not numerous in each cell, mostly from 1½-2 lines in length, a few scarcely 1 line long; the fertile seeds outside black, shining and marked with exceedingly subtle reticulation, the prominent angles ascending and diverging from the hilum, the summit convex and broad; sterile seeds brown, narrower, but never very slender." (“Eucalyptographia,” figs. 9 and 10.)

Fertile seeds jet black, glossy, 5–7 mm. long, 4–5 mm. broad, elongated pyramidal to somewhat triangular, with 3–5 prominent undulating radiating ridges extending from the hilum to the broken and somewhat membranous margin, the inner face distinctly muricate, the back convex, minutely rugose. Hilum terminal, rather large, usually with a broad, oblique depression sloping towards the back, whitish and very distinct from the dark, rugose, muricate, hard testa.

Sterile seeds glossy, light brown, 4–5 mm. long, narrow to broad, all more or less obtusely angled and very finely striate, the broad ones somewhat D-shaped to eubiform.

It approaches *E. pachyloma* somewhat in the rudimentary membrane to the fertile seeds, and *E. buprestinum* in the sterile seeds. Bremer Bay, Western Australia (J. Wellstcad, December, 1919).
Fertile seeds light brown to jet black, 1 to 7 mm. long, 1/2 to 4 mm. broad, somewhat pyramidal, cubiform, oblong or elongated-pyramidal to D-shaped, thick or compressed, with 1-5 more or less prominent diverging ridges, the surface microscopically pitted rugose. Hilum terminal, usually conspicuous.

Sterile seeds hard and brittle, somewhat cubiform, pyramidal to D-shaped, the latter sometimes much compressed. In a number of cases, when the colour of both kinds of seeds is the same, it is sometimes difficult to distinguish one class of seed from the other, but as a general rule the sterile seeds are smaller and harder, and often more glossy than the fertile ones.

(a) Large, elongated-pyramidal:—
   E. marginata.  
   E. gigantea.

(b) Moderately large, triangular to compressed D-shaped:—
   E. Preissiana.  
   E. patens.  
   E. diversifolia.

(c) Large and thick:—
   E. Planckonian.  
   E. megacarpa.

(d) Medium, fertile seeds dark brown to jet black:—
   E. Blaxlandii.  
   E. virgata.  
   E. altior.  
   E. fraxinoides.  
   E. Sieberiana.  
   E. Consideniana.  
   E. piperita.

(e) Medium, fertile seeds light to dark brown:—
   E. Cloeziana.  
   E. coriacea.  
   E. pilularis var. pyriformis.  
   E. obliqua.  
   E. stricta.  
   E. macrorrhyncha.  
   E. hemastoma.

(f) Medium, with scarcely prominent ridges:—
   E. acmenoides.  
   E. umbra.

(g) Small:—
   E. amygdalina.  
   E. numerosa.  
   E. radiata.  
   E. dives.  
   E. vitrea.  
   E. tanioila.  
   E. eugenioides.  
   E. eugenioides var.  
   E. ligustrina.  
   E. Penrithensis.
(h) Somewhat elongated to obliquely pyramidal:—

E. fastigata. E. stellulata.
E. regnans. E. Moorei.
E. Laseroni. E. Mitchelliana.
E. Andrewsii. E. Simmondsii.

(a) Large, elongated-pyramidal.

Fertile seeds light brown to jet black, 3-7 mm. long, 1½-4 mm. broad, somewhat oblong to elongated or obliquely pyramidal, with 3-5 diverging ridges, the back moderately smooth. Hilum terminal, rather large in E. marginata.

Sterile seeds pyramidal to D-shaped, much smaller than the fertile seeds.

E. marginata.
E. gigantea.

E. marginata.

"Seeds all very angular and without any appendage, the sterile mostly not narrow, but smaller than the rather large fertile seeds. Seeds forming two rows in each cell; the fertile grains 1½-2½ lines long, black, somewhat shining, much fewer than the sterile seeds, which are pale-brownish and 1½-1 lines long, and nearly as broad." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds jet black, glossy, 4-7 mm. long, 3-4 mm. broad, minutely rugose, the majority usually narrow or elongated and angular, the broader ones more or less pyramidal, with 3-5 prominent ridges radiating from the hilum, the back moderately smooth and much convex. Hilum terminal, usually whitish, its shape largely depending on the shape of the seed, e.g., compare (a) with (c). It is, however, very conspicuous.

Sterile seeds very light to dark brown, D-shaped to pyramidal, barely 3 mm. long, less numerous than the fertile seeds. King George’s Sound, Western Australia (J.H.M., September, 1909).

E. gigantea.

Fertile seeds light brown, glossy, 3 mm. long, 1-1½ mm. broad, oblong, semi-ovate to obliquely D-shaped, usually with 1-3 small acute ridges on the inner face, sometimes the lower half quite smooth, semi-ovate, the back smooth, faintly pitted. When face downwards the long, smooth back is oblong-ovate in outline. Hilum terminal or nearly so, very small and sometimes difficult to discern; testa firm, rather thin.

Sterile seeds light brown, somewhat darker than the fertile seeds, very angular, shorter and slightly smaller, and often without the long, smooth back of the fertile seeds. Hilum terminal and usually easy to find; testa very hard and brittle. Tumberumba (J. L. Boorman, 1916).
(b) Moderately large, triangular to compressed D-shaped.

Fertile seeds light brown to jet black, 1½–3 mm. long, 1½–2 mm. broad, compressed D-shaped to somewhat pyramidal, with 1 to 3 more or less prominent ridges. Hilum terminal, rather small.

Sterile seeds somewhat triangular, oblong to compressed D-shaped, somewhat similar to the fertile seeds.

*E. Preissiana.*

*E. diversifolia.*

*E. patens.*

*E. alpina.*

*E. Preissiana.*

"Most sterile seeds attaining nearly the size of the fertile seeds, all without any appendage. Majority of seeds from nearly 1 to 1½ lines long, none very narrow. The mutual similarity or even conformity of the fertile and sterile seeds place *E. Preissiana* so far near the the *Renanthera*, the broad sterile seeds occurring in but very few species outside of that group." (*Eucalyptographia,* figs. 10 and 11.)

Fertile seeds dark brown, shiny, 3 mm. long, 2 mm. broad, compressed D-shaped, with rather sharp edges, and somewhat obtuse ventral ridges, and slightly depressed laterally, the surface somewhat pitted rugose, and darker than the margin, the inner face rather straight, the back convexed. Hilum terminal, small, ovate, paler than the somewhat thick testa.

Sterile seeds glossy, pale to dark brown, 3–4 mm. long, 2 mm. broad, oblong-D-shaped, somewhat similar to the fertile seeds; testa thick and hard.

It is very difficult to separate the fertile seeds from the sterile seeds, the latter are sometimes much larger and paler than the former. Bremer Bay (J. Wellstead, May, 1919).

*E. patens.*

"Fertile and sterile seeds of the same form and size, all compressed, mostly not much longer than broad, none provided with a marginal membrane. Seeds measuring about 1 line in length." (*Eucalyptographia,* figs. 9 and 10.)

Fertile seeds very pale to dark brown, 2 mm. long, 1 mm. broad, plump, angular and D-shaped, the sides rather dull, the broad convex back smooth and glossy, the inner face with one or two faint ridges, the margin firm and rather sharp. Hilum terminal, small; testa thin.

Sterile seeds compressed, very glossy, light to dark-brown, D-shaped, the majority slightly larger than the fertile seeds; testa very hard. 6 miles from Busselton, Western Australia (Percy Murphy, April, 1909).
E. alpina.

"Seeds without any appendage, the sterile seeds mostly not very narrow." ("Eucalyptographia," Fertile seeds shown at fig. 8.)

Fertile seeds glossy, jet-black, 3 mm. long, 2 mm. broad, angular and somewhat obliquely D-shaped, slightly. concave on each side, the inner face marked with two or three sharp ridges, the back convexed, pitted rugose. Hilum terminal or nearly so, ovate, whitish; testa somewhat hard, but much softer than the sterile seeds.

Sterile seeds glossy, reddish-brown to dark brown, 3 mm. long, 1-1½ mm. broad, more or less oblong, quadrangular to triangular, minutely pitted or longitudinally striate. More numerous than the fertile seeds; testa very hard, rather thick. Wonderland Peak, Grampians, Victoria (P. R. H. St. John).


"Sterile seeds broad, nearly as large as the fertile seeds. . . . Fertile seeds few, sharply angular and very slightly membranous at their edges. The approximate conformity of the fertile and sterile seeds is that of the Renantherse or generality of Stringybark trees." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds rather dull, light brown, 1½-2 mm. long, about 1½ mm. broad, angular-turbinate to somewhat D-shaped, usually much narrower towards the hilum, and also more or less truncate, with two or three faint ridges, the edges sharp or rounded, minutely pitted striate on the back. Hilum terminal, rather large ovate to orbicular, usually paler than the thin, brittle testa.

Sterile seeds glossy, light brown, often difficult to distinguish from the fertile seeds, the majority, however, are usually more D-shaped, harder and more shining, and with less marked ridges.

Somewhat similar to E. patens, but without the prominent ridges, while a number are more turbinate. Botanic Gardens, Sydney, cult. (W. F. Blakely, June, 1918).

(c) Large and thick.

Fertile seeds thick, 4-6 mm. long, 2-4 mm. broad, pyramidal to D-shaped, with prominent, more or less muricate ridges. Hilum terminal, rather large.

Sterile seeds pyramidal to D-shaped, smaller than the fertile seeds.

E. Planchoniana.

E. megacarpa.

E. Planchoniana.

"Seeds without any appendage, the sterile not much smaller than the fertile seeds." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds dark brown to black, glossy, 5-6 mm. long, 3 mm. broad, 3-5 angled, more or less pyramidal in shape, with 3-5 ridges radiating from a broad,
depressed space surrounding the hilum, the ridges more prominent than in *E. megacarpa*, the space between, depressed and very minutely pitted rugose, also the broad convexed back. Hilum terminal, greyish and conspicuous.

Sterile seeds 4–5 angled, somewhat similar in shape to the fertile seeds, but only about half the size, usually light to dark brown.


*E. megacarpa*.

"Seeds very angular, the fertile of nearly the same size as the sterile seeds, all without appendage." (*Eucalyptographia,* figs. 10 and 11.)

Fertile seeds dark brown to black, shining, 4–5 mm. long, 2½ mm. broad, irregularly 3–4 angled, with as many more or less prominent nerves or ridges, each nerve or ridge commencing at the outer edge of the moderately broad and distinct greyish hilum, and extending to the margin; the space between the nerves or ridges usually depressed or concave, and microscopically striate, the ridges smooth or rugose, the back convex, striate. Hilum terminal, the space surrounding it often broad, but its size is largely controlled by the angles of the seed.

Sterile seeds light to dark brown, angular, irregularly oblong, usually slightly longer than the seeds.

Differing from *E. Planchoniana* mainly in size, and in the somewhat roughish ridges. Centennial Park, Sydney, cult. (J. L. Boorman, 1918.)

(d) Medium; fertile seeds dark brown to jet black.

Fertile seeds dark brown to jet black, 1–3½ mm. long, pyramidal to D-shaped, usually with three to four prominent angles or ridges, and minutely pitted-rugose. Hilum terminal, rather large.

Sterile seeds cubiform to D-shaped.

<table>
<thead>
<tr>
<th>E. Blaxlandi</th>
<th>E. virgata</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. agglomerata</td>
<td>E. altior</td>
</tr>
<tr>
<td>E. Camfieldi</td>
<td>E. fraxinoides</td>
</tr>
<tr>
<td>E. capitellata</td>
<td>E. Sieberiana</td>
</tr>
<tr>
<td>E. leavopinea</td>
<td>E. Consideniana</td>
</tr>
<tr>
<td>E. de Beuzevillei</td>
<td>E. piperita</td>
</tr>
</tbody>
</table>

*E. Blaxlandi*.

Fertile seeds glossy, dark brown to jet black, 1½–3 mm. long, 1–1½ mm. broad, rather plump, somewhat pyramidal to triangular, a few D-shaped, and oblong, partly
cylindrical, with 1–4 scarcely conspicuous ridges, and minutely pitted rugose on the face, or striate on the back. Hilum terminal, rather large, more or less oblique, or projecting over the face, paler than the thin, brittle testa.

Sterile seeds glossy, reddish brown to dark brown, the majority narrow to broad D-shaped, smaller than the fertile seeds.

Scarcely differing from *E. capitellata*. Blackheath (J. L. Boorman, November, 1919).

*E. agglomerata.*

Fertile seeds glossy, dark brown to almost jet black, 1½–2½ mm. long, 1–1½ mm. broad, somewhat obliquely pyramidal, D-shaped, triangular to oblong, rather plump, with usually three scarcely prominent radiating ridges, the edges prominent, thin, and sometimes very sharp, the whole surface rather prominently pitted rugose. Hilum terminal, with or without a nerve-like ring or thickening around the orifice, paler than the firm, somewhat brittle testa.

Sterile seeds glossy, light reddish-brown to dark brown, polymorphic, usually smaller than the fertile seeds, the majority compressed, D-shaped.

More distinctly pitted rugose than *E. eugenioides*, and also darker in colour, and slightly smaller than *E. Blaxlandi*. Yarranbool (J. L. Boorman, October, 1921).

*E. Camfieldi.*

Fertile seeds glossy, dark brown to jet black, 1½–2 mm. long, 1 mm. broad, polymorphic, the majority somewhat obliquely pyramidal with a broad, convexed back, and usually with three scarcely prominent ridges on the inner face; a number are D-shaped and also more or less oblong, all prominently pitted-rugose, or somewhat striate on the back. Hilum terminal, usually distinct and thickened into a nerve-like ring around the orifice; testa firm, brittle.

Sterile seeds glossy, dark reddish-brown, somewhat similar, but smaller than the fertile seeds.

Similar to *E. eugenioides* in the hilum, and to *E. eugenioides* var. in the shape of the fertile seeds. A little south of the 17-mile post, Galston-road, Hornsby (W. F. Blakely and D. W. C. Shiress, October, 1918).

*E. capitellata.*

“Sterile seeds mostly not very narrow, all without any appendage.” ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds glossy, dark brown to almost jet black, 1½–3 mm. long, 1–1½ mm. broad, polymorphic, obliquely triangular to obliquely pyramidal, oblong with a broad
scar, or with 1–3 faint ridges on the face, minutely pitted rugose all over, or somewhat striate on the back. Hilum terminal, usually conspicuous, and with a nerve-like ring surrounding the orifice, sometimes projecting over the face; testa thin, brittle.

Sterile seeds glossy, reddish brown to dark brown, the majority D-shaped, thinner and smaller than the fertile seeds.

Slightly larger than *E. agglomerata*. Corner of Pittwater and Spit roads (W. F. Blakely and J. L. Boorman, October, 1921).

*E. laxopinea*.

Fertile seeds glossy, dark brown to nearly black, 2–4 mm. long, 1–2 mm. broad, polymorphic, D-shaped, oblong to obliquely pyramidal, or navicular, with 1–3 prominent acute ridges and minutely pitted rugose all over. Hilum terminal, small, paler than the firm testa.

Sterile seeds glossy, light reddish-brown to dark brown, somewhat similar but smaller than the fertile seeds.

Larger and more variable than *E. macrorrhyncha*. Nundle (J. L. Boorman, 1918).

*E. de Beuzevillei*.

Fertile seeds glossy, very dark brown, almost black, 1½–3 mm. long, up to 1½ mm. broad, somewhat triangular, D-shaped to pyramidal, rather thick, with two to four fairly prominent radial ridges, minutely pitted rugose on both surfaces. Hilum terminal, rather large, paler than the thin, brittle testa.

Sterile seeds glossy, light yellowish-brown to dark brown, more or less similar to the fertile seeds, but smaller and more compressed.

Near *E. pilularis* var. *pyriformis*. Differing from *E. coriacea* in being darker and larger. Jounama Peaks, Kiandra district (W. A. W. de Beuzeville, December, 1919).

*E. virgata*.

Fertile seeds glossy, dark brown to jet black, 2–3½ mm. long, 1–1½ mm. broad, very angular, the majority somewhat obliquely pyramidal, with a broad base, and with three to five rather acute radiating ridges extending from the hilum to the rather sharp edge, face minutely pitted rugose, the convexed back smooth, minutely pitted, darker than the face. Hilum terminal, rather conspicuous, greyish, the space surrounding it broad, usually obliquely depressed; testa rather firm.
Sterile seeds glossy, light to dark brown, very angular, the majority of the broad ones D-shaped, nearly as large as the fertile seeds, the narrow ones obliquely triangular to quadrangular clavate, the former more numerous than the latter.

Seeds slightly larger than those of *E. stricta*. National Park (J. L. Boorman, 1917).

**E. altior.**

Fertile seeds glossy, dark brown to jet black, 1–2\(\frac{1}{2}\) mm. long, 1–1\(\frac{1}{2}\) mm. broad, very angular, pyramidal to obliquely ovate, with usually three to four somewhat prominent ridges radiating from the hilum to the edge of the seed, minutely pitted rugose all over, the back, however, much more smooth than the face, and side. Hilum terminal, very small, paler than the thin testa, sometimes with a shallow depression surrounding it.

Sterile seeds glossy, light to dark reddish-brown, the broad ones acutely angled, compressed D-shaped, nearly as large as the fertile seeds, hard and brittle, the narrow ones quadrangular, clavate, 1–4 mm. long, not nearly as numerous as the broad ones. Mount Victoria (J. L. Boorman, 1917).

**E. fraxinoides.**

Fertile seeds glossy, dark brown to jet black, 1\(\frac{1}{2}\)–3 mm. long, 1–1\(\frac{1}{2}\) mm. broad, very angular on the face, pyramidal to ovate-oblong, with a rather broad, convex, smooth, minutely pitted back, the face with three to five rather prominent radial ridges extending from the hilum to the margin. Hilum terminal, small, whitish, thickened on the inner edge, with a broad space sloping towards the margin; testa firm.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, a large number somewhat similar, but smaller than the fertile seeds, the remainder D-shaped to quadrangular oblong, all thick and brittle.

Somewhat similar to *E. altior*, but many of them more oblong, with a somewhat larger smooth back. State Forest No. 577, via Queanbeyan (R. C. Blacket, July, 1919).

**E. Sieberiana.**

"Seeds without any appendage, the sterile rather short, but often comparatively broad." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds glossy, dark brown to jet black, 2–4 mm. long, 1–2 mm. broad, polymorphic, obliquely pyramidal to somewhat ovate-oblong, the majority with three to five strong radiating ridges extending from the hilum to the edge, the back usually broadly convexed, minutely pitted rugose. Hilum terminal, very small, paler than the thin, firm testa.
Sterile seeds glossy, light to dark reddish-brown, polymorphic, the majority D-shaped or somewhat pyramidal with faint ridges, rarely as large as the fertile seeds.

Somewhat similar to *E. fraxinoides*, but more polymorphic. Wingello (J. L. Boorman, 1916).

*E. Consideniana.*

Fertile seeds glossy, dark brown to jet black, 1½–3 mm. long, 1–1½ mm. broad, polymorphic, oblong, obliquely truncate to pyramidal, with two to five fairly prominent radiating ridges, and a broad convex back, minutely pitted on both surfaces. Hilum terminal, small, paler than the thin testa.

Sterile seeds glossy, light reddish-brown to dark brown, the majority somewhat triangular to D-shaped, smaller than the fertile seeds.

Smaller and more elongated than *E. Sieberiana*. Nerriga (J. L. Boorman, 1917).

*E. piperita.*

"Sterile seeds mostly not much narrower than the fertile seeds, all without appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds glossy, dark brown to jet black, 1½–2 mm. long, about 1 mm. broad, polymorphic, when face upwards somewhat obliquely pyramidal, with three to five radiating radial ridges; when back upwards somewhat oblong and usually more pointed at one end, minutely pitted rugose all over. Hilum terminal, small, paler than the very thin testa.

Sterile seeds glossy, light to dark-brown, somewhat similar in shape to the fertile seeds, but slightly smaller, the majority broad, only a small percentage D-shaped.

Somewhat similar to *E. Sieberiana*, but smaller. Blackheath (J. L. Boorman, 1917).

(e) Medium.

Fertile seeds light to dark brown, 1–3 mm. long, otherwise somewhat similar to (d).

*E. Cloëziana.*
*E. coriacea.*
*E. pilularis var. pyriformis.*
*E. obtusiflora.*
*E. pilularis.*
*E. stricta.*
*E. macrorrhyncha.*
*E. obliqua.*
*E. Muelleriana.*
*E. hamastoma.*

*E. Cloëziiana.*

Fertile seeds glossy, yellowish-brown, 1½–2½ mm. long, up to 1½ mm. broad, very angular, D-shaped to triangular, somewhat thick, minutely pitted rugose all
over, and usually with about two fairly prominent ridges extending from the truncate hilum to the end of the seed, the margin somewhat expanded or acute. Hilum terminal, small, often thicker on the inner face; testa thick, brittle.

Sterile seeds glossy, yellowish-brown, similar to the fertile seeds, but with more rounded edges and more compressed.

Differing from the majority of the D-shaped series in colour and fewer ridges. Queensland (per F. M. Bailey, May, 1913).

_E. pilularis_ var. _pyriformis_.

Fertile seeds glossy, dark-brown, 2–3 mm. long, 1–2 mm. broad, thick, somewhat D-shaped to obliquely pyramidal, with two to four radiating ridges extending from the hilum to the prominent edge, minutely pitted rugose, truncate at the hilum. Hilum terminal, rather large, paler than the firm testa, and the ridges.

Sterile seeds glossy, light to dark reddish-brown, somewhat similar to the fertile seeds, but smaller, and without the rather prominent pale ridges.

Slightly larger than the typical form. Bucca Creek, South Grafton to Dalmorton (J. L. Boorman).

_E. pilularis._

"Sterile seeds mostly not much narrower than the fertile seeds, all without appendage." ("Eucalyptographia," figs. 10 and 11.)

Fertile seeds glossy, light brown, 1½–2 mm. long, 1–1½ mm. broad, somewhat pyramidal to D-shaped, the base rather broad, surrounded by a distinct sharp rim which connects with the 3–5 radial ridges, the face and back minutely pitted rugose. Hilum terminal, usually orbicular, testa firm.

Sterile seeds glossy, reddish-brown, polymorphic, the majority D-shaped and slightly smaller than the fertile seeds.

In colour and size it resembles _E. hamastoma_ and _E. obtusiflora_. Wyong (J. L. Boorman, 1915).

_E. macrorhyncha._

"Sterile seeds not very narrow, all without appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds glossy, dark brown, 1½–2½ mm. long, the majority about 1 mm. broad, somewhat D-shaped to obliquely pyramidal, with about three radiating, rather acute, ridges extending from the hilum to the thin edge of the seed, minutely pitted rugose all over. Hilum terminal, paler than the rather firm testa.
Sterile seeds glossy, reddish-brown to dark brown, similar to the fertile seeds, but less angular and without the somewhat conspicuous, sharp ridges.

Darker in colour than *E. Cloeziana*, and more sharply angled. Mount Victoria (J.H.M., 1917).

*E. Muelleriana.*

Fertile seeds glossy, light to dark brown, 2–3 mm. long, 1–2 mm. broad, D-shaped to somewhat obliquely pyramidal, with three to five prominent radiating ridges extending from the hilum to the edge, a few oblong, with two to three faint radiating ridges, minutely pitted rugose on both surfaces. Hilum terminal, rather small; testa firm.

Sterile seeds glossy, light to dark reddish-brown, similar in shape, but without the prominent radiating ridges of the fertile seeds, the majority smaller.

Seems to differ from *E. Sieberiana* mainly in the colour of the fertile seeds. Eden (H. H. Rose, 1918).

*E. coriacea.*

"Seeds without any appendage, the sterile mostly not much narrower than the fertile seeds." (*Eucalyptographia,* figs. 8 and 9 as *E. punciflora*.)

Fertile seeds glossy, very dark brown, 1½–2½ mm. long, 1–1½ mm. broad, D-shaped to somewhat pyramidal, a few oblong, with two to three faint radiating ridges, minutely pitted rugose on both surfaces. Hilum terminal, small; testa thin.

Sterile seeds glossy, light to dark brown, somewhat similar to the fertile seeds in size and shape, but with a hard, brittle testa.

The seeds are very strong in oil, which has a castor-oil-like flavour. Differs from *E. vitrea* in being more D-shaped, and darker in colour. Mount Macedon, Victoria (C. Walter, April, 1902).

*E. obtusiflora.*

Fertile seeds glossy, light brown, 2–2½ mm. long and nearly as broad, angular, D-shaped to pyramidal, with three to five strong nerve-like radial ridges, paler than the testa, extending from the hilum to the edge, the back broadly convexed, minutely pitted, the face pitted rugose. Hilum small, terminal, paler than the rather hard testa; endosperm hardish.

Sterile seeds glossy, yellowish brown to light brown, similar to the fertile seeds, and often very difficult to separate, the majority compressed D-shaped, slightly smaller than the fertile seeds, a few of the somewhat quadrangular, oblong ones as long as the fertile seeds.

Differing from *E. virgata* in colour and size. They are, however, almost identical with *E. stricta*. The Spit, near Sydney (W. F. Blakely and J. L. Boorman).
E. stricta.

"Sterile seeds mostly not much narrower than the fertile seeds or quite as broad, all without any appendage. Only a small portion of the sterile seeds narrow." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds glossy, light brown, 2 mm. long, 1½ mm. broad, thick, somewhat pyramidal when face upwards, and imperfectly D-shaped when on the side, more or less acutely angled, with three to five rather strong ridges extending from the broad hilum to the sharp outer edge of the seed, the broad back convex, slightly pitted. Hilum rather large, terminal, surrounded by a broad, slight depression; testa hard.

Sterile seeds reddish brown or dark brown, according to age, very glossy, almost similar to the fertile seeds, but without the radial ridges, usually D-shaped, very numerous. Katoomba, Blue Mountains (J. H. Camfield).

E. obliqua.

"Sterile seeds mostly not much narrower than the fertile seeds, all without appendage." ("Eucalyptographia," figs. 8 and 9.)

Fertile seeds shiny, light to dark brown, 1½–2 mm. long, 1–1½ mm. broad, rather plump, D-shaped to pyramidal, with three to five radiating ridges extending from the hilum to the somewhat sharp rim, minutely pitted rugose on both surfaces. Hilum terminal, rather large, whitish, usually with a broad space surrounding it; testa firm, also the endosperm.

Sterile seeds glossy, light to dark brown, the majority similar, but smaller than the fertile seeds, a few narrow and more elongated than the rest.

Somewhat similar to E. obtusiflora in shape and colour. Wingello (J. L. Boorman, 1917).

E. hamastoma.

"Seeds without any appendage, the sterile seeds rather short and often comparatively broad." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds shiny, light brown, 1½–2½ mm. long, about 1 mm. broad, polymorphic, D-shaped, pyramidal to somewhat obliquely pyramidal, moderately plump, with three to five thin, dark ridges radiating from the hilum, the back convex, minutely pitted, but not as distinct as the face and sides; testa thin. Hilum terminal, small, often longer than broad, paler than the thin testa.

Sterile seeds glossy, light to dark brown, the majority similar in shape to the fertile seeds and often as large, but differing very much in texture.

Seeds with a castor-oil-like flavour. Somewhat similar to E. obtusiflora in colour, but differing in the less prominent and faintly ridged seed. Manly, near Sydney (J. L. Boorman, 1917).
(f) Medium D-shaped, with scarcely prominent ridges.

Fertile seeds light brown, 1½–2 mm. long, pyramidal to D-shaped, much contracted towards the hilum, with two to four scarcely prominent ridges, minutely pitted. Hilum terminal, very small.

Sterile seeds compressed, triangular to D-shaped.

_E. aenemioiides._

_E. umbra._

_E. aenemioiides._

"Sterile seeds mostly not much narrower than the fertile seeds, all without any appendage." ("Eucalyptographia," sterile and fertile seeds figured respectively at figs. 9 and 10.)

Fertile seeds glossy, light brown, 1½–2 mm. long, 1 mm. broad, ovate to D-shaped, often broader at the base, more or less angular, and with two to three radial faint ridges extending from the hilum, the edges acute, the sides slightly concave and minutely pitted rugose, back rather broad, convexed, smooth and minutely pitted, scarcely rugose. Hilum terminal, very small; testa rather hard and thick.

Sterile seeds glossy, light to dark reddish-brown, almost similar to the fertile seeds, but more constantly D-shaped to triangular and not quite so plump, hard and brittle. Wyong (J. L. Boorman, 1916).

_E. umbra._

Fertile seeds glossy, light brown, 1½–2 mm. long, 1 mm. broad, ovate to triangular, a few somewhat D-shaped, minutely pitted rugose all over, the margin sometimes rather sharp, the broad back usually convexed. Hilum terminal, very small and indistinct; testa thin.

Sterile seeds glossy, reddish-brown, about as large, or the more compressed D-shaped ones larger, similar in shape to the fertile seeds, and also minutely pitted rugose.

Scarcely differing from _E. aenemioiides_. Between the 7 and 8 mile post, Gordon to Pittwater road (W. F. Blakely and D. W. C. Shiress, June, 1919).

(g) Small.

Fertile seeds light to dark brown, 1½–2 mm. long, pyramidal to D-shaped, with three to four prominent angles or ridges. Sterile seeds quadrangular to D-shaped, or somewhat similar to the fertile seeds, but smaller and harder.

_E. amygdalina._

_E. tenuiola._

_E. numerosa._

_E. eugenioides._

_E. radiata._

_E. eugenioides var._

_E. dives._

_E. ligustrina._

_E. vitrea._

_E. Penrithensis._
E. amygdalina.

"Fertile as well as sterile seeds quite small; all without appendage." ("Eucalyptographia.")

The figures, 9 and 10, are not very satisfactory, and the figure of the species includes material other than that of typical amygdalina.

Fertile seeds glossy, light to dark brown, 1-1\(\frac{3}{4}\) mm. long, about 1 mm. broad, somewhat pyramidal to D-shaped, with two to four radiating ridges extending from the hilum to the sharp, somewhat undulating edge, minutely pitted rugose all over, the back sometimes large, convexed. Hilum terminal, small, paler than the firm testa.

Sterile seeds glossy, light to dark brown, polymorphic; the majority more or less D-shaped, smaller than the fertile seeds, and usually without the radiating ridges.

Near E. stricta and E. obtusiflora, and differing from them in size. Bellerive to Rokeby, Tasmania (J.H.M., February, 1918).

E. numerosa.

Fertile seeds rather dull, brown, 1\(\frac{1}{2}\)-2 mm. long, about 1 mm. broad, usually obliquely pyramidal, with two to four radiating ridges extending from the hilum to the rather sharp edge of the seed, minutely pitted rugose on both surfaces, a few narrow and somewhat cylindrical. Hilum terminal, small; testa firm.

Sterile seeds glossy, light to dark reddish-brown, the majority D-shaped, smaller than the fertile seeds, the narrow ones often very thin, about 1\(\frac{1}{2}\) mm. long.

It is allied to E. Andrewsii, &c., in the cylindrical seeds. Cobbity (J.H.M. and R. H. Cambage, June, 1913).

E. radiata.

Fertile seeds shiny, light-brown, 1-2 mm. long, 1 mm. broad, oblong to pyramidal, with two to four scarcely prominent radiating ridges, a few somewhat cylindrical, shaped like the toe of a slipper at the base, and obliquely truncate at the hilum, flat or slightly channelled, pitted rugose. Hilum terminal, small; testa firm but thin.

Sterile seeds glossy, light to dark reddish-brown, polymorphic, the D-shaped ones more numerous than the narrow ones, the latter sometimes 2 mm. long, the former shorter.

Scarcely differing from E. numerosa. Wingello (J. L. Boorman, 1919).

E. dives.

Fertile seeds glossy, brown, 1\(\frac{3}{4}\)-2 mm. long, 1-1\(\frac{1}{2}\) mm. broad, rather plump, somewhat pyramidal to obliquely pyramidal, oblong to D-shaped, with two to four moderately strong ridges radiating from the hilum, minutely striate on both surfaces. Hilum terminal, the converging ridges forming a nerve-like ring around it, and paler than the firm, thin testa.
Sterile seeds glossy, light brown, polymorphic, the majority D-shaped, with very faint ridges, or these absent, a few about the same size as the fertile seeds.

Seems to be more closely allied to *E. stricta* and *E. obtusiflora*, and differing from them in being smaller. Wingello (J. L. Boorman, 1917).

*E. vitrea.*

Fertile seeds glossy, pale to dark brown, 1–1 3/4 mm. long, and about as broad in proportion, the majority very plump, roundish, with two sharp ridges, a few somewhat pyramidal, to oblong, minutely pitted rugose. Hilum terminal, small, enclosed in a pale nerve-like ring; testa firm, thin.

Sterile seeds glossy, light to reddish-brown, the majority D-shaped, more compressed than the fertile seeds, but about the same length.

Differing from *E. dives* in the almost round type of seed. Cutaway Hill, 4 miles south of Mittagong, New South Wales (D. W. C. Shiress, July, 1919).

*E. teeniola.*

Fertile seeds rather dull, brown to dark brown, 1 1/4–2 mm. long, up to 1 1/4 mm. broad, somewhat pyramidal to oblong, usually with two to four radiating ridges, minutely pitted rugose on both surfaces. Hilum terminal, small; testa thin and brittle.

Sterile seeds glossy, dark to reddish-brown, somewhat similar to the fertile seeds in size and shape.

Much smaller and thinner than *E. Sieberiana* and *E. Consideniana*. St. Mary's, Tasmania (L. G. Irby, June, 1912).

*E. eugenioides.*

"Sterile seeds mostly not much narrower than the fertile seeds, all without any appendage." ("Eucalyptographia," figs. 9 and 10.)

Fertile seeds glossy, dark-brown, 1–1 3/4 mm. long, about 1 mm. broad, somewhat triangular, D-shaped, oblong to pyramidal, rather plump, with one to three fairly prominent ridges on the inner face, or the oblong ones smooth, with two shallow grooves extending from the hilum to nearly the centre of the seed, minutely pitted rugose all over. Hilum terminal, with a thickened nerve-like ring around the orifice; testa firm, brittle.

Sterile seeds glossy, light reddish-brown to dark brown, polymorphic, somewhat similar to the fertile seeds.
Differing from *E. agglomerata* in being smaller and less sharply angled. Opposite Blaxland Railway Station (W. F. Blakely and Dr. E. C. Chisholm, October, 1922).

*E. eugenioides* var.

Fertile seeds glossy, dark brown, 1–1 ½ mm. long, about 1 mm. broad, polymorphic, the majority somewhat triangular or obliquely oblong, a few pyramidal, with usually one to three very faint ridges, and minutely but distinctly pitted rugose all over. Hilum terminal, very small, sometimes with a nerve-like ring around the orifice, but not so distinct as in *E. eugenioides*, usually paler than the firm, brittle testa.

Sterile seeds glossy, dark reddish-brown to dark brown, polymorphic, the majority smaller than the fertile seeds.

Differing from *E. eugenioides* in being much thinner and more prominently pitted rugose. In the latter character it resembles *E. agglomerata*. Glen Innes (J. L. Boorman, 1918).

*E. ligustrina*.

Fertile seeds glossy, dark brown, 1 ½–2 mm. long, 1 mm. broad, polymorphic, the majority somewhat oblong, with one to three scarcely prominent ridges, a few somewhat triangular to obliquely pyramidal, minutely pitted rugose all over, or the back sometimes faintly striate. Hilum terminal, small, very small in the majority of cases; testa thin, brittle.

Sterile seeds glossy, light yellowish-brown to dark brown, more or less triangular to D-shaped, smaller than the fertile seeds.


*E. Penrithensis*.

Fertile seeds glossy, pale to dark brown, 1½–2 mm. long, 1 mm. broad, very irregular in outline, the majority narrow, curved and angular on the face, the back smooth, convex, somewhat triangular, and more or less compressed, with one to three faint ridges, minutely pitted rugose, sometimes very acute. Hilum terminal, very small; testa thin.

Sterile seeds glossy, dark reddish-brown to brown, the majority compressed, D-shaped to triangular, about the same size as the fertile seeds.

Seems to be nearer *E. fastigata* than to *E. eugenioides*. Toongabbie (Dr. C. Hall).
(h) Somewhat elongated to obliquely pyramidal.

Fertile seeds light to dark brown, 1 1/2-3 mm. long, obliquely pyramidal to somewhat oblong-cylindrical, or more or less elongated, the majority with a long, smooth back, and with one to four often irregular ridges on the ventral. Hilum terminal.

Sterile seeds obliquely pyramidal to D-shaped.

Differing from the preceding in the more elongated fertile seeds.

- **E. fastigata.**
- **E. regnans.**
- **E. Lasseroni.**
- **E. Andreusi.**
- **E. stellulata.**
- **E. Moorei.**
- **E. Mitchelliana.**
- **E. Simmondsii.**

**E. fastigata.**

Fertile seeds glossy, light brown, 1 1/2-3 mm. long, the majority narrow, boat-shaped to somewhat pyramidal in appearance, when face upwards, obliquely ovate to obliquely oblong when back upwards, minutely pitted rugose all over. Hilum terminal, very small, paler than the firm, brittle testa.

Sterile seeds glossy, light brown, scarcely differing in colour and shape from the fertile seeds, and almost the same size, the majority, however, are smaller.

Differing from **E. piperita**, to which it is closely allied, mainly in the pale brown seeds. Marulan (J. L. Boorman, 1916).

**E. regnans.**

Fertile seeds glossy, dark brown, 1 1/2-2 mm. long, the majority oblong to somewhat navicular, and often with a long, smooth, cylindrical base free from radiating ridges, a few acute at both ends, while others are obliquely pyramidal, with three or more radiating ridges, all more or less minutely pitted rugose. Only a few D-shaped. Hilum terminal, small, the pale ridges somewhat thickened around the orifice; testa thin.

Sterile seeds glossy, light to dark-brown, the majority similar but smaller than the fertile seeds, only a small percentage D-shaped.

Seem to differ from **E. fastigata** in being slightly smaller. Powelltown, Victoria (per Forestry Commission, December, 1922).

**E. Lasseroni** (not figured).

Fertile seeds glossy, light-brown, 1 1/2-2 mm. long, 1 mm. broad, oblong, boat-shaped to obliquely pyramidal, a few D-shaped, with one to three fairly prominent ridges, minutely pitted rugose all over. Hilum terminal, very small; testa thin.
Sterile seeds glossy, dark reddish-brown, smaller than the fertile seeds and more compressed.

Seems to be allied to *E. fastigata*. Guyra (W. Dunn).

*E. Andreusi.*

Fertile seeds glossy, dark brown, 1½–2 mm. long, about 1 mm. broad, somewhat oblong-pyramidal, with two to four radiating ridges to obliquely triangular, a few D-shaped, all minutely pitted rugose on both surfaces, the back usually broad and smooth. Hilum terminal, small; testa firm.

Sterile seeds glossy, light to dark reddish-brown, the majority somewhat D-shaped to triangular, slightly smaller than the fertile seeds, a few of the narrow ones more cylindrical and about 2 mm. long.

Near *E. regnans* and *E. fastigata*. Parish Robertson, county Gough, Glen Innes Forest District (*per* Forestry Commission, November, 1918).

*E. stellulata.*

“Seeds without any appendage, the sterile seeds usually not narrow.” (*Eucalyptographia,* figs. 9 and 10.)

“Seed small, from ¾–1 mm. long, variously angled and shaped, exalbuminous; testa brownish, smooth; hilum inconspicuous.” (*On Seedlings,* Sir John Lubbock, vol. i, 532.)

Fertile seeds shiny, light brown, 1½–2 mm. long, about 1 mm. broad, obliquely pyramidal, oblong to navicular (boat-shaped), with two to four rather faint ridges and with a long, smooth, pitted back. Hilum terminal, small, paler than the thin testa.

Sterile seeds glossy, light to dark brown, polymorphic, or somewhat similar to the fertile seeds.

Near *E. fastigata*. Wingello (J. L. Boorman, 1917).

*E. Moorei.*

Nearly all narrow linear seeds.

Fertile seeds glossy, light brown, 2 mm. long, 1 mm. broad, somewhat obliquely pyramidal, navicular, oblong to triangular, usually with one to four scarcely prominent radiating ridges; a few more or less cylindrical, with an oblique scar near the hilum, the back convexed, glossy, minutely pitted rugose. Hilum terminal, rather small; testa thin.

Sterile seeds glossy, light brown, cubiform to D-shaped, smaller than the fertile seeds.

Seems to be closely allied to *E. regnans*. Blackheath (J.H.M.).
E. Mitchelliana.

Fertile seeds glossy, dark brown, $1\frac{1}{2}-2\frac{1}{2}$ mm. long, the majority about 1 mm. broad, a few slightly broader, obliquely pyramidal to somewhat cylindrical-oblong, straight or curved, the basal portion either blunt or acute, usually truncate at the hilum, the face with two to four ridges, sometimes extending the full length of the seed, minutely pitted rugose all over; testa firm. Hilum terminal, small.

Sterile seeds glossy, somewhat similar to the fertile seeds, but usually smaller and narrower, the narrowest often curved, about 2 mm. long.

Near E. Andreasi, and differing from it in the somewhat more cylindrical fertile seeds. Buffalo Mountain, Victoria (P. R. H. St. John, February, 1919).

E. Simmondsii.

Fertile seeds glossy, dark brown, $1\frac{1}{2}-2\frac{1}{2}$ mm. long, about 1 mm. broad, obliquely pyramidal, oblong to D-shaped, with two to four scarcely prominent radiating ridges, minutely pitted rugose all over. Hilum terminal, small, paler than the thin, brittle testa.

Sterile seeds glossy, pale to dark brown, polymorphic, more compressed and angular, also smaller than the fertile seeds.

EXPLANATION OF PLATES (260-263).

PLATE 260.

Series Striolatae. Continued from Part LXIII, p. 132.)

   1a. Enlarged, showing the ventral surface and the small hilum.
   1b. Somewhat similar to 1e, but the seed is more pointed and slightly thicker.
   1c. Enlarged, showing the smooth, striated dorsal surface. (Mataranka Station, Roper River, Northern Territory, C. E. F. Allen, No. 683).

2. *E. pruinoso Schauer, natural size.
   2a. Enlarged, showing the smooth, ventral surface and the position of the small hilum.
   2b. Enlarged, showing a thicker and more quadrangular seed.
   2c. Enlarged, showing the ventral surface of a small ovate seed with a larger and more depressed hilum than 2a.
   2d. Enlarged, showing the raised ventral surface and three faint ridges, also a very small hilum.
   2e. Enlarged, showing the dorsal surface, which is finely striate.
   2f. Enlarged, showing the dorsal surface of a more oblong seed. (Armstrong River, Northern Territory, R. J. Winters.)

   3a. Enlarged, showing the flat, smooth, ventral surface, and the distinct hilum.
   3b. Enlarged, showing the ventral surface of a more elongated seed, with a faint, sharp ridge on the upper end.
   3c. Enlarged, showing the dorsal surface and the somewhat transverse striae. (Stannary Hills, North Queensland, Dr. T. L. Bancroft, September, 1900.)

   4a. Enlarged, showing the ventral surface, which is faintly striate, and the small, rather deeply depressed hilum.
   4b. Enlarged, showing the ventral surface of a thicker and shorter seed than 4a.
   4c. Enlarged, showing the ventral surface and the relative thickness of the seed.
   4d. Enlarged, showing the ventral surface of a more oblong seed.
   4e. Enlarged, showing the ventral surface of a thinner seed than 4a.
   4f. Enlarged, showing the striae on the dorsal surface. (Liverpool, New South Wales, J. L. Boorman, 1918.)

   5a. Enlarged, showing the ventral surface and the small depressed hilum.
   5b. Enlarged, showing the ventral surface and the truncate side.
   5c. Enlarged, showing the ventral surface on an oblong seed, with a large depression surrounding the small hilum.
   5d. Enlarged, showing the ventral surface of a somewhat triangular seed, with faint radiating striae.
   5e. Enlarged, showing a somewhat similar but smaller seed than 5d.
   5f. Enlarged, showing the dorsal surface marked with longitudinal striae. (Broken Hill, New South Wales, E. C. Andrews, 1919.)
6a. Enlarged, showing the ventral surface and the small hilum in the centre.
6b. Enlarged, showing the ventral surface and the elongated hilum.
6c. Enlarged, showing the ventral surface and also thickness of the seed.
6d. Enlarged, showing the ventral surface and the elongated hilum. Note also the difference in the shape of the seeds.
6e. Enlarged, showing the dorsal surface. This seed differs from the rest in being pointed at each end. (Bourke, A. Murphy, 1915).

7. *E. paniculata* Sm., natural size.
7a. Enlarged, showing the dorsal surface.
7b. Enlarged, showing the ventral surface and the small hilum.
7c. Enlarged, showing the dorsal surface, with two faint longitudinal ridges.
7d. Enlarged, showing the ventral surface of a somewhat D-shaped seed.
7e. Enlarged, showing the dorsal surface of a thick seed.
7f. Enlarged, showing the ventral surface of a thin, almost orbicular seed.
7g. Enlarged, showing the dorsal surface, which is microscopically striate. (Dungog, New South Wales, W. F. Blakely).

8a. Enlarged, showing the ventral surface and the obscure hilum.
8b. Enlarged, showing the ventral surface. It is a much thicker seed than 8a, and the hilum is more distinct.
8c. Enlarged, showing the ventral surface of a very thin, slightly incurved seed.
8d. Enlarged, showing the ventral surface of a thin seed, which is also thicker on the upper edge.
8e. Enlarged, showing the dorsal surface of a very small, thick seed.
8f. Enlarged, showing the dorsal surface of a thin, orbicular seed. (Near Myponga, South Australia, W. Gill, April, 1918.)

9a. Enlarged, showing the ventral surface, which has four faint ridges, and the hilum close to one end of the seed.
9b. Enlarged, showing the ventral surface without ridges, and the almost central hilum.
9c. Enlarged, showing the ventral surface of a slightly triangular seed.
9d. Enlarged, showing the ventral surface of a slightly conical seed.
9e. Enlarged, showing the dorsal surface and the longitudinal strie. (7 miles from Ashford, New South Wales, per the Secretary, Forestry Commission).

10a. Enlarged, showing the ventral surface of an oblong seed.
10b. Enlarged, showing the ventral surface of an orbicular seed, and the large hilum.
10c. Enlarged, showing the ventral surface of an almost quadrangular seed.
10d. Enlarged, showing the ventral surface of a somewhat D-shaped seed.
10e. Enlarged, showing the dorsal surface.
10f. Enlarged, showing the very fine strie on the dorsal surface. (Dubbo, New South Wales, J. L. Boorman, 1916).

11a. Enlarged, showing the ventral surface and the depressed hilum.
11b. Enlarged, showing the ventral surface of an oblong seed.
11c. Enlarged, showing the ventral surface of a nearly orbicular seed.
11d. Enlarged, showing the ventral surface of a large oblong seed.
11c. Enlarged, showing the ventral surface of a D-shaped seed.
11f. Enlarged, showing the dorsal surface of a rather thick seed.
11g. Enlarged, showing the dorsal surface of a thin, oblong seed. (Parramatta River, near Parramatta, W. F. Blakely and D. W. C. Shiress, June, 1919.)

12a. Enlarged, showing the ventral surface of a thick seed and the almost obscure hilum.
12b. Enlarged, showing the ventral surface of a very acute seed and the large, elongated hilum.
12c. Enlarged, showing the ventral surface of an auriform seed.
12d. Enlarged, showing the ventral surface of a thin, orbicular seed, with a large depressed hilum.
12e. Enlarged, showing the dorsal surface, which is minutely striate longitudinally. (Merindee, New South Wales, A. Murphy, 1918.)

13a. Enlarged, showing the ventral surface.
13b. Enlarged, showing the ventral surface with the hilum scarcely in the centre of the seed.
13c. Enlarged, showing the ventral surface of an ovate seed, and the hilum closer to the lower end.
13d. Enlarged, showing the ventral surface with the hilum in the centre of a large, elongated depression.
13e. Enlarged, showing the dorsal surface with two faint longitudinal ridges. (Coolabah, New South Wales, J. L. Boorman, 1915.)

14a. Enlarged, showing the ventral surface and the small hilum in the centre of the seed.
14b. Enlarged, showing the ventral surface.
14c. Enlarged, showing the ventral surface of a large, elliptical seed.
14d. Enlarged, showing the ventral surface of a large, orbicular seed.
14e. Enlarged, showing the very fine striae on the dorsal surface of an oblong seed. (Bunaberry, New South Wales, J. L. Boorman, 1916.)

15a. Enlarged, showing the smooth ventral surface and the large hilum.
15b. Enlarged, showing the ventral surface of a more acute seed than 15a.
15c. Enlarged, showing the ventral surface of a larger seed than 15a, 15b. The hilum is also more elongated.
15d. Enlarged, showing the ventral surface of a somewhat D-shaped seed.
15e. Enlarged, showing the dorsal surface.
15f. Enlarged, showing the very fine striae on the dorsal surface.
15g. Enlarged, showing the dorsal surface. (State Forest No. 199, Co. Forbes, New South Wales, per Secretary, Forestry Commission, May, 1919.)

16a. Enlarged, showing the smooth ventral surface and the small hilum.
16b. Enlarged, showing the ventral surface of an elongated seed.
16c. Enlarged, showing the ventral surface of a thick seed with a large, depressed hilum on one end, and a large depression on the other.
16d. Enlarged, showing the ventral surface of an acutely ovate seed.
16e. Enlarged, showing the dorsal surface of an acute seed.
16f. Enlarged, showing the dorsal surface and the fine striae. (Dubbo, New South Wales, A. Murphy.)

17. *E. odorata* Behr. and Schlecht., natural size.
17a. Enlarged, showing the ventral surface, with the hilum close to the upper edge.
17b. Enlarged, showing the ventral surface of a somewhat oblong seed.
17c. Enlarged, showing the ventral surface of an orbicular seed.
17d. Enlarged, showing the ventral surface.
17e. Enlarged, showing the ventral surface of a thin orbicular seed.
17f. Enlarged, showing the dorsal surface of a thick seed.
17g. Enlarged, showing the dorsal surface of a somewhat triangular seed.
17h. Enlarged, showing the dorsal surface and the very fine striae. (Bilair, Mount Lofty Ranges, South Australia, W. Gill.)

18a. Enlarged, showing the ventral surface and the small hilum.
18b. Enlarged, showing the ventral surface of a small, nearly orbicular seed.
18c. Enlarged, showing the ventral surface.
18d. Enlarged, showing the ventral surface of a rather thick seed.
18e. Enlarged, showing the ventral surface of a D-shaped seed.
18f. Enlarged, showing the dorsal surface, with a slight ridge down the centre. (Koonndrook State Forest, New South Wales, No. 625, Forest Guard McCormick.)

19a. Enlarged, showing the ventral surface and the small hilum.
19b. Enlarged, showing the ventral surface and the large depressed hilum.
19c. Enlarged, showing the ventral surface and the position of the small hilum.
19d. Enlarged, showing the ventral surface of an elliptical seed.
19e. Enlarged, showing the dorsal surface of a somewhat triangular seed.
19f. Enlarged, showing the dorsal surface and the fine striae. (Grattai, near Mudgee, New South Wales, J. L. Boorman, 1917.)

20a. Enlarged, showing the ventral surface and the small, depressed hilum.
20b. Enlarged, showing the ventral surface and the position of the hilum.
20c. Enlarged, showing the ventral surface of a different shaped seed to 20a and 20b.
20d. Enlarged, showing the ventral surface and the sharp point on the end of the seed.
20e. Enlarged, showing the ventral surface and the abrupt point on each end of the seed.
20f. Enlarged, showing the dorsal surface of an elongated seed.
20g. Enlarged, showing the dorsal surface and the longitudinal striae.
20h. Enlarged, showing the striae on the dorsal surface. (Rockhampton, Queensland, J.H.M., March, 1909.)

21a. Enlarged, showing the ventral surface and the small hilum.
21b. Enlarged, showing the ventral surface and the hilum close to the upper end of the seed.
21c. Enlarged, showing the ventral surface of a small, orbicular seed, and the position of the hilum.
21d. Enlarged, showing the ventral surface and the position of the hilum.
21e. Enlarged, showing the ventral surface.
21f. Enlarged, showing the ventral surface and the elongated depression surrounding the hilum.
21g. Enlarged, showing the dorsal surface of 21f. (Western Australia, C. A. Gardner.)

22a. Enlarged, showing the ventral surface and the small hilum.
22b. Enlarged, showing the ventral surface.
22c. Enlarged, showing the ventral surface of a more ovate seed than 22a.
22d. Enlarged, showing ventral surface and the position of the hilum.
22e. Enlarged, showing the ventral surface of an orbicular seed.
22f. Enlarged, showing the dorsal surface and the longitudinal striae. (Wyalong, New South Wales, J. F. Boorman, 1918.)
Series Levispermae.

23. E. redunca Schrader, natural size.
23a. Enlarged, showing the ventral surface and the rather large hilum.
23b. Enlarged, showing the ventral surface.
23c. Enlarged, showing the ventral surface and the depressed hilum.
23d. Enlarged, showing the ventral surface.
23e. Enlarged, showing the ventral surface and the hilum close to the lower edge of the seed.
23f. Enlarged, showing the ventral surface and the position of the hilum.
23g. Enlarged, showing the smooth dorsal surface. (Western Australia, C. A. Gardner).

PLATE 261.

Series Foveolatae.

1a. Enlarged, showing the ventral surface and the hilum in a shallow depression.
1b. Enlarged, showing the ventral surface of a slightly concave seed.
1c. Enlarged, showing the ventral surface and the position of the hilum.
1d. Enlarged, showing the somewhat keeled dorsal surface.
1e. Enlarged, showing the almost flat dorsal surface. (The Dee, Tasmania, J.H.M., August, 1918.)

2. E. rubida Deane and Maiden, natural size.
2a. Enlarged, showing the ventral surface and the large oblong hilum.
2b. Enlarged, showing the ventral surface of a very acute seed.
2c. Enlarged, showing the ventral surface and the small hilum.
2d. Enlarged, showing the dorsal surface with two faint longitudinal ridges.
2e. Enlarged, showing the dorsal surface of a very acute seed. (Wingello, New South Wales, J. L. Boorman, 1918.)

3. E. aggregate Deane and Maiden, natural size.
3a. Enlarged, showing the ventral surface.
3b. Enlarged, showing the ventral surface and the large elongated hilum.
3c. Enlarged, showing the ventral surface and the small hilum.
3d. Enlarged, showing the ventral surface of an elliptical seed.
3e. Enlarged, showing the ventral surface of a rather thick, ovate seed.
3f. Enlarged, showing the dorsal surface of a thick, somewhat triangular seed.
3g. Enlarged, showing the dorsal surface of an ovate seed. (Wallerawang, New South Wales, J. L. Boorman, 1917.)

4. E. parvisfolia Cambage, natural size.
4a. Enlarged, showing the ventral surface of a somewhat quadrangular seed, and the small hilum.
4b. Enlarged, showing the ventral surface and a smaller hilum than 4a.
4c. Enlarged, showing the ventral surface of a different shaped seed to 4a and 4b.
4d. Enlarged, showing the ventral surface and the broad depression around the hilum.
4e. Enlarged, showing the ventral surface and the small hilum without any depression surrounding it.
4f. Enlarged, showing the minutely pitted dorsal surface. (Nimmitabel, New South Wales, J. L. Boorman, 1918.)

5a. Enlarged, showing the smooth ventral surface and the large hilum.
5b. Enlarged, showing the slightly ridged ventral surface and the small hilum.
5c. Enlarged, showing the slightly ridged ventral surface.
5d. Enlarged, showing the dorsal surface marked with two longitudinal depressions.
5e. Enlarged, showing the dorsal surface, and one faint line or ridge.
5f. Enlarged, showing the smooth, minutely pitted dorsal surface. (Transcontinental Railway Survey, South Australia, H. Deane, May, 1908.)

6a. Enlarged, showing the pitted ventral surface and the very small hilum.
6b. Enlarged, showing the ventral surface of an elongated seed and the hilum close to the lower end.
6c. Enlarged, showing the ventral surface.
6d. Enlarged, showing the ventral surface with the hilum in the centre.
6e. Enlarged, showing the minutely pitted dorsal surface; with a ridge down the centre. (Wyndham, New South Wales, J. L. Boorman, August, 1915.)

7a. Enlarged, showing the slightly ridged ventral surface and the small hilum.
7b. Enlarged, showing the dorsal surface of a D-shaped seed.
7c. Enlarged, showing the ventral surface with a sharp ridge down the centre and the small hilum near the lower end.
7d. Enlarged, showing the somewhat keeled dorsal surface. (Great Western Mountain, Tasmania, L. Rodway.)

8. *E. Lane-Poolei* Maiden, natural size.
8a. Enlarged, showing the ventral surface and the hilum.
8b. Enlarged, showing the ventral surface of a more uniform seed.
8c. Enlarged, showing the ventral surface marked with three faint ridges.
8d. Enlarged, showing the dorsal surface of a more compressed seed. (Near Beenup, Western Australia, C. E. Lane-Poole, July, 1919.)

9a. Enlarged, showing the ventral surface and the hilum.
9b. Enlarged, showing the ventral surface and the small hilum in the centre of a large depression.
9c. Enlarged, showing ventral surface and the very small hilum.
9d. Enlarged, showing the ventral surface of a thick seed.
9e. Enlarged, showing the dorsal surface.
9f. Enlarged, showing the smooth dorsal surface. (Yorkrakine Rocks, Westonia, Western Australia, C. A. Gardner.)

10a. Enlarged, showing the ventral surface and the large depression surrounding the hilum.
10b. Enlarged, showing the ventral surface of a triangular seed.
10c. Enlarged, showing the very large, shallow depression around the hilum.
10d. Enlarged, showing the dorsal surface, and a ridge down the centre. (Broken Hill, New South Wales, E. C. Andrews, January, 1919.)

11a. Enlarged, showing the ventral surface and the depression around the hilum.
11b. Enlarged, showing the ventral surface and the small hilum in the centre.
11c. Enlarged, showing the ventral surface and the position of the hilum.
11d. Enlarged, showing the ventral surface and the thickness of the seed.
11e. Enlarged, showing the dorsal surface and two faint longitudinal ridges. (Cobyr, New South Wales, J. L. Boorman, May, 1918.)
12a. Enlarged, showing the ventral surface and the small hilum.
12b. Enlarged, showing the ventral surface of an elongated seed.
12c. Enlarged, showing the ventral surface and the small depression around the hilum.
12d. Enlarged, showing the dorsal surface and the longitudinal ridge down the centre of the seed.
12e. Enlarged, showing the dorsal surface of a somewhat triangular seed. (Bremner Bay, Western Australia, J. Wellstead, December, 1919.)

13a. Enlarged, showing the ventral surface and the hilum.
13b. Enlarged, showing the ventral surface and the hilum on the narrow end of the seed.
13c. Enlarged, showing the ventral surface and the hilum almost in the centre of a different shaped seed to 13a and 13b.
13d. Enlarged, showing the surface and the large hilum.
13e. Enlarged, showing the ventral surface of a very flat seed.
13f. Enlarged, showing the minutely pitted dorsal surface.
13g. Enlarged, showing the dorsal surface. (Spring Creek, Cobangra, Victoria, H. B. Williamson, October, 1922.)

14a. Enlarged, showing the slightly concave ventral surface and the small hilum in the centre.
14b. Enlarged, showing the flat ventral surface and the relative thickness of the seed.
14c. Enlarged, showing the ventral surface and the slight depression around the hilum.
14d. Enlarged, showing the broad concave surface and the small hilum.
14e. Enlarged, showing the minutely pitted dorsal surface. (40 miles north of Rosemell, Western Australia, B. R. Lucas.)

15. *E. quadrangulata* Deane and Maiden, natural size.
15a. Enlarged, showing the slightly convex ventral surface and the small hilum.
15b. Enlarged, showing the flat ventral surface and obscure hilum.
15c. Enlarged, showing the concave, ventral surface.
15d. Enlarged, showing the undulate ventral surface and the position of the hilum.
15e. Enlarged, showing the concave, ventral surface of a very thin seed and the larger hilum.
15f. Enlarged, showing the minutely pitted dorsal surface. (Nundle State Forest, New South Wales, Forest Overseer Mattson, *per* Forestry Commission.)

16a. Enlarged, showing the ventral surface and the small hilum at the end of the depression.
16b, 16c, 16d. Enlarged, showing the ventral surface and the position of the hilum, which is fairly constant in this species. The seeds, too, are also very uniform in shape.
16c. Enlarged, showing the dorsal surface. (Stirling Range, Western Australia, C. A. Gardner.)

17a. Enlarged, showing the ventral surface and the depression surrounding hilum.
17b. Enlarged, showing the ventral surface and the small hilum.
17c. Enlarged, showing the flat ventral surface.
17d. Enlarged, showing the ventral surface and the hilum close to the broad end of the seed.
17e. Enlarged, showing the dorsal surface and two faint lines.
17f. Enlarged, showing the dorsal surface of a more elongated seed. (West Ballandry, near Griffith, New South Wales, W. D. Campbell, July, 1919.)
Series Alveolatae.

18a. Enlarged, showing the ventral surface and the hilum, also the microscopic fringe.
18b. Enlarged, showing the depressed ventral surface.
18c. Enlarged, showing the broad, concave ventral surface and the position of the small hilum.
18d. Enlarged, showing the ventral surface and the depressed hilum.
18e. Enlarged, showing the dorsal surface, which is minutely honeycombed all over.
18f. Enlarged, showing the dorsal surface of a larger seed. (Bucca Creek, Coff's Harbour, New South Wales, J. L. Boorman.)

Series Rufispermae.

19a. Enlarged, showing the ventral surface with the fine radiating stria and the small hilum.
19b. Enlarged, showing the ventral surface of a more irregular shaped seed than 19a.
19c. Enlarged, showing the ventral surface and the broad depression.
19d. Enlarged, showing the ventral surface of a very angular seed.
19e. Enlarged, showing the dorsal surface. (120 miles east of Kalgoorlie, Western Australia, H. Deane. May, 1909.)

Series Lepidotoe-Fimbriatae.

A. — Hilum ventral.

20a. Enlarged, showing the ventral surface and the large hilum.
20b. Enlarged, showing the ventral surface and the large shallow depression surrounding the hilum.
20c. Enlarged, showing the ventral surface and the large depression.
20d. Enlarged, showing the dorsal surface. (The Domain, Hobart, Tasmania, L. Rodway.)

PLATE 262.

Series Lepidotoe-Fimbriatae (continued from Plate 261.)

1a. Enlarged, showing the ventral surface and the large hilum.
1b. Enlarged, showing the ventral surface and the position of the hilum.
1c. Enlarged, showing the ventral surface and the large hilum of a compressed globose seed.
1d. Enlarged, showing the ventral surface and the hilum close to the edge of the seed.
1e. Enlarged, showing the dorsal surface.
1f. Enlarged, showing a linear quadrangular sterile seed.
1g. Enlarged, showing a more compressed linear sterile seed. (Tumbarumba, New South Wales, per Forestry Commission, September, 1918.)

2a. Enlarged, showing the ventral surface and the radiating ridges.
2b. Enlarged, showing the ventral surface and the rather large hilum.
2c. Enlarged, showing the ventral surface and six radiating ridges.
2d. Enlarged, showing the dorsal surface.
2e. Enlarged, showing the convex dorsal surface. (Wingello, New South Wales, A. Murphy, 1916)
   3a. Enlarged, showing the ventral surface and the small hilum.
   3b. Enlarged, showing the ventral surface and the large hilum of a more elongated seed than 3a.
   3c. Enlarged, showing the rather smooth ventral surface.
   3d. Enlarged, showing the ventral surface and the radiating ridges.
   3e. Enlarged, showing the dorsal surface.
   3f. Enlarged, showing the dorsal surface of a somewhat D-shaped seed. (Marulan, New South Wales, A. Murphy, 1916.)

   4a. Enlarged, showing the ventral surface and the radiating ridges, also the large hilum.
   4b. Enlarged, showing the ventral surface of a triangular seed.
   4c. Enlarged, showing the dorsal surface.
   4d. Enlarged, showing the ventral surface with only two ridges.
   4e. Enlarged, showing the ventral surface with four radiating ridges. (Marulan, A. Murphy, 1916.)

   5a. Enlarged, showing the ventral surface and the large depression surrounding the small hilum.
   5b. Enlarged, showing the ventral surface and the small hilum.
   5c. Enlarged, showing the dorsal surface.
   5d. Enlarged, showing the dorsal surface of a small truncate seed.
   5e. Enlarged, showing the ventral surface. (Wingello, A. Murphy, 1916.)

   6a. Enlarged, showing the ventral surface of a thin seed.
   6b. Enlarged, showing the ventral surface and the faint ridges.
   6c. Enlarged, showing the ruged ventral surface.
   6d. Enlarged, showing the broad dorsal surface, which is covered with a microscopic scurfy substance. (Berrima, New South Wales, J. L. Boorman, 1918.)

   7a. Enlarged, showing the fairly smooth ventral surface.
   7b. Enlarged, showing the ventral surface and the shallow depression surrounding the hilum.
   7c. Enlarged, showing the ventral surface and the elongated depression surrounding the hilum.
   7d. Enlarged, showing the ventral surface and three rather prominent ridges.
   7e. Enlarged, showing the dorsal surface and the prominent keel. (Marulan, J. L. Boorman, 1917.)

   8a. Enlarged, showing the concave ventral surface and the small hilum.
   8b. Enlarged, showing the flat ventral surface and the ovate depression.
   8c. Enlarged, showing the dorsal surface of a D-shaped seed.
   8d. Enlarged, showing the ventral surface.
   8e. Enlarged, showing the ventral surface and the small hilum.
   8f. Enlarged, showing the dorsal surface. (Parish Nundialla, county Camden, New South Wales, per Forestry Commission, 1919.)

   9a. Enlarged, showing the broad ventral surface.
   9b. Enlarged, showing the ventral surface and the broad depression.
   9c. Enlarged, showing the ventral surface and the hilum in the centre of the depression.
   9d. Enlarged, showing the ventral surface and the elongated depression.
   9e. Enlarged, showing the dorsal surface (Parish Oromear, county Murray, New South Wales, Forest Guard Blacket, per W. A. W. de Bouzville, March, 1921.)
10a. Enlarged, showing the radiating ventral surface and the fringed margin.
10b. Enlarged, showing the ventral surface and two prominent ridges.
10c. Enlarged, showing the radiating ventral surface and the position of the hilum.
10d. Enlarged, showing the dorsal surface and the fringed margin. (7 miles from Dungog on the Booral road, J. L. Boorman, September, 1920.)

11a. Enlarged, showing the seurfy ventral surface and the depression surrounding the hilum.
11b. Enlarged, showing the oblique ventral surface and the hilum.
11c. Enlarged, showing the ventral surface.
11d. Enlarged, showing the densely seurfy surface and the very small hilum.
11e. Enlarged, showing the seurfy dorsal surface. (South Australia, per W. Gill.)

12a. Enlarged, showing the seurfy ventral surface and three faint ridges.
12b. Enlarged, showing the ventral surface of a smaller seed, with a relatively small hilum.
12c. Enlarged, showing the ventral surface with four faint ridges.
12d. Enlarged, showing the ventral surface and the obscure hilum.
12e. Enlarged, showing the ventral surface and the large hilum.
12f. Enlarged, showing the seurfy dorsal surface and the marginal fringe. (State Forest No. 423, Nowra District, New South Wales, Forest Guard Gallagher, March, 1919)

13a. Enlarged, showing the ventral surface and the small hilum.
13b. Enlarged, showing the depressed conical surface and three faint ridges.
13c. Enlarged, showing the ventral surface and the depressed hilum.
13d. Enlarged, showing the ventral surface and the large hilum.
13e. Enlarged, showing the domed ventral surface and the minute hilum.
13f. Enlarged, showing the dorsal surface.
13g. Enlarged, showing the dorsal surface with a slight depression in the centre. (Pokolbin, New South Wales, R. H. Cambage, No. 1506.)

14a. Enlarged, showing the somewhat pyramidal surface and the small hilum.
14b. Enlarged, showing the irregular dorsal surface.
14c. Enlarged, showing the lateral surface and concave depression of a totally different shaped seed to the preceding.
14d. Enlarged, showing the ventral surface and the broad hilum.
14e. Enlarged, showing the dorsal surface and the fringed margin.
14f. Enlarged, showing the dorsal surface of an ovate seed. (Wyong, New South Wales, J. L. Boorman, 1917.)

15. *E. betugoides* Sm., natural size.
15a. Enlarged, showing the raised ventral surface and the radiating ridges.
15b. Enlarged, showing the ventral surface and the radiating ridges, and the small hilum at the top.
15c. Enlarged, showing the ventral surface and the faint ridges.
15d. Enlarged, showing the dorsal surface and the marginal fringe. (Manly, near Sydney, J. L. Boorman 1917.)

16. *E. resinifera* Sm., natural size.
16a. Enlarged, showing the ventral surface and the small hilum.
16b. Enlarged, showing the ventral surface.
16c. Enlarged, showing the ventral surface and a more distinct hilum than 16a.
16d. Enlarged, showing the ventral surface of a somewhat quadrangular seed.
16e. Enlarged, showing the ventral surface and the faint ridges.
16f. Enlarged, showing the ventral surface and the slightly depressed hilum.
16g. Enlarged, showing the dorsal surface. (Woy Woy, New South Wales, J. L. Boorman.)

17a. Enlarged, showing the ventral surface and the ridge down the centre of the seed.
17b. Enlarged, showing the ventral surface of a cubiform seed.
17c. Enlarged, showing the ventral surface and the raised ridges.
17d. Enlarged, showing the ventral surface of an elongated triangular seed.
17e. Enlarged, showing the ventral surface of a very acute seed, with a prominent ridge down the centre.
17f. Enlarged, showing the dorsal surface.
17g. Enlarged, showing the dorsal surface and the small fringe. (Parish Robertson, Glen Innes, New South Wales, J. L. Boorman.)

18a. Enlarged, showing the dorsal surface and the microscopic fringe.
18b. Enlarged, showing the ventral surface and the small hilum.
18c. Enlarged, showing the ventral surface and two faint lines.
18d. Enlarged, showing the ventral surface of a more compressed seed than 18c.
18e. Enlarged, showing the ventral surface of a quadrangular seed.
18f. Enlarged, showing the dorsal surface. (Kellerberrin, Western Australia, F. H. Vachell, December, 1903.)

19a. Enlarged, showing the ventral surface.
19b, 19c, 19d, 19e, 19f. Enlarged, showing the ventral surface and the position of the hilum.
19g. Enlarged showing the dorsal surface and the minute fringe. (Woy Woy, New South Wales, A. Murphy, 1917.)

**PLATE 263.**

**Series Lepidotea-Fimbriate.**

*B.—Hilum terminal.*

1a. Enlarged, showing the sealy ventral surface and the somewhat oblique hilum.
1b. Enlarged, showing the sealy dorsal surface.
1c. Enlarged, showing the ventral surface and the sealy ridges of a somewhat oblong seed, also the small terminal hilum on the upper end.
1d. Enlarged, showing the dorsal surface of a triangular seed.
1e. Enlarged, showing the dorsal surface and the fringed ridge down the centre of the seed. (Wyong, New South Wales, J. L. Boorman, October, 1920.)

2. *E. longifolia* Otto and Link, natural size.
2a. Enlarged, showing the pyramidal ventral surface and the small hilum at the top.
2b. Enlarged, showing the ventral surface and the minutely fringed ridges and margin.
3c. Enlarged, showing the ventral surface of a broadly pyramidal seed.
3d. Enlarged, showing the terminal hilum.
3e. Enlarged, showing the lateral surface and the terminal hilum.
3f. Enlarged, showing the ventral surface and three sharp ridges. (Rookwood, near Sydney, J. L. Boorman, December, 1917.)

3. *E. robusta* Sm., natural size.
3a. Enlarged, showing the ventral surface and the hilum in the centre of the broad depression.
3b. Enlarged, showing the ventral surface of an oblique seed and the small hilum.
3c. Enlarged, showing the ventral surface of a triangular seed.
3d. Enlarged, showing the ventral surface and the terminal hilum.
3e. Enlarged, showing the dorsal surface.
3f. Enlarged, showing the lateral surface of a D-shaped seed. (Nowra, New South Wales, Forest Guard Gallagher, 1919.)

4. *E. tetrocousis* Sm., natural size.
4a. Enlarged, showing the lateral surface and the terminal hilum, also the fringed ridges.
4b. Enlarged, showing the lateral surface and the small hilum.
4c. Enlarged, showing the ventral surface on an elongated seed.
4d. Enlarged, showing the terminal hilum of a triangular seed.
4e. Enlarged, showing the surface of a pyramidal seed.
4f. Enlarged, showing the concave lateral surface and the small hilum on the thin end of the seed.
4g. Enlarged, showing the lateral surface of a triangular seed. (Gosford, New South Wales, A. Murphy, 1917.)

5a. Enlarged, showing the small terminal hilum and the fringed angles or ridges.
5b. Enlarged, showing the ventral surface of a D-shaped seed.
5c. Enlarged, showing the lateral surface of an oblong seed.
5d. Enlarged, showing the concave lateral surface.
5e. Enlarged, showing the concave lateral surface and the terminal hilum.
5f. Enlarged, showing the lateral surface and the small terminal hilum. (Barakulla, west of Chinchilla, Central Queensland, J. G. Young, July, 1919.)

6a. Enlarged, showing the lateral surface and the fringed ridges.
6b. Enlarged, showing the fringed ridges and the small terminal hilum.
6c. Enlarged, showing the terminal hilum.
6d. Enlarged, showing the fringed ridges of a broadly pyramidal seed.
6e. Enlarged, showing the smooth lateral surface and the small hilum on the upper end.
6f. Enlarged, showing the lower end of a broad seed.
6g. Enlarged, showing the concave lateral surface and the fringed ridges. (Coonabarabran, New South Wales, J. L. Boorman, 1916.)

7. *E. rostrata* Schlecht., natural size.
7a. Enlarged, showing the lateral surface of an oblique seed, and the microscopic hilum at the top.
7b. Enlarged, showing the smooth lateral surface and the faint ridge down the centre of the seed
7c. Enlarged, showing the three sharp, minutely fringed ridges and the small hilum at the top.
7d. Enlarged, showing the lateral surfaces of a quadrangular seed.
7e. Enlarged, showing the lateral and dorsal surfaces of a D-shaped seed. (Near Condobolin, New South Wales, R. J. Fawcett, March, 1919.)

8a. Enlarged, showing the undulate ventral surface.

8b. Enlarged, showing the concave lateral surface and the fringed ridges, also the small hilum on the lower end of the seed.

8c. Enlarged, showing the ventral surface of a triangular seed.

8d. Enlarged, showing the ventral surface of a broad seed.

8e. Enlarged, showing the lateral surface of a triangular seed.

8f. Enlarged, showing the dorsal surface and the minutely fringed margin. (Near Pelican Point, Swan-road, Western Australia, C. E. Lane-Poole, October, 1917.)

Series *Pachyspermae*.


9a. Enlarged, showing the ventral surface and the large hilum.

9b. Enlarged, showing the smooth, dorsal surface of 9a.

9c. Enlarged, showing a linear, quadrangular, sterile seed.

9d. Enlarged, showing a linear wedge-shaped sterile seed. (Darwin, Northern Territory, H. Brown, per D. W. C. Shiress, March, 1920.)


10a. Enlarged, showing the ventral surface.

10b. Enlarged, showing the ventral surface and the large circular hilum.

10c. Enlarged, showing dorsal surface. (Darwin, N. Holtze, 1905.)


11a. Enlarged, showing the ventral surface.

11b. Enlarged, showing the ventral and lateral surfaces.

11c. Enlarged, one of the D-shaped sterile seeds.

11d. Enlarged, showing another type of sterile seed.

11e. Enlarged, showing a subulate sterile seed. (Dongarra, Western Australia, E. W. Clarkson, November, 1919.)

Series *Coehleatae*.


12a. Enlarged, showing the ventral surface and the three ridges, also the hilum at the top.

12b. Enlarged, showing the ventral surface with faint ridges and a wing-like expansion at the base, also the position of the hilum.

12c. Enlarged, showing the ventral surface of a sterile seed.

12d. Enlarged, showing the dorsal surface.

12e. Sterile seeds, natural size.

12f. Enlarged, showing the lateral surface of a D-shaped sterile seed. (Kaligan Plains, Western Australia, J.H.M., 1909.)


13a. Enlarged, showing the ventral and lateral surfaces, also the hilum at the top.

13b. Enlarged, showing the hilum, rudimentary ventral wings, and the lateral wings.

13c. Enlarged, showing the dorsal view of 13a.

13d. Sterile seeds, natural size.

13e. Enlarged, showing the ventral view of one of the sterile seeds. (Bremer Bay, Western Australia, J. Wellstead.)
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:—

- *acacioides* A. Cunn. (xlvi).
- *acmenioides* Schauer (xxxii).
- *affinis* Deane and Maiden (lvii).
- *amylodina* Labill. (xvi).
- *Andreesi* Maiden (xxi).
- *Bakeri* Maiden (lxv).
- *Baueriana* Schauer (lvii).
- *Baueriana Schauer var. conica* Maiden (lviii).
- *bicolor* A. Cunn. (lvii).
- *Boormani* Deane and Maiden (xliv).
- *Caleyi* Maiden (lv).
- *capitellata* Sm. (xxvii).
- *conica* Deane and Maiden (lviii).
- *Consideniana* Maiden (xxxvi).
- *coriacea* A. Cunn. (xv).
- *corymbosa* Sm. (xvi).
- *Dalrympleana* Maiden (lxv).
- *diels* Schauer (xix).
- *dunosa* A. Cunn. (lxv).
- *eugeniioides* Sieber (xxix).
- *globulus* Labill. (lxvii).
- *hamastoma* Sm. (xxxxvii).
- *longifolia* Link and Otto (ii).
- *mauculata* Hook. (vii).
- *melliodora* A. Cunn. (ix).
- *Muelleriana* Howitt (xxx).
- *numerosa* Maiden (xvii).
- *odorata* Behr and Schlechtendal (xii).
- *paniculata* Sm. (viii).
- *pilularis* Sm. (xxvi).
- *piperita* Sm. (xxxiii).
- *polyanthemos* Schauer (lix).
- *populifolia* Hook. (xxxvii).
- *propinqua* Deane and Maiden (lxvii).
- *punctata* DC. (x).
- *radiata* Sieb. as *amylodina* (xvi).
- *resinifera* Sm. (iii).
- *robusta* Sm. (lxviii).
- *rostrata* Schlecht. (lxii).
- *rubida* Deane and Maiden (lxiii).
- *saligna* Sm. (iv).
- *siderophloia* Bentham. (xxxix).
- *sideroxylon* A. Cunn. (xxvii).
- *Smithii* R. T. Baker (lxx).
- *stellulata* Sieb. (xiv).
- *tereticornis* Sm. (xi).
- *viminalis* Labill. (lxiv).
- *virgata* Sieb. (xxv).

*Government Printer, Sydney. 4to. Each part contains 4 plates and other Illustrations.*

**Note by Government Printer.**

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1925.

Sydney: Alfred James Kent, Government Printer—1922.
EUCALYPTUS PATELLARIS F. v. M. (1).
E. PANICULATA Sm. (7).
E. SIDEROXYLON A. Cunn. (19).
E. POPULIFOLIA Hook. (12).
E. MELLIODORA A. Cunn. (19).
E. PRINOSA Schauer. (12).
E. LEPTOXYLON F. v. M. (8).
E. SIDEROPHLOIA Bentham. (17).
E. POLYANTHEMS Schauer. (14).
E. ODORATA Behr. und Schlecht. (17).
E. REDINCA Schauer. (23).
E. LEPTOPHILA F. v. M. (3).
E. MICROCARPA Maiden. (11).
E. CALEYI Maiden (9).
E. MICROCARPA Maiden. (11).
E. Bicolor A. Cunn. (18).
EUCALYPTUS PERRINIANA F.v.M. (1).
E. PARVIFOLIA Cabatez. (6).
E. GUNNII Hook. f. (7).
E. GILLII Maiden. (10).
E. NEGLECTA Maiden. (12).
E. W. EDWARDI Maiden. (19).
E. RUBIDA Deane and Maiden. (21).
E. KRUSEANA F.v.M. (8).
E. LANE-POOLI Maiden. (8).
E. DECIPiens Engl. (14).
E. AGGREGATA Deane and Maiden. (7).
E. OVATA Labill. (6).
E. CRUCIS Maiden. (9).
E. UNICINATA Turcz. (12).
E. QUADRANGULATA Deane and Maiden. (15).
CRIT. REV EUCALYPS

PL. 262

EUCALYPTUS GLOBULUS Labill. (1).
E. VIMINALIS Labill. (7).
E. CANALICULATA Maiden. (10).
E. PEMILA Camesc. (12).
E. RESINIFERA Sm. (16).

E. SMITHI R. T. Baker. (5).
E. SALIGNA Smith. (14).
E. DENTATA Maiden. (17).
E. PROPINQUA Deane and Maiden. (19).

E. GONIOCALYX F.v.M. (3).
E. MACARTHURI Deane and Maiden. (6).
E. NITENS Maiden. (9).
E. PUNCTATA DC. (12).
E. ROTRYODES Smith. (15).
E. SALTUS Sm. (18).
CRIT. REV. EUCALYPTUS.

PL. 263.

SEEDS.

EUCALYPTUS PELLIITA F.v.M. (1).
E. TEKETICORNIS SM. (2).
E. ROSTRATA Schlecht. (3).
E. LONGIFOLIA Link and Otto. (5).
E. EXSERTA F.v.M. (6).
E. RUDIS Engl. (7).
E. ERYTHROCYLYS F.v.M. (8).
E. BUPRESTIUM F.v.M. (9).
E. ROBUSTA Smith. (10).
E. DEAILBATA A. Cunn. (11).
E. MINIATA A. Cunn. (12).
E. PACHYLOMA Benth. (13).
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 5.

Part LXV of the Complete Work.

(WITH FOUR PLATES.)

Price Three Shillings and Sixpence.

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

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER.

1925.
A Critical Revision of the genus Eucalyptus

By

J. H. Maiden, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 5.
Part LXV of the Complete Work.

(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

PRICE THREE SHILLINGS AND SIXPENCE.

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

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1925.
VI. The Leaf.
(With special reference to evolution.)

(Continued from Parts LVI and LVII, and the Plates of Part LX).

1. Introduction . . . . . . . . . . . . . 203
2. Hand-crushing of leaves for determination of species 204
3. Angles of secondary veins with midrib . . . . 204
4. Juvenile leaves (note only) . . . . . . . 205
5. Mature leaves (note only) . . . . . . . 205
6. Correlation of Seedlings and Juvenile Leaves (ad-
   ventitious shoots) . . . . . . . . . . . 206
   a. Terminology of Juvenile Leaves . . . 208
   b. Coloured Plates . . . . . . . . . 208

Juvenile Leaves.

7. Additional descriptions . . . . . . . . . . 209

Explanation of Plates (264-267) . . . . . . . 231
VI. THE LEAF.

(With special reference to evolution.)

1. Introduction.

The leaf has been dealt with in some detail under the headings of "Juvenile Leaf," at Part LVI, and "Mature Leaf," at Part LVII. Although it is convenient to thus differentiate between extreme forms of the leaf (and, indeed, of any organ), we must remember that there are no hard-and-fast lines between the extreme physical (and, indeed, chemical) characters of the leaves of any tree, much less of any species, but insensible gradations. It would, indeed, require a cinematograph to show the complete series morphologically.

These intermediate forms have been recorded in this work, chiefly under Descriptions of Species and Explanations of Plates, as the "Intermediate Leaf." So far as I can recollect, I introduced the term, but I am afraid that it has been used more or less loosely to indicate "A member of the series of Intermediate leaves."

To some extent, though with less appropriateness, it would be proper to criticise the term Juvenile Leaf and Mature Leaf in all cases in which it can be proved that the ultimate Juvenile Leaf and the ultimate Mature Leaf respectively have not been referred to. In other words, under the circumstances under which we obtain herbarium specimens from the bush, leaves that we term Juvenile or Mature are such to the best of our knowledge and belief at the time, and they may be deposed from their positions with advancing knowledge. I have dwelt on the point elsewhere, and the matter is but another illustration of the fact that morphological forms or characters are not absolute, but are the concrete representation of the physiological combination of circumstances that bring them about. In other words, they are an expression of the resultant of the botanical forces concerned.

This may be a convenient place to give a few hitherto unrecorded notes concerning leaves.

In describing E. Gunnii, Hook. f., says: "As is the case with other species of this most difficult genus, no dependence can be placed on the size of any of the parts or on the form of the leaves." (Lond. Journ. Bot., III, 499, 1844.)

Considering a single character, we have an example of variation in the quality (texture, colour, etc.) of the timber of an individual tree. Or, taking an instance from the animal kingdom, wool of different qualities may be obtained according to its position on the fleeces.

As long as I can remember anything in Eucalyptus study, both in the bush and in the herbarium, I have been in the habit of crushing leaves and endeavouring to recognise them by odours. A few notes of the kind will be found scattered throughout this work. What diagnostic value will ultimately be found in these observations I do not know, but they are quite worthy of being followed up, primarily in the interests of field botanists.

For example, there is an indefinable, soft, pleasant, fragrance (does it remind one of apples?) in E. coriacea, E. de Beuzevillei, E. roccifera, E. allior, E. gigantea, E. Risdoni var. elata, E. viminalis, perhaps augmented by an attenuated atmosphere, just as E. radiata and E. dives, for example, fill the countryside with a peppermint odour on a misty day. In 1902 I recorded that E. linearis sometimes has a faint odour of oil of geranium when crushed. On 18th February, 1918, Mr. Blakely informed me that young shoots of E. eximia in the Hornsby-Galston district (a few miles north of Sydney) distinctly smell of oil of lemon.

There is evidence of a tendency to uniformity in the chemical composition of oils in a few species, and further inquiries will doubtless be made in the future. Following are examples:—

"The oils of E. oleosa and E. salmonophloia consist of the same constituents, and, allowing for rather more pinene in the oil of E. salmonophloia, practically no difference could be determined between the oils of these two species . . . ." (H. G. Smith in Proc. Linn. Soc., N.S.W., XXXIX, 26, 1914.)


3. Angles of Secondary Veins with Midrib.

In the following species one or two typical leaves were selected by Mr. R. H. Anderson from a number of herbarium specimens, and two average angles measured in the middle section of each leaf. (See Part LVII, p. 394.) The number of angles falling under a given angle are tabulated, thus showing the general range of venation angles. It will be seen, from the evidence submitted, that the majority of angles of one species lie within a range of about 10 degrees.
205

*E. botryoides* (24 specimens examined).

<table>
<thead>
<tr>
<th>Angle.</th>
<th>Number</th>
<th>Angle.</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 deg.</td>
<td>...</td>
<td>2</td>
<td>55 deg.</td>
</tr>
<tr>
<td>65 &quot;</td>
<td>...</td>
<td>12</td>
<td>50 &quot;</td>
</tr>
<tr>
<td>60 &quot;</td>
<td>...</td>
<td>17</td>
<td>45 &quot;</td>
</tr>
</tbody>
</table>

Average range—50 to 65 degrees.

*E. tereticornis* (10 specimens examined).

<table>
<thead>
<tr>
<th>Angle.</th>
<th>Number</th>
<th>Angle.</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 deg.</td>
<td>...</td>
<td>2</td>
<td>45 deg.</td>
</tr>
<tr>
<td>35 &quot;</td>
<td>...</td>
<td>7</td>
<td>50 &quot;</td>
</tr>
<tr>
<td>40 &quot;</td>
<td>...</td>
<td>13</td>
<td>55 &quot;</td>
</tr>
</tbody>
</table>

Average range—35 to 45 degrees.

*E. corymbosa* (10 specimens examined).

<table>
<thead>
<tr>
<th>Angle.</th>
<th>Number</th>
<th>Angle.</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 deg.</td>
<td>...</td>
<td>3</td>
<td>70 deg.</td>
</tr>
<tr>
<td>60 &quot;</td>
<td>...</td>
<td>9</td>
<td>75 &quot;</td>
</tr>
<tr>
<td>65 &quot;</td>
<td>...</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Average range—60 to 70 degrees.

*E. saligna* (10 specimens examined).

<table>
<thead>
<tr>
<th>Angle.</th>
<th>Number</th>
<th>Angle.</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 deg.</td>
<td>...</td>
<td>3</td>
<td>60 deg.</td>
</tr>
<tr>
<td>50 &quot;</td>
<td>...</td>
<td>4</td>
<td>65 &quot;</td>
</tr>
<tr>
<td>55 &quot;</td>
<td>...</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Average range—50 to 65 degrees.

4. **Juvenile Leaves.**

On Plates 266 and 267 are depicted leaves more juvenile than previously figured, though in some cases it is probable, and indeed obvious, that leaves of an earlier stage will be found. (See also Plate 268, 269, Part LVXI.)

5. **Mature Leaves.**

In the Plates depicting each species, a "mature" leaf has been shown wherever possible. That is to say, a leaf as mature as was available at the time. But, as observations become extended, the tendency of leaves approaching maturity in this genus is found to be in the direction of falcateness, and diminishing narrow-lanceolateness, and the drawings now submitted show this. I believe that further observations will additionally prove the truth of the position thus set up.
In some of the rarer species we do not know whether we have the ultimate growth or not, and in many cases we are sure we have not. How difficult it therefore becomes to make deductions! Often we have not leaves from the tops of the trees (in this position the leaves are often smaller and narrower), but from lower down, because easier accessible.

It is probable that in some species in which we have not hitherto found lanceolate leaves, we shall find them later, since we have found such leaves in a few species as the result of special search. There is a direct tendency to reduce the number of species with non-lanceolate leaves. Part LVII, pp. 412, 413, may be referred to in this connection. It is possible that, in the case of a few of the less-known species, it may be that a species with leaves non-lanceolate, or preponderatingly so, is conspecific with a form of which we only know lanceolate leaves.

6. Correlation of Seedlings and Juvenile Leaves.

(Adventitious Shoots.)

(a) Terminology of juvenile leaves.

(b) Coloured plates.

It may be convenient at this place to interpose a few notes on the correlation of seedlings and juvenile leaves (adventitious shoots). Later on the seedlings will be described in individual detail (as the leaves have been), when the coloured plates, necessary to elucidate them, become available.

The puzzling variation in the shape, texture, vestiture, etc., of seedlings, has a direct counterpart in the juvenile and intermediate leaves of the tree. This correlation is most important. Bushmen have known of it for very many years, even before botanists appear to have formally recorded it. Here are a few notes by botanists:

Pasquale, G. A., 1867. "These adventitious buds enclose the new shoot, which repeats the primitive form of the young plant in everything that it has produced above the cotyledons . . ." (Quoted by C. De Candolle, see Part LII, p. 91.)

Mueller, F. (Fragm., II, 1869) has a brief note on the subject (quoted at Part LVI, bottom of p. 282).

Planchon, J. E., 1875. See remarks on polymorphism in E. globulus, quoted at Part LII of this work, p. 89.

Briosi, G. A., Milan, 1891. Quoted by C. De Candolle and others at Part LVI p. 287, of the present work.

De Candolle, C., 1903. "E. globulus. It is known (his own observations were made at Cannes in 1889) that the trunk of this tree frequently produces adventitious shoots, with the branches and the leaves having the juvenile form so characteristic of the species. The fact has been known for a long while." He then quotes Pasquale and Briosi. (This work, Part LVI, p. 287)
He goes on to say: "I have invariably maintained that the first branches of these (adventitious) shoots, as well as their leaves, have always their juvenile form and structure, whatever may be the part of the tree from which they have arisen." Then (p. 288) he quotes M. Naudin, who cites *E. ciminalis* in addition to *E. globulus*.

**Naudin, Ch.** Then we have Naudin's remarks (1st Mem., 347, 1883, and 2nd Mem., 16. 1891), quoted at Part LVI. p. 283 (last paragraph but one from bottom), in which he speaks of the variations of shapes of leaves in the seedling stage, especially noting the "first six or eight leaves" (Naudin II, 16). See also p. 284, paragraph after that headed "First Foliage."

The following passage from Naudin, I, 347 (translation) is the first definite account we get of the (sometimes) puzzling characters of the leaves of the seedlings which follow those of the cotyledons:—

"The variations are very much greater in the stage which follows (the cotyledons), and it is there, indeed, that the difficulties of specific diagnosis commence. The first leaves which follow the cotyledons have seldom the shape of those which appear in a more advanced stage. They are sometimes alternate and petiolate from the commencement, more often they are opposite and sessile or almost sessile, but while in many of the species this last characteristic affects the six or eight first leaves, in other species also a great number, they remain sessile and opposite during a long period of the youth of the tree, and sometimes for its whole life."

**Lubbock, J., I, 526 (1892) (with figures).** "They all agree in having the primary leaves (I have used the term 'juvenile,' J.H.M.) opposite and entire, but these differ slightly in form. Those of *E. globulus* are linear-lanceolate; of *E. rostrata*, *E. cordata* and *E. leucocyaodon* lanceolate; of *E. stellulata* oval; of *E. coccifera*, *E. marginata* and *E. ficifolia* ovate; of *E. occidentalis* oblong; and of *E. calophylla* cordate, covered on both surfaces with crystalline glands. The primary leaves of many individual specimens of *E. ficifolia* are more or less distinctly alternate."

**Deane and Maiden** (top of p. 287), quoting *Proc. Linn. Soc., N.S.W.*, XX, 597 (1893) and other places throughout that series, used the terms Seeding or Sucker leaves as interchangeable. In some of the earlier Parts of the present work I followed the same practice, but as I found it was misleading I abandoned it.

Under the caption "Juvenile Leaves" we have references, including — "Between these stem-shoots and seedling-leaves there is a great similarity . . . we may regard these reversion shoots as of almost equal value with the seedlings for the purpose of studying the ancestral forms of Eucalypts." (R. H. Cambage, in *Journ. Roy. Soc., N.S.W.*, XLVII, 41, 1913, quoted at bottom of p. 288, Part LVI).

**Dr. Cuthbert Hall** in "Evolution of the Eucalypts," *Proc. Linn. Soc., N.S.W.*, XXXIX, 519, 1914, says: "The so-called sucker-leaves are of the same form as the seedling-leaves. . . ."
(a) Terminology of Juvenile Leaves.

The general subject is not frequently referred to in books published in Europe, probably because the contrast between juvenile and mature foliage is vastly less noticeable than in Australia, where Eucalyptus is so abundant. The following table shows some of the terms found in botanical literature:

<table>
<thead>
<tr>
<th>Juvenile leaves</th>
<th>Young leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seedling leaves.</td>
<td>Leaves of adventitious shoots (Bentham.)</td>
</tr>
</tbody>
</table>

Cotyledon leaves = Opposite leaves (of old writers).

= (partly) First leaves above the cotyledons (Naudin).

= First leaves (Naudin; Kerner and Oliver).

= Primary leaves (Lubbock).

= Sucker leaves\(^1\) (of the Australian public).

= Leaves of reversion shoots (Goebel).

= Primary leaves (Diels).

= Juvenile leaves (J.H.M.)

= Abnormal leaves\(^2\) (R. T. Baker).

= Adventitious leaves (R. H. Cambage).

\(^1\) Sucker leaves in Europe are, in strictness, those which are on shoots which spring from below the ground.

\(^2\) We do not speak of a child or young of any animal as being abnormal simply on account of his youth.

[Diels's Law.—Juvenile leaves may appear at any part of the plant and carry on the cycle of life up to the fruiting stage. It is merely referred to at this place, as it has been somewhat fully dealt with at Part LVI, p. 303.]

(b) Coloured Plates.

It may be convenient to anticipate briefly some of the coloured plates (not yet published).

If we take *E. eugenioides* (Plate 1, Figs. A–E), *E. globulus* (Plate 1, Figs. F–I) and *E. Flocktonia* (Figs. 133–135), where we have reproduced the principal phases of the seedling, it is obvious to a tyro that we have a perfect correlation between the seedlings, and the ordinary juvenile and intermediate (sucker) leaves of the tree.

Compare these coloured figures with, as regards—

- *E. eugenioides*, figs. 1–2, Plate 39, Part VIII; 2a, 4a, 4b, 10a, and 15a, Plate 40; Part VIII.
- *E. globulus*, figs. 1, 2a, Plate 79, Part XVIII.
- *E. Flocktonia*, Plate, 236, Part LVIII fig. 3a, Plate 243, Part LIX; fig. 1, Plate 267. Part LXV.
At the base of a sucker shoot (usually a congeries of intermediate leaves, developing eventually into mature leaves), one may often (e.g., fig. 5, Plate 266), see a small leaf, more or less ovoid in shape, and succeeded by comparatively large ones. This small leaf is correlated to one of the lower leaves of the seedling, not much higher than the cotyledon leaf. The small leaf has remained stationary in growth, or nearly so, while those above it may have developed into large ones.

It is time-absorbing, yet most interesting, to watch these changes, and, further, the lowest leaves may, while small, be rubbed off or drop off, or they may continue to develop without check into the large ones seen in Plate 270. Whatever happens, retarded development through malnutrition or accident on the one hand, or rapid, development on the other, the result is the same in regard to the elimination of the small leaves of the shoot. The same things happen in regard to the youngest leaves of the seedlings, but the development of the seedlings is even more difficult to watch than the shoots. I regret that circumstances preclude representations of the development, extending over a long period, of seedlings and shoots, until they have arrived at a considerable size. Mr. W F. Blakely hopes to take the matter up.

**JUVENILE LEAVES.**

7. **ADDITIONAL DESCRIPTIONS.**

Under the respective species, in the present work, the following juvenile leaves have been imperfectly described, or not at all. It is understood, of course, that the leaves described are as young as I have seen them. In some cases they will, doubtless, be collected at a still earlier stage.

46. *E. acacioides* A. Cunn.

Sessile, or nearly so, glaucous, linear to linear-lanceolate, thin, about 8 cm. long and 4 mm. wide, venation indistinct. Compare Fig. 11, Plate 52.


1. Shortly petiolate, slightly glaucous, thin, broadly lanceolate to orbicular (say, 9 or 10 cm. in diameter), intramarginal vein at a considerable distance from the edge, secondary veins looped or spreading, making an angle of about 40-50 degrees with the midrib. (*E. alba*, Rockhampton, Queensland, J.H.M.)

2. Poplar-leaved Eucalyptus. Petiolate, thick, not glaucous, heart-shaped to nearly orbicular, and to almost reniform, rounded at the base, very large (I have one in my possession almost 30 cm. in greatest breadth and length). The secondary veins very prominent, looped at the base and afterwards more or less parallel (say, 3 or 4 cm. apart), towards the periphery of the leaf becoming reticulate and much finer. This character of the secondary veins becoming finer towards the periphery is not unusual in juvenile leaves, but becomes more obvious in leaves of large size. (*E. platyphylla*).
The question as to whether *E. alba* and *E. platyphylla* are conspecific should be investigated once for all, by local botanists, and this would include examination of juvenile leaves and seedlings. In Rockhampton, on trees attributed to *E. alba*, I found the juvenile (already described), thin and small, and with the mature foliage tending to broadly lanceolate. Mr. S. W. Jackson, 38 miles west of Mackay, found *E. platyphylla* with very large glabrous juvenile leaves; "on full-grown trees the leaves are much smaller and roundish in shape." Seedlings should be grown and compared.

"The size of the young leaves is astonishing. I have measured on young shoots leaves 18 inches long and 15 across. Most Eucalypts have some peculiarity in the young state. In this case the leaves are not placed at right angles to the stem, but are very much larger than in any other Eucalypt of the east coast." (Rev. J. E. Tenison-Woods in *Proc. Linn. Soc., N.S.W.*, vii, 332, as *E. platyphylla*).

"Leaves often 5 inches long by 4 inches across." (W. V. Fitzgerald, Kimberleys.)

The leaves of this species are so large and so coarse that a limited trade could be done in them, for painting sketches, and also for use as fans, as I have suggested under *E. Poelscheana* below.


Paler on the underside, moderately thick, sessile to stem-clasping, emarginate, orbicular, from 1·5 to 4·5 cm. in diameter. the youngest leaves covered with stellate hairs. Intramarginal vein removed from the edge, but rather obscure, the secondary veins forming an angle of about 45–50 degrees with the midrib.

313. *E. altior* (Deane and Maiden) Maiden.

Glaucous, thin, shortly petiolate to nearly sessile, ovate to nearly orbicular, up to 7–8 cm. in diameter, the intramarginal vein not close to the edge, the secondary veins curved to spreading, and making an angle of about 35–45 degrees with the midrib. Figs. 2a and 2b, Plate 231.

160. *E. amplifolia* Naudin.

Petiolate or nearly sessile, equally green on both sides, thickish, nearly orbicular, large, intramarginal vein distinct and distant from the edge. Secondary veins nearly horizontal to looping, and eventually making an angle of about 45–55 degrees with the midrib. Figs. 2a and 4a, Plate 131.

105. *E. angustissima* F.v.M.

Linear, thickish, venation indistinct.

177. *E. annulata* Benth.

Not seen in a truly juvenile state. Perhaps lanceolate, thickish, venation not distinct.

Sessile to shortly petiolate, rather thick, equally green on both sides, linear to linear-lanceolate, with hooked apex, thickish, venation inconspicuous. About 7 cm. long, 1 cm. wide.


Add to p. 96, Part XLIII: Sessile to very shortly pedunculate, thickish, apparently equally green on both sides, though the young tips dry pale, edges glandular, venation indistinct. Fig. 2b, Plate 179.

149. *E. baueideni* F.v.M.

Sessile, equally green on both sides, moderately thin, small, under 5 cm. long and 13 mm. broad as seen, narrow-lanceolate to ellipsoid, venation moderately evident. Fig. 1a, Plate 120.

39. *E. Behriana* F.v.M.

Ovoid to orbicular, the intramarginal vein well removed from the edge. Thickish, bright or oily green, secondary veins not very conspicuous. Fig. 6a, Plate 48.


Satisfactory specimens not available. Petiolate, equally green on both sides, rather thin, rather small, lanceolate to broadly-lanceolate, venation moderately conspicuous. Fig. 2a, Plate 199.

No. 42. *E. bicolor* A. Cunn.

Narrow-lanceolate, the intramarginal vein distant from the edge. Shortly petiolate, thin, equally green on both sides. Figs. 5a and 5b, Plate 49.


Very shortly petiolate, not very thin, the margins undulate, and with a reddish rim when fresh. The leaves roughish, particularly on the lower side, owing to the presence of stellate hairs, which are also on the edges of the leaves and always on the twigs. Fig. 3a, Plate 38.

37. *E. Boormani* Deane and Maiden.

Add to p. 330, Part X: Shortly petiolate, rather thick, equally green on both sides, orbicular, 10–11 cm. in diameter, sometimes the secondary vein so prominent as to give the leaf a triplinerved appearance. Fig. 2a, Plate 48.
41. *E. Bosistoana* F.v.M.

Leaves of young seedlings roundish or ovate or orbicular, scattered, stalked; umbels few-flowered, either axillary-solitary or racemously arranged. Shortly petiolate, thin, equally green on both sides. Diameter about 6 cm. Figs. 1 and 2a, Plate 49.

126. *E. botryoides* Sm.

Petiolate, ovate to nearly orbicular, rather thin, paler on the under side, margin somewhat undulate, glabrous, intramarginal vein distinctly removed from the edge, secondary veins curved or spreading, with an angle of about 45-55 degrees with the midrib. Fig. 1, Plate 99.

22. *E. buprestium* F.v.M.

"Ovoid to oblong mucronate, petiolate, say 2-3 inches long by 1\(\frac{1}{2}\) inches broad, glaucous, equally green on both sides, margin slightly thickened; venation distinct, intramarginal vein at a considerable distance from the edge, sub-pinnately veined, with the lateral veins approximately forming an angle of 45 degrees with the midrib." (Maiden in *Journ. W.A. Nat. Hist. Soc.*, Vol. III, January, 1911.)

237. *E. calophylla* R.Br.

Shortly petiolate, peltate towards base, rather thick, broadly lanceolate to nearly ovate, puckered or undulate, dull, besprinkled with stellate hairs, especially on rachis, where they are longer; secondary veins conspicuous and nearly transverse. Fig. 1a, Plate 176.


Very glaucous, petiolate, lanceolate to broadly lanceolate, coriaceous, up to 3 cm. broad, and 6 or 7 cm. long, secondary veins moderately prominent, the intramarginal vein so distant from the edge as to (with the midrib) give the leaf a triplinerved appearance.

83. *E. Campaspe* S. Moore.

"Silver-top Gimlet." The following leaves from Forester J. M. Cusack, near Kalgoorlie, are not quite in the earliest stage, but are near it. Mealy glaucous, thickish, petiolate, lanceolate, with a mucro, size 5-9 cm. by 1-5-3 cm., intramarginal vein at some distance from the edge, the secondary veins making an angle of about 40 to 50 degrees with the midrib. Oil dots conspicuous.

[The leaves of this species remind me of *E. fruticetorum* a good deal, and should be commercially tested for oil.]
113. E. cinerea F.v.M.

Glaucous, broadly lanceolate, and slightly petiolate and apiculate, to orbicular, sessile and emarginate. Venation spreading, the secondary veins at an angle of 40 to 50 degrees with the midrib. Fig. 2, Plate 89.

185. E. cladocalyx F.v.M.

Petiolate, thinnish, nearly orbicular, about 6 or 7 cm. in diameter, of a brownish cast all over, but much paler on the underside, where the larger veins are particularly obvious because of the brown colour. The secondary veins looped and spreading, at an angle of about 40 to 45 degrees with the midrib. Fig. 2a, Plate 151.

65. E. eneorifdia DC.

Sessile or shortly petiolate, narrow lanceolate, rather thin, glaucous or rather silvery, intramarginal vein not close to the edge, secondary veins not prominent. Fig. 14a, Plate 60.

8. E. coccedfera Hook. f.

Sessile, stem-clasping, cordate to orbicular, say 3–4 cm. in diameter, thin, equally green on both sides, rachis very glandular. Figs. 2a and 2b, Plate 28 (Seedling leaves). "The juvenile leaves are broadly oblong, opposite, sessile, not usually united across the stem." (Rodway, Proc. Roy. Soc., Tas., 1917.)

34. E. Consideriana Maiden.

Add to p. 312, Part X: Sessile or shortly petiolate, thin, slightly paler on the underside, oblique, broadly lanceolate to ovate and ellipsoid. Figs. 2a, 3a, 3b, Plate 46.

186. E. Cooperiana F.v.M.

All the material I know of this species is figured on Plate 151. The only leaf is depicted at 5a, and I think it may turn out to be nearly a juvenile leaf. Note the comparatively great distance of the intramarginal vein from the edge. It is moderately thick, the secondary veins are not inconspicuous and at an angle of about 40 to 45 degrees with the midrib.

104. E. cordata Labill.

Stem-clasping, cordate to orbicular, crenulate, sometimes connate, moderately thick, glaucous, venation almost transverse. Figs. 2a and 2b, Plate 84. "The foliage is ashy-blue. Leaves opposite, sessile, very broadly ovate to orbicular, not joining across the stem; this juvenile condition, which is very like the foliage of Urn (E. urnigera) and Mueller's Gums (E. Johnstoni), is maintained throughout the life of the tree." (Rodway.)
On 24th April, 1919, Mr. W. F. Blakely showed me a specimen in the Botanic Gardens, Sydney, with the lower leaves alternate.


Orbicular, petiolate, rather thin, equally green on both sides, the intramarginal vein at a considerable distance from the edge.

80. *E. corrugata* Maiden.

Very glaucous, and the rachis quadrangular. Leaves decussate, stem-clasping, the midribs slightly decurrent, thin, equally glaucous on both sides, oblong or elliptical to oblong-lanceolate, with a short mucro, small, say 5 cm. (2 inches) by 3 cm. (1½ inch) long. These juvenile leaves remind one of those of the *E. globulus*, *Maideni*, *goniocalyx* group. Collected by Walter Gill, near Kalgoorlie, W.A. (J.H.M. in *Journ. Roy. Soc., N.S.W.*, lli, 500, 1918.) Figs. 1a and 1b, Plate 143.

115. *E. cosmophylla* F.v.M.

Petiolate, almost orbicular, 6 or 7 cm. in diameter, moderately thick, equally green on both sides, the intramarginal vein at a considerable distance from the edge. Fig. 3a. Plate 91.

51. *E. crebra* F.v.M.

Pendulous, narrow-lanceolate to lanceolate, thin, but thicker and more glaucous in interior localities, the venation inconspicuous to rather conspicuous. Figs 4a and 4b, Plate 53.

351. *E. crucis* Maiden.

"The juvenile foliage will probably be found to nearly resemble that of *E. Websteriana* (which-I have not seen), but the mature foliage is quite different, being constantly acute lanceolate to broadly ovate, and always opposite and sessile or very shortly petiolate. Yorkrakine." (C. A. Gardner.)

275. *E. Cullenii* Cambage.

Add to Part 48, p. 233: Not seen in the earliest stage. Shortly petiolate, thinnish, equally green on both sides, venation not conspicuous. Fig. 2a, Plate 198.

165. *E. dealbata* A. Cunn.

With long peduncles, glaucous, particularly so on the sharply quadrangular axes, nearly orbicular, nearly 8 cm. in diameter, often emarginate, not very thick, secondary veins abundant and fairly parallel, but not close together and approximately at an angle of 40 to 50 degrees with the midrib. Fig. 4, Plate 135.
108. *E. diversicolor* F.v.M.

Petiolate, thin, distinctly paler on the underside, broadly lanceolate to ovoid and nearly orbicular, 5–7 cm. in diameter, often crenulate, secondary veins looped and arranged in an alternate manner, at an angle of 55 to 65 degrees to the midrib. Figs. 7a and 7b, Plate 86.


Sessile and stem-clasping, thin, equally green on both sides, more or less cordate-lanceolate, to nearly orbicular, up to 4 or 5 cm. in diameter, venation distinctly reticulate; midribs distinctly brown as in *E. cladocalyx*. Figs. 8 and 8a, Plate 36.

*E. doratoxylon*. F.v.M.

Branchlets angular. Leaves small and dark green (thus distinguishing it easily from *E. decurva*), crowded, shining on both pages, not at all glaucous along the branchlets, with fairly conspicuous venation and oil-dots. (Mount Toolbrunup, Stirling Range, C. A. Gardner.)

278. *E. drepanophylla* F.v.M.

Equally green on both sides, thickish, petiolate, somewhat undulate, broadly lanceolate, apex blunt, intramarginal vein distinctly removed from the edge, the secondary veins spreading, not distinct, making an angle of about 40 to 45 degrees with the midrib. Figs. 2a, 5a, 5b, 6a, 6b, Plate 200.

199. *E. dumosa* A. Cunn.

Stems quadrangular, glaucous, petiolate, thick, without apex, but variable from broadly-lanceolate to ovate and nearly orbicular (with a diameter of 4–5 cm.). Intramarginal vein at a distance from the edge, secondary veins spreading, at an angle of about 40 to 50 degrees with the midrib. Fig. 1, Plate 19.

253. *E. erythrocorys* F.v.M.

Petiolate, equally and brightly green on both sides, lanceolate (say 7–13 cm. long and 4–5 cm. broad), the branchlets and leaves profusely covered with stellate hairs, moderately thick in texture. Margin more or less crenate, intramarginal vein distant from the edge, the secondary veins spreading or even reticulate, and making variable angles with the midrib. Fig. 1b, Plate 184.

260. *E. eudesmioides* F.v.M.

Add to Part 46, p. 166: Sessile, stem-clasping, slightly glaucous, thickish, venation distinct. Fig. 3a, Plate 189.
228. *E. eximia* Schauer.

Petiolate, pale on the underside, sometimes perfoliate, in its early stage with the branchlets, midribs and other parts of the leaves plentifully besprinkled with chocolate-brown stellate hairs. At an early stage the leaf ovate, but later becoming lanceolate or broad-lanceolate, with or with not an auriculate or cordate base. Figs. 1a, 1b, 3a, 3b, 3c, 3d, Plate 172.

162. *E. er sectora* F.v.M.

Linear-lanceolate or strap-shaped, about 1 cm. broad (or less) and up to 20 cm. long and less, flexuous, apex not rigid. Equally green on both sides. Venation obvious under a low power, when the venation is seen to be reticulate, and the intramarginal vein distinct from the edge, considering the narrowness of the leaf. Fig. 6, Plate 132.

197. *E. ferruginea* Schau.

Although I have labelled figure 4a, Plate 159, as "mature," I think it would be more correctly described as "juvenile." The leaves are brown (perhaps all through life) owing to the presence of short brown hairs. The juvenile leaves are broadly lanceolate, cordate at the base, blunt at the apex. They are rather large, that depicted above, before drying being about 18 cm. long and half that in width. The secondary veins looped or curved, and make an approximate angle of 50 to 60 degrees with the midrib. Fig. 4a, Plate 159.

236. *E. ficifolia* F.v.M.

Petiolate, very thin, pale on the underside, very broadly lanceolate, undulate to puckered on one half of a lamina, the intramarginal vein usually remote from the margin, secondary veins slightly curved, and at an angle of about 50 to 60 degrees with the midrib.

5. *E. fecunda* Schau.

Thin, very glaucous, petiolate, slightly crenate to undulate, with base nearly straight and little tendency to be cordate. Nearly orbicular, the intramarginal vein far from the edge, the secondary veins forming an angle of about 30 to 45 degrees from the midrib. Fig. 2, Plate 24.

224. *E. Foelscheana* F.v.M.

I have measured a juvenile leaf 15 inches long by 11 inches, and was informed that larger ones could have been collected. They are so thick and so rigid that a single leaf makes an excellent fan, with a rigid petiole, say 6 cm. long and .6 in. diameter
The leaves are free from hairs, so far as I have seen them, in shape slightly cordate at the base, with a blunt apex, and very broadly lanceolate, undulate or puckered or both, as so often seen in the Corymbosae. The secondary veins are almost at right angles to the midrib, and while therefore parallel to one another, are not equidistant, the distances being usually about 1 cm.

[I think an enterprising resident of Darwin could work up a nice little trade in these leaves as fans. They would require to be carefully dried; sketches of landscapes, birds, &c., could be painted on them, the handle ornamented with a little silk, and each leaf labelled with some such words as "Giant Gum Leaf from Northern Territory."

122. *E. Forrestiana* Diels.

Glaucous (soon becoming glabrous on the upper side), thick (not so thick or so large as those of *E. tetraptera*). Petiolate, covered with oil-dots, the intramarginal vein distant from the margin, the secondary veins spreading, and at an angle of about 30 to 40 degrees from the midrib. See also fig. 2a, Plate 95.

45. *E. fruticetorum* F.v.M.

Glaucous, thickish, shortly petiolate to nearly sessile, bluntly lanceolate, rich in oil and oil-dots conspicuous. Intramarginal vein distant from the edge, secondary veins spreading, and at an angle of about 30 to 40 degrees with the midrib. Fig. 7a, Plate 52.

180. *E. gamophylla* F.v.M.

Glaucous, rather thick, connate, caused by the fusion or nearly orbicular lamina, 6 or 7 cm. in diameter, secondary veins spreading at an angle of about 40 to 45 degrees with the midrib, and, as the intramarginal vein is absent, or usually absent, the secondary veins taper from the midrib until they appear to lose themselves, long before the edge is reached. Fig. 2, Plate 147.

106. *E. gigantea* Hook. f.

Fragrant, shortly petiolate, glaucous, varying much in shape, size and thickness. From ovate and broadly ovate to orbicular, the ovate leaves being sometimes oblique and somewhat falcate. The orbicular leaves are frequently 9-11 cm. in diameter, while the oblique ones may be 15 cm. in width and 26 cm. in length. The leaves may be thickish, but when they are in the intermediate stage they may be very thin, and equally green on both sides. Intramarginal vein at a considerable distance from the edge, the secondary veins looped to spreading, making varying angles with the midrib. Fig. 5, Plate 85.
74. *E. Gillii* Maiden.

Glaucous, thickish, sessile, rounded at the base or somewhat cordate, bluntly apiculate or orbicular, with a diameter of 3 or 4 cm. Intramarginal vein moderately distant from the edge, secondary veins spreading, and making about 40 to 50 degrees with the midrib. See fig. 9, Plate 67.

98. *E. globulus* Labill.

Rather thin, the upper page bright green, the lower intensely white all over, and likewise the rachis. Large, ovate-lanceolate, the base but slightly cordate, apex often blunt, oil-dots conspicuous. Intramarginal vein at a distance from the edge, the secondary veins fine, opposite and somewhat alternate, making an angle of 45 to 55 degrees with the midrib. Figs. 1 and 2a, Plate 79.

116. *E. gomphocephala* DC.

Petiolate, orbicular, thinnish, equally green on both sides, orbicular (with a diameter of about 5 cm.), sometimes emarginate, intramarginal vein at a considerable distance from the edge. The secondary veins not always opposite, and at an angle of 45 to 60 degrees with the midrib. Fig. 2a, Plate 92.

139. *E. Gunnii* Hook. f.

Glaucous all over (including the fruits and branchlets, but the mature leaves for the most part frosted), sessile in pairs, with glandular intermediate rachises, orbicular, about 4 cm. in diameter, emarginate. Figs. 6a, 6b, 7b, Plate 108.


I cannot see any difference in the juvenile leaves of *E. intermedia* and *E. corymbosa*. At the same time, I have not those of *E. intermedia* in as early a stage as those of the latter.


Add to Part 36, p. 169: Shortly petiolate, equally pale green on both sides, moderately thick, venation prominent, lanceolate to obovate, small, not usually more than 2 cm. broad. Fig. 7a, Plate 151.

146. *E. Johnstoni* Maiden.

Bright green on both sides, thin to thick, margins crenulate, sessile and cordate at the base or shortly petiolate and rounded at the base, orbicular and a little emarginate, with a diameter of about 3-5 cm., the rachis glandular. The intramarginal vein at a distance from the edge, or indistinct, the secondary veins spreading and at an angle of 50 to 60 degrees with the midrib.
I have not seen them quite in their earliest stage. Thin, petiolate, rachis almost terete, equally green on both sides, nearly ovate, sometimes undulate, rounded at the base, shortly acuminate, about 7 cm. long by 12 cm. broad, intramarginal vein fairly distant from the edge, secondary veins conspicuous, particularly on the under side, spreading to reticulate, the principal veins roughly at about 40 to 50 degrees to the midrib. Fig. 5, Plate 123.


I have not seen them in their perfectly juvenile stage. Rather thin, equally green on both sides, petiole very short or absent, lanceolate, the leaf depicted about 10 cm. in length and 4 cm. in width, the intramarginal vein distinctly removed from the edge, the secondary veins at an angle of about 35 to 45 degrees with the margin. Fig. 1a, Plate 167.

223. *E. latifolia* F.v.M.

Very thin, translucent, by reflected light equally dullish green on both sides, petiolate, margin undulate, broadly lanceolate, apex blunt (perhaps orbicular, but I have not seen such a shape in the youngest stage), intramarginal vein close to the edge, the secondary veins at an angle of about 50 to 60 degrees with the midrib. Fig. 6a, Plate 168.

38. *E. leptophleba* F.v.M.

Thickish and coriaceous, somewhat shiny, equally green on both sides, shortly petiolate. Elliptical or nearly oblong in shape, 16-8 cm. (7 inches) in length, and 10-8 cm. (4½ inches) in breadth, are common dimensions. The secondary veins prominent, roughly parallel, and often nearly at right angles to the midrib. The intramarginal vein at a considerable distance from the edge. Fig. 1a, Plate 201.

332. *E. leptophylla* F.v.M.

With reference to the description at p. 259, Part LVI, the young leaves are glaucous, but not always "very thin." Mr. C. A. Gardner describes them from Southern Cross as: "Small, sessile, opposite, broadly ovate, and with the stems prominently glandular-dotted, glaucous, the veins inconspicuous, pinnate, the intramarginal one distant from the margin. Fig 2, Plate 229.

58. *E. leucoxylon* F.v.M.

Of moderate thickness, glaucous, sessile, stem-clasping, nearly orbicular (with a diameter of, say, 4 cm.). Intramarginal vein at a distance from the edge, secondary venation spreading roughly at an angle of 40 to 50 degrees with the midrib, reticulate towards the intramarginal vein. Fig. 1a, Plate 56.
10. *E. linearis* Dehn.

Linear, the most linear of all species, say 5 cm. long, sessile, glabrous, thin.

211. *E. longicornis* F.v.M.

Add to Part XXXIX, p. 273: Sessile or nearly so, slightly glaucous, thickish, ovate to oblong and orbicular (say 5 cm. in diameter) markedly triplinerved.

107. *E. longifolia* Link and Otto.

Petiolate, thin, sometimes slightly paler coloured on the lower side, but usually the same colour on both sides; ovate to broadly ovate or nearly rhomboid. A common measurement is 5 by 7 cm. (up to 9 by 6 cm.).

183. *E. macrandra* F.v.M.

I have not seen them quite in the earliest stage, petiolate, the base tapering to the petiole, ovate to broadly lanceolate, bright green on both sides, the intramarginal vein at a considerable distance from the edge, the secondary veins at an angle of 40 to 50 degrees from the midrib, greater than those figures at 3a, and 5a, Plate 150.

239. *E. maculata* Hook.

Shortly petiolate, thin, paler on the underside, ovate to orbicular, scabrous, owing to the presence of stellate hairs on the leaves and glandular hairs on the rachis; peltate in the earliest stage, venation conspicuous. Figs. 1a, 1b, Plate 178.

99. *E. Maideni* F.v.M.

"Young shoots quadrangular, their leaves broadly cordate, with a small pointed apex, opposite, and of a whitish hue underneath (only, J.H.M.), petioles almost absent." (Original description.) Thin, plentifully dotted, the intramarginal vein distant from the edge, the secondary veins spreading from the base, and roughly at an angle of 50 to 60 degrees from the midrib. Figs. 3 and 4, Plate 79.


Glaucous (as is the tree all over), moderately thick, ovate to nearly orbicular, the base cordate, the apex emarginate, the nodes distant. The intramarginal veins distant from the edge, the secondary veins distinct, spreading at an angle with the midrib of about 45 to 55 degrees. They shade off, towards the edge, into fine, reticulate veins. Figs. 1a, 1b, 1c, Plate 54, and fig. 2a, Plate 240.
66. *E. melliodora* A. Cunn.

Petiolate, thinnish, ovoid to ovoid-lanceolate, glaucous to glabrous, the intramarginal vein so distant and so regularly disposed with respect to the edge that it affords one of the best examples of a triplinerved leaf in Eucalyptus; the other veins not very conspicuous, and making an angle of about 40 to 45 degrees with the midrib—See figs. 1a and 4, Plate 61.

49. *E. microtheca* F.v.M.

Shortly petiolate, dull green, not glaucous, lanceolate, apex blunt, intramarginal vein close to the margin, the secondary veins moderately distinct and at an angle of about 45 to 55 degrees with the midrib. Fig. 16 and 17, Plate 52.


The thickish juvenile leaves have two aspects. The following are from Hartley Vale, Blue Mountains (W. F. Blakely), and are doubtless more or less concerned with the impossibility of making a hard and fast line between the juvenile and intermediate leaf:—

(a) 2-3 cm. long, about 5 cm. broad, lanceolate, prominently black-dotted, sessile, venation scarcely evident.

(b) Much larger, more pointed at the apex, and broadish at the base, sessile, or nearly so. Secondary veins at an angle of 10-15 degrees with the midrib.

See also Part XXXVIII, p. 218.


Sessile, lanceolate to broadly lanceolate, thin, underside pale, intramarginal vein somewhat distant from the edge, midrib pale brown, secondary veins forming an angle of 40 degrees with the midrib. Sparsely besprinkled with stellate hairs. See fig. 1, Plate 2.

296. *E. Mundijongensis* Maiden.

Shortly petiolate, thin, equally green on both sides, ovate to broadly ovate, early becoming apiculate, intramarginal vein at a considerable distance from the edge; secondary veins curved to spreading, and at an angle of about 50 to 60 degrees with the midrib.

A juvenile leaf, not quite in its earliest stage, is depicted at fig. 11, Plate 140, under the name *E. redunda*, but it really came from the type tree of *E. Mundijongensis*.

The so-called juvenile leaves already described at p. 305, Part L, are intermediate leaves.

Broadly lanceolate to orbicular, without setae, and, so far, non-peltate. See Part LXII, p. 68.

182. *E. occidentalis* Endl.

Shortly petiolate, perhaps sessile, pale-coloured on both sides, or slightly glaucous, of variable thickness and size. Ovate to nearly orbicular, the intramarginal vein at a considerable distance from the margin. Venation conspicuous, the secondary veins looped to spreading, and making an angle of about 40 to 45 degrees with the midrib. See fig. 3a, Plate 148.

255. *E. odontocarpa* F.v.M.

In lustre varying from bright yellowish-green to dull and almost greenish-white. It is figured at fig. 2, Plate 186. Part XLV. I have since found, from the same source a shorter, broader leaf, with the secondary veins making a wider angle with the midrib. Broadly lanceolate, about 7 cm. long by 1½ cm. broad, rather thick, intramarginal vein well removed from the edge.

226. *E. pachyphylla* F.v.M.

Petiolate (but length of petiole variable), pale green on both sides, thick, the venation moderately distinct, intramarginal vein distinct from the edge, the secondary veins at an angle of about 35 to 40 degrees with the midrib. See fig. 1a, Plate 171, but not in earliest stage.

171. *E. pachycoma* Benth.

Shortly petiolate or nearly sessile, equally dull green on both sides, hardly glaucous, thickish, narrow-lanceolate, venation distinct, the intramarginal vein distinct from the edge, the secondary veins spreading, and at an angle of about 40 degrees with the midrib. See figs. 13a, 13b, Plate 139 (juvenile leaves). Most of the specimens I have are narrow, like fig. 13a. Figs. 9, 10, 11, Plate 36 (not juvenile leaves).

61. *E. paniculata* Sm.

Shortly petiolate or nearly sessile, thin, glabrous, pale green on the underside, darker above, ovate to broadly lanceolate. Intramarginal vein distantly removed from the edge, the fine secondary veins at an angle of about 45 to 60 degrees with the midrib. See figs. 1a, 1b, Plate 196. Compare also fig. 11, Plate 57.

192. *E. papuana* F.v.M.

Thin, dull-coloured, the same colour on both sides, sessile, or the petiole very short, venation distinct. The intramarginal vein at a considerable distance from the edge. Large, say 12 cm. long by 10 cm. broad, ovate. The secondary veins curved or spreading, and at an angle of about 45 to 55 degrees with the midrib. See fig. 3a, Plate 155.
163. *E. Parramattensis* C. Hall.

Add to Part XXXII, p. 37: Sessile or shortly petiolate, thin, equally green on both sides.

156. *E. pellita* F.v.M.

With a short petiole, thin, pale in the underside, darker green above, ovate or broadly lanceolate, rather large (the specimen figured at fig. 2a, Plate 127, being about 14 cm. long by 9 cm., when freshly collected), the intramarginal vein distinctly but not far removed from the edge, the secondary veins looped to spreading, and at an angle of about 45-55 degrees with the midrib. See fig. 2a, Plate 127.


Perfoliate, probably very large; I have a pair of leaves over 30 cm. long, the individual leaves 12 cm. broad. The fusion is perfect at the bases of the leaves, except for a little undulation in some cases. Very thick, pale-green on both sides, only a trace of glaucousness, if any. Each leaf ovate, the venation not distinct; intramarginal vein not far removed from the edge, and the fine secondary veins parallel, and at about an angle of 55 to 65 degrees with the midrib. See fig. 1a, Plate 180.

138. *E. Perriniana* F.v.M.

Glaucous, in its earliest stage perfoliate, length of a perfoliate pair 13 cm., breadth of a single leaf, 9 cm. They pucker or are undulate more or less, as is the case with most perfoliate leaves. Moderately thick, each leaf tending to be orbiculate, the secondary venation spreading to reticulate, and at about 45 to 55 degrees from the midrib, the intramarginal vein distant from the edge. See fig. 1, Plate 108.

1. *E. pilularis* Sm.

Sessile, sometimes slightly auriculate, pale on the underside, thin, narrow to broad-lanceolate or ovate. See fig. 1, Plate 2.

Those of var. *pyriformis* Maiden are more distinctly auriculate. See fig. 1a, Plate 206, and compare them with those of *E. Simmondsii* Maiden, figs. 3a, 3b, 3c, Plate 232.

32. *E. piperita* Sm.

Shortly petiolate, pale on the underside, thin, broadly lanceolate to nearly orbicular. See figs. 2 and 8a, Plate 45.

Shortly petiolate, shiny, pale-green, thick, irregularly orbicular (about 4-6 cm. in diameter), emarginate, the under surface somewhat inflexed, dotted all over with small oil-glands, the venation rather indistinct, the intramarginal vein at a distance from the edge, the secondary veins looped or spreading, at an angle of about 40 to 50 degrees from the midrib. See fig. 5a, Plate 145.

62. *E. polyanthemos* Schauer.

The whole plant more or less glaucous, the juvenile leaves entirely so; moderately thick, petiolate, orbicular or nearly so (diameter of about 12 cm.), emarginate, the intramarginal vein at a considerable distance from the edge. Secondary veins looped or spreading, at about an angle of 40 to 50 degrees with the midrib. See fig. 1, Plate 59.

40. *E. populifolia* Hook.

With long petiole, moderately thick, dull on both sides, orbicular (up to 12 cm. in diameter), or sometimes rounded quadrangular, venation very distinct, intramarginal vein far removed from the edge, secondary veins spreading and at angles of 40 to 50 degrees from the midrib. Fig. 11a, Plate 48.

96. *E. Preissiana* Schau.

Sessile to shortly petiolate, often cordate at the base, always rounded at the apex, thick, equally green on both sides, oblong to ovate, intramarginal vein distinctly removed from the edge, venation distinct, the secondary veins spreading and forming an angle of about 55 to 80 degrees with the midrib. Fig. 4a, Plate 77.

152. *E. propinqua* Deane and Maiden.

Add to Part XXIX, p. 191: Shortly petiolate, thin, pale on the underside, ovate to broadly-lanceolate.

54. *E. pruinosa* Schau.

Plant glaucous all over, thick, cordate at the base and crowded, ovate to orbicular and more or less emarginate; intramarginal vein at a considerable distance from the edge, secondary veins looped and spreading at about an angle of 45 to 55 degrees with the midrib. Fig. 1a, Plate 240.

114. *E. pulverulenta* Sims.

Sessile, stem-clasping, thickish, glaucous, very nearly truly orbicular. Fig. 5, Plate 90.
225

284. *E. pumila* Cambage.

Add to Part L, p. 300: Not seen in earliest stage. Shortly petiolate, rather thick, slightly glaucous.

153. *E. punctata* DC.

Petiolate, moderately thin to thickish, equally green on both sides, or perhaps a very little paler on the underside; broadly-lanceolate to ovate. Venation not distinct unless the leaves are quite young. Intramarginal vein at a considerable distance from the edge, secondary veins spreading, at an angle of about 40 to 50 degrees with the midrib. Figs. 5 and 6a, Plate 122.

218. *E. pyrophaora* Benth.

Shortly petiolate, moderately thick, equally green on both sides, almost shiny, somewhat plicate, tending to orbicular, slightly apiculate, cordate at the base (not seen in the very earliest stage); intramarginal vein well removed from the edge, secondary veins roughly parallel, and at an angle of about 50 to 65 degrees from the midrib. Fig. 4a, Plate 166.

201. *E. radiata* Sieb.

Add to Part XXXVIII, p. 229: Sessile, stem-clasping, rounded at base, thin, aromatic.

172. *E. redunca* Schau.

Sessile or shortly petiolate, thick, equally pale-green on both sides; venation conspicuous, intramarginal vein at a considerable distance from the edge; venation spreading, the secondary veins making an angle of about 40 to 50 degrees with the midrib. Partly described at p. 94, Part XXXIV, ex J.H.M. in *Journ. W.A. Nat. Hist. Soc.*, iii (1911). Fig. 3a, Plate 140, for the type form, and 10a for var. *elata*. Fig. 10 really belongs to *E. Mundifongensis*, as explained at p. 221.

155. *E. resinifera* Sm.

Sessile or shortly petiolate, paler on the underside, thin, intramarginal vein distinct from the edge; venation transverse to spreading, the secondary veins at an angle of about 45 to 50 degrees with the midrib. Figs. 1 and 3a, Plate 125.

125. *E. robusta* Sm.

Pedunculate, thin, equally green on both sides, ovate to nearly orbicular, and soon acuminate, rather large when ovate (say 12 cm. long by 8 cm. broad); intramarginal vein somewhat distantly removed from the edge; secondary veins spreading, and making an angle of about 40 to 50 degrees with the midrib. Fig. 4a, Plate 97.

Markedly stem-clasping and connate, sessile, glaucous, thickish, nearly orbicular to ovate and ovate-acuminate.

168. *E. rostrata* Schlecht.

Petiolate, quadrangular, glaucous, varying much in thickness and size, ovate; venation distinct, particularly on the under surface; intramarginal vein far removed from the edge; secondary veins curved to spreading, and making an angle of about 45 to 55 degrees with the midrib. Figs. 10a, 10b, Plate 136.

169. *E. rudis* Endl.

Petiolate, very thin, green on both sides, broadly ovate to nearly orbicular (in the intermediate stage enlarging and becoming plicate). Intramarginal vein moderately distant from the edge; the secondary veins curved, and then spreading, making an angle of about 45 to 55 degrees with the midrib. Fig. 9a, Plate 138.

127. *E. saligna* Sm.

Petiolate, thin, underside pale, broadly-lanceolate to ovate; secondary veins thin, curved to spreading, making an angle of about 40 to 50 degrees with the midrib. Fig. 11a, Plate 99, but I have seen a broader juvenile leaf.

184. *E. salubris* F.v.M.

Shortly petiolate or nearly sessile, glaucous, thickish, covered with oil-dots, lanceolate, under 7 cm. long as a rule. Venation not conspicuous, intramarginal vein rather distant from the edge, venation spreading, the secondary veins at an angle of about 35 to 40 degrees from the midrib. Figs. 7a, 8a, Plate 150.

196. *E. setosa* Schau.

Rather thin, hispid, dark coloured, stem-clasping, and varying in shape from cordate to nearly orbicular, broadly lanceolate and ovate. Venation conspicuous; intramarginal vein distinct from the edge; secondary veins looping or spreading, and making an angle of about 45 to 55 degrees with the midrib. Figs. 5a, 8a, Plate 158.

10. *E. siderophloia* Benth.

Shortly petiolate, glaucous but not mealy-white, thick, orbicular (with a diameter of, say, up to 12 cm.) to ovate and broadly-lanceolate, intramarginal vein at a considerable distance from the edge; secondary veins looped and making an angle of about 45 to 55 degrees with the midrib. Fig. 19, Plate 47.
33. *E. Sieberiana* F.v.M.

Add to Part X, p. 306: Sessile or very shortly petiolate, slightly glaucescent, from ovate to nearly orbiculate, thin.

55. *E. Smithii* R. T. Baker.

Often slightly glaucescent, equally (dull) green on both sides, thin, oil-dots plentiful, stem-clasping at the base, tapering to the apex; about 7 cm. long and 2 cm. broad at the base; the secondary veins spreading, and making an angle of about 35-45 degrees with the midrib. Fig. 1, Plate 55.

179. *E. spathulata* Hook.

My specimens are not satisfactory; they may be described as thickish, equally green on both sides, linear-lanceolate to slightly spathulate, intramarginal vein distinct from the edge, secondary veins not distinct. Fig. 9a, Plate 146.

52. *E. Staigeriana* F.v.M.

Shortly petiolate, perhaps sessile, rather thin, equally green on both sides, very aromatic (lemon-scented), oblong to ovate; intramarginal vein distinctly removed from the edge, the secondary veins at about an angle of 40 to 45 degrees with the midrib. Fig. 11a, Plate 53.


Add to Part XLIII, p. 98: Petiolate, thickish, equally green on both sides or slightly glaucescent, broadly lanceolate to nearly ovate.


Petiolate, thick, slightly glaucescent, pale-green on both sides, nearly orbicular, with a diameter of say 5-7 cm., or ovate; intramarginal vein at some distance from the edge; secondary venation curving, spreading, making an angle of about 40 to 45 degrees with the midrib. Figs. 2a and 2b, Plate 208.

82. *E. Stricklandi* Maiden.

Those figured are petiolate, rather thick, bluish-green on both sides, slightly glaucescent, with the branchlets covered with glandular processes (? incipient oil-glands), broadly-lanceolate, the secondary veins making an angle of about 40 to 50 degrees with the midrib. Fig. 4, Plate 209.
228

158. *E. tetricornis* Sm.

Petiolate, very thin, equally green on both sides, nearly orbicular (say 5–6 cm. in diameter) to ovate and broadly lanceolate; the intramarginal vein (or a secondary one) so very distant from the edge and so symmetrically curved with respect to the edge, that it frequently gives the leaf a marked triplinerved appearance; the secondary veins curved and making an angle of about 45 to 55 degrees with the midrib. Figs. 1a, 3a, and 4a, Plate 128.

216. *E. terminalis* F.v.M.

Petiolate, the rachis, petiole and juvenile leaf more or less covered with long, brownish hairs, the underside somewhat paler than the upper, thin, ovate, the intramarginal vein distant from the edge, and giving the leaf a triplinerved appearance (? peltate); the secondary veins looped or spreading, making an angle of about 45 to 55 degrees with the midrib. Fig. 1a, Plate 164.

193. *E. tessellaris* F.v.M.

Shortly petiolate, or nearly sessile, rather thin, equally green on both sides, linear-lanceolate, long, say 7 to 10 times the breadth, the intramarginal vein distinct from the edge, though not obvious in so narrow a leaf; the secondary veins parallel and making an angle of about 35 to 45 degrees with the midrib. Fig. 1, Plate 156.

259. *E. tetragonora* F.v.M.

 Oblong to ovate and nearly orbicular, often with cordate leaves. Sessile, or the short petioles decurrent down the rachis, not thin, very glaucous, at the same time as they get old, they are succeeded by leaves with stellate and glandular hairs on margins and midribs. See also a note at p. 162, Part XLVI.

121. *E. tetraptera* Turcz.

Petiolate, probably the thickest of all Eucalyptus leaves, sometimes almost fleshy; bright green on both sides, ovate to nearly orbicular; size ranges from 2 cm. by $\frac{3}{4}$ cm. to 9 by $5\frac{1}{2}$ cm.; venation as a rule distinct; intramarginal vein at a distance from the edge, the secondary veins curved and spreading and making an angle of about 60–65 (sometimes 70 to 75) degrees with the midrib.

47. *E. Thoetziana* F.v.M.

Shortly petiolate or sessile, linear or linear-lanceolate, mostly under 1 dm. long and 1 cm. broad, shining, dark green on both sides, moderately thin; secondary veins not very distinct, but mostly at an angle of about 30 to 35 degrees with the midrib. Fig. 13, Plate 52.
111. *Todtiana* F.v.M.

Not seen in earliest stage; shortly petiolate, dull, pale coloured, thickish, lanceolate; venation spreading, at an angle of about 40 to 50 degrees with the midrib. Fig. 3a, Plate 88.

204. *Torelliana* F.v.M.

Shortly petiolate, thin, paler on the underside, broadly lanceolate to nearly ovate and orbicular, rather large (say 9 by 14 cm. in greatest dimensions), occasionally peltate towards the base, besprinkled with stellate hairs in the usual manner of Corymbose. The juvenile leaves were described by Mueller as mature ones. See Part XXXIX, p. 240. Figs. 2a, 3a, 4a, Plate 160.


Moderately glaucous, shortly petiolate, not seen in the earliest stage, moderately thick, ovate to broadly lanceolate (say 5-6 cm. long and 2½ cm. broad), the intramarginal vein at a distance from the edge; secondary venation spreading at an angle of about 45 degrees. Figs. 2a, 2b, Plate 233.

231. *E. trachyploia* F.v.M.

Shortly petiolate, broadly lanceolate to ovate, cordate, peltate near base, paler on the underside, besprinkled with hairs, the rachis so much so as to be scabrous. Figs. 2a, 2b, 6a, 6b, 7a, Plate 174.


Sessile, stem-clasping, cordate, apiculate, thin to thickish according to exposure, glabrous, pale green underneath, the upper page dark green, nearly ovate to broadly lanceolate, large, say 12 or 13 cm. in greatest length and 9 cm. in greatest width; intramarginal vein at a considerable distance from the edge, the secondary veins looped and spreading, making varying angles with the midrib. Fig. 10, Plate 41.

68. *E. uncinata* Turcz.

Sessile, thickish, very pale on both sides, but not glaucous, almost ovate (about 3 cm. long by 2 cm. broad), to broadly lanceolate and lanceolate; intramarginal vein distinctly removed from the edge; secondary veins curved to spreading, at an angle of about 40-50 degrees with the midrib. Figs. 3a, 5, 9, Plate 62, also p. 263, Part LVI.


Sessile, rather thick, very shiny on both sides, oblong, elliptical or orbicular, small; venation inconspicuous, spreading, making an angle of about 35 to 40 degrees with the midrib.

Glabrous, or very faintly glaucous when quite young, equally green on both sides, thin, sessile, often stem-clasping, broadest towards the base, and gradually tapering towards a frequently blunt apex. The sizes of the leaves vary greatly, and the prevailing shape is lanceolate. Venation spreading, the secondary veins making an angle of about 35 to 45 degrees with the midrib. Figs. 1a, 1b, 1c, 2, 3, 6, 11a, Plate 119.


Petiolate, slightly glaucous, thin to rather thick, ovate to almost orbicular, in length up to 17 cm. and breadth 10 cm., tapering at the base, intramarginal vein distinct from the edge; venation distinct, curved and spreading, making an angle of about 30 degrees with the midrib. Fig. 2a, Plate 43.


Sessile or very shortly petiolate, slightly glaucous, moderately thick; secondary veins very spreading from the base, making an angle of about 25 to 35 degrees with the midrib. See fig. 1a, Plate 34. Greener, firmer in texture, narrower and more acuminate (Penola), than those of *E. Simmondsii*.

230. *E. Watsoniana* F.v.M.

My material is incomplete, but, such as it is, it is characteristic of the Corymbose, and may be described as follows:—(1) Petiolate, translucent, very thin, devoid of hairs, not perfoliate; purplish when fresh, broadly lanceolate. (2) Petiolate, thick, equally green on both sides, ovate to elliptical, intramarginal vein at some distance from the edge, the secondary veins coarsely transverse, at an angle of about 45 to 55 degrees with the midrib.
EXPLANATION OF PLATES (264-267).

PLATE 264.

Seeds.

Series Neuroptera.

   1a. Enlarged, showing the ventral surface and the more or less prominent nerves.
   1b. Enlarged, showing the ventral surface, the elongated hilum and the spreading nerves.
   1c. Enlarged, showing the dorsal surface and the semi-circumferential wing with its undulate, denticulate margin.
   1d. Sterile seed enlarged, showing the broad, concave depression. (Perth, Dr. J. B. Cleland.)

Series Muricatae.

   2a. Enlarged, showing the ventral surface and the position of the hilum.
   2b. Enlarged, showing the broad, smooth, dorsal surface.
   2c. Enlarged, showing the lateral surface of a very compressed seed. (Eyre's Range, via Bremer Bay, Western Australia, J. Wellstead, December, 1919.)

Series Pyramidal-D-shaped.

   3a. Enlarged, showing the ventral surface of an ovate seed.
   3b. Enlarged, showing the ventral surface and the small hilum of a somewhat elongated, reniform seed.
   3c. Enlarged, showing the ventral surface of an elongated seed.
   3d. Enlarged, showing the lateral surface of a broad, reniform seed.
   3e. Enlarged, showing the ventral surface of a moderately smooth seed with the hilum in the centre of a large depression at one end. (Tumberumba, N.S.W., J. L. Boorman, 1916.)

   4a. Enlarged, showing the ventral surface and the five ridges radiating from the large hilum.
   4b. Enlarged, showing the ventral surface of an irregular-shaped seed with the large hilum close to the upper end.
   4c. Enlarged, showing the ventral surface of a short, broad seed.
   4d. Enlarged, showing the smooth, dorsal surface of an elongated seed. (King George's Sound, J. H. Maiden, September, 1909.)

5. *E. Preisichiana*, natural size.
   5a. Enlarged, showing the lateral surface of a D-shaped seed.
   5b. Enlarged, showing the lateral surface of a long D-shaped seed.
   5c. Enlarged, showing the lateral surface of a very broad D-shaped seed.
   5d. Enlarged, showing the ventral surface of an obliquely D-shaped seed. (Bremer Bay, Western Australia, J. Wellstead, May, 1919.)

E
6a. Enlarged, showing the ventral surface of a somewhat pyramidal seed and the position of the hilum.
6b. Enlarged, showing the ventral surface of a thick D-shaped seed.
6c. Enlarged, showing the ventral surface of a thick, D-shaped, sterile seed.
6d. Enlarged, showing the lateral surface of a very compressed D-shaped sterile seed. (6 miles from Busselton, Western Australia, Percy Murphy, April, 1909.)

7a. Enlarged, showing the ventral surface and the rather large hilum.
7b. Enlarged, showing the lateral surface and one of the ridges extending from the hilum to the base of the seed.
7c. Enlarged, showing the ventral surface of a small seed.
7d. Enlarged, showing the dorsal surface of a triangular seed.
7e. Enlarged, showing the ventral surface of a D-shaped seed. (Cultivated, Botanic Gardens, Sydney, W. F. Blakely, June, 1918.)

8a. Enlarged, showing the ventral surface, with three longitudinal ridges and the small hilum at the upper end of the seed.
8b. Enlarged, showing the ventral surface of a broad, thick, seed.
8c. Enlarged, showing the lateral surface of a short, broad seed.
8d. Enlarged, showing the dorsal surface of a fertile seed, somewhat similar to 8a.
8e. Enlarged, showing the lateral surface of a D-shaped sterile seed. (Wonderland Peak, Grampians Victoria, P. R. St. John.)

9a. Enlarged, showing the ventral surface and the large hilum, also the slightly fringed margin.
9b. Enlarged, showing the ventral surface of a more pyramidal seed than 9a.
9c. Enlarged, showing the ventral surface and the broad hilum of a much smaller seed than 9a and 9b.
9d. Enlarged, showing the ventral surface of a somewhat wedge-shaped seed.
9e. Enlarged, showing the dorsal surface of a seed somewhat similar to 9a. (Cultivated, Centennial Park, Sydney, J. L. Boorman, 1918.)

10a. Enlarged, showing the ventral surface and the large hilum.
10b. Enlarged, showing the lateral surface and the small hilum of a smaller seed than 10a.
10c. Enlarged, showing the ventral surface of an irregularly shaped seed.
10d. Enlarged, showing the ventral surface of a D-shaped fertile seed.
10e. Enlarged, showing the ventral surface of a somewhat pyriform seed.
10f. Enlarged, showing the ventral surface of a pyriform seed somewhat similar to 10e. (Wyong, J. L. Boorman, 1915.)

11a. Enlarged, showing the ventral surface and the large hilum at the top. It is somewhat similar in shape to 8b.
11b. Enlarged, showing the ventral surface and the broad depressions between the ridges.
11c. Enlarged, showing the ventral and lateral surface of a more compressed seed than 11a.
11d. Enlarged, showing the lateral surface of a large D-shaped sterile seed. (Queensland, per F. M. Bailey, May, 1913.)
12a. Enlarged, showing the ventral surface and the five ridges.
12b. Enlarged, showing the ventral surface and rather strong ridges, with a broad, shallow depression between them, as in 11b.
12c. Enlarged, showing the ventral surface and the thin, sharp ridges. (Wooli State Forest, Wooli, G. Boyd, November, 1919.)

13a. Enlarged, showing the ventral surface of a somewhat D-shaped seed.
13b. Enlarged, showing the ventral surface of an elongated pyramidal seed, which is somewhat similar in shape to 4b and 9a.
13c. Enlarged, showing the ventral surface of a compressed fertile seed.
13d. Enlarged, showing the ventral surface of a broad, pyramidal seed with three radiating ridges, and the very small hilum at their junction. (Mount Victoria, J. H. Maiden, 1917.)

PLATE 265.

**Series Pyramidal-D-shaped (continued).**

1a. Enlarged, showing the ventral surface and the hilum.
1b. Enlarged, showing the lateral surface of a moderately smooth seed.
1c. Enlarged, showing the ventral surface and the prominent ridges of a large, thick seed.
1d. Enlarged, showing the ventral surface of a compressed seed.
1e. Enlarged, showing the lateral surface of a sterile seed. (Blackheath, J. L. Boorman, November, 1919.)

2a. Enlarged, showing the ventral surface of a D-shaped fertile seed.
2b. Enlarged, showing the ventral surface of an irregularly shaped seed.
2c. Enlarged, showing the ventral surface of a slightly concave seed.
2d. Enlarged, showing the ventral surface of a somewhat pyramidal-shaped seed.
2e. Enlarged, showing the smooth, dorsal surface of a somewhat similar seed to 2c. (Corner of Pittwater and Spit roads, W. F. Blakely and J. L. Boorman, October, 1921.)

3. *E. de Beuzevillei*, natural size.
3a. Enlarged, showing the lateral surface of a wedge-shaped seed.
3b. Enlarged, showing the ventral surface of a somewhat oblong seed.
3c. Enlarged, showing the ventral surface and large hilum of a thick seed with three fairly prominent ridges.
3d. Enlarged, showing the lateral surface of a large sterile seed. (Jounama Peaks, Cooma district, W. A. W de Beuzeville, December, 1919.)
   4a. Enlarged, showing the ventral surface of a cuneate seed.
   4b. Enlarged, showing the lateral surface of a more or less ovate seed.
   4c. Enlarged, showing the lateral surface of a D-shaped seed.
   4d. Enlarged, showing the ventral surface of a thick seed without the prominent ridges.
   4f. Enlarged, showing the ventral surface of a pyriform seed. (Mount Macedon, Victoria, C. Walter April, 1902.)

   5a. Enlarged, showing the narrow ventral surface of a somewhat pyramidal seed.
   5b. Enlarged, showing the broad ventral surface of a much thicker seed than 5a.
   5c. Enlarged, showing the very broad ventral surface, which is somewhat similar to 7d.
   5d. Enlarged, showing the lateral surface of a compressed seed. (Wingello, J. L. Boorman, 1917.)

   6a. Enlarged, showing the ventral surface with four faint obtuse ridges.
   6b. Enlarged, showing the lateral surface of a compressed seed.
   6c. Enlarged, showing the ventral surface of a smooth seed, much smaller than 6a.
   6d. Enlarged, showing the lateral surface of a D-shaped seed.
   6f. Enlarged, showing the dorsal surface of a small D-shaped seed. (Wyong, J. L. Boorman, 1916.)

   7a. Enlarged, showing the ventral surface and the broad hilum of a somewhat pyramidal seed.
   7b. Enlarged, showing the ventral surface of a more elongated seed than 7a.
   7c. Enlarged, showing the ventral surface with three slightly prominent ridges and the very small hilum.
   7d. Enlarged, showing the broad ventral surface of a thick, somewhat strongly ridged seed.
   7e. Enlarged, showing the ventral surface of an elongated, ridged seed. (Blackheath, J. L. Boorman, 1917.)

   8a. Enlarged, showing the ventral surface of a very strongly ridged seed.
   8b. Enlarged, showing the ventral surface of a faintly ridged seed.
   8c. Enlarged, showing the lateral surface of a D-shaped fertile seed.
   8d. Enlarged, showing the ventral surface of a smooth, elongated seed, somewhat similar to 7c. (Wingello, J. L. Boorman, 1916.)

   9a. Enlarged, showing the ventral surface of a large, somewhat pyramidal seed, which shows affinity with 8a.
   9b. Enlarged, showing the ventral surface of an elongated, pyramidal seed.
   9c. Enlarged, showing the ventral surface with a large depression on one side of the small hilum and a sharp ridge on the other side.
   9d. Enlarged, showing the dorsal surface of a thick, somewhat D-shaped fertile seed.
   9e. Enlarged, showing the lateral surface of a D-shaped sterile seed. (National Park, J. L. Boorman, 1917.)

10a. Enlarged, showing the ventral surface of an elongated pyramidal seed.

10b. Enlarged, showing the ventral surface of a thick, pyramidal seed.

10c. Enlarged, showing the ventral surface of a small pyramidal seed.

10d. Enlarged, showing the ventral surface of a compressed D-shaped seed.

10e. Enlarged, showing the lateral surface of a D-shaped seed. (Manly, near Sydney, J. L. Boorman, 1917.)


11a. Enlarged, showing the ventral surface of a thick, pyramidal seed.

11b. Enlarged, showing the ventral surface of a smaller seed than 11a.

11c. Enlarged, showing the ventral surface and prominent ridges of a pyramidal seed.

11d. Enlarged, showing the ventral surface of a somewhat similar seed to 11c and 10f. Plate 264.

11e. Enlarged, showing the ventral surface of a small, somewhat pyramidal seed. (Bellerive to Rokeby, Tasmania, J.H.M., August, 1918.)


12a. Enlarged, showing the ventral surface of a somewhat pyramidal seed.

12b. Enlarged, showing the lateral surface of a somewhat cuneate seed.

12c. Enlarged, showing the ventral surface of a moderately smooth, elongated seed.

12d. Enlarged, showing the smooth dorsal surface of an elongated seed.

12e. Enlarged, showing the slightly ridged ventral surface of an elongated seed. (Wingello, J. L. Boorman, 1919.)


13a. Enlarged, showing the ventral surface of a compressed, almost orbicular seed, with the raised hilum on the upper edge.

13b. Enlarged, showing the ventral surface of a somewhat pyramidal seed.

13c. Enlarged, showing the ventral surface of a compressed, triangular seed.

13d. Enlarged, showing the ventral surface of a somewhat elongated, pyramidal seed.

13e. Enlarged, showing the ventral surface of a D-shaped seed.

13f. Enlarged, showing the lateral surface of a D-shaped seed.

13g. Enlarged, showing the lateral surface of a D-shaped sterile seed. (Wingello, J. L. Boorman, 1917.)


14a. Enlarged, showing the ventral surface of a depressed, pyramidal seed.

14b. Enlarged, showing the ventral surface of an obliquely pyramidal seed.

14c. Enlarged, showing the ventral surface of an oblong seed with five sharp ridges.

14d. Enlarged, showing the ventral surface of a compressed seed, with a large depression around the hilum.

14e. Enlarged, showing the lateral surface of a sterile seed. (4 miles south of Mittagong, N.S.W., D. W. C. Shires, July, 1919.)


15a. Enlarged, showing the ventral surface, the large hilum, and the unequal ridges.

15b. Enlarged, showing the ventral surface of a compressed seed.

15c. Enlarged, showing the ventral and lateral surface of an oblique seed.

15d. Enlarged, showing the ventral surface of a depressed, pyramidal seed, somewhat similar to 14c.

15e. Enlarged, showing the ventral surface, the small hilum, and three prominent ridges.

15f. Enlarged, showing the lateral surface of a smooth oblong-ovate seed, which is more or less cuneate towards the top. (Opposite Blaxland railway station, W. P. Blakely and Dr. E. C. Chisholm, October, 1922.)
16a. Enlarged, showing the ventral surface of a thick, somewhat pyramidal seed, with three prominent ridges.
16b. Enlarged, showing the ventral surface of an oblong-pyramidal seed.
16c. Enlarged, showing the lateral surface of a large, elongated seed.
16d. Enlarged, showing the ventral surface of a compressed fertile seed. (Marulan, N.S.W., J. L. Boorman, 1916.)

17. *E. regnans*, natural size.
17a. Enlarged, showing the ventral surface of an obliquely pyramidal seed.
17b. Enlarged, showing the smooth ventral surface of an ovate seed.
17c. Enlarged, showing the ventral surface and the faint ridges of an obliquely pyramidal seed.
17d. Enlarged, showing the ventral surface of an elongated pyramidal seed.
17e. Enlarged, showing the lateral surface of an ovate-cuneate seed, somewhat similar to 15f. (Powelltown, Victoria, per Forests Commission, December, 1922.)

18a. Enlarged, showing the ventral surface of a depressed pyramidal seed.
18b. Enlarged, showing the ventral surface of a somewhat similar seed to 17a.
18c. Enlarged, showing the ventral surface of a compressed-pyramidal seed.
18d. Enlarged, showing the ventral surface of a pyramidal seed with a very broad hilum.
18e. Enlarged, showing the lateral surface of a smooth, oblong seed.
18f. Enlarged, showing the ventral surface of a somewhat triangular seed. (Mount Victoria, J.H.M.)

19a. Enlarged, showing the dorsal surface of an oblong seed.
19b. Enlarged, showing the ventral surface and the prominent ridge, also the small hilum.
19c. Enlarged, showing the ventral surface and the prominent ridge.
19d. Enlarged, showing the ventral surface of a thick, D-shaped seed.
19e. Enlarged, showing the dorsal surface of 19d.
19f. Enlarged, showing three sterile seeds, all of which are thin and compressed.

20a. Enlarged, showing the ventral surface and the prominent hilum.
20b. Enlarged, showing the ventral surface and the position of the small hilum.
20c. Enlarged, showing the ventral surface of a compressed seed.
20d. Enlarged, showing the ventral surface and the small hilum of a somewhat similar seed to 20a.
20e. Enlarged, showing the dorsal surface of an elongated seed.
20f. Enlarged, showing the ventral surface of a moderately smooth seed. (Parish Robertson, county Gough, Glen Innes district, per Forestry Commission, November, 1918.)

21a. Enlarged, showing the ventral surface and the four ridges.
21b. Enlarged, showing the ventral surface and the prominent hilum in the centre, with a sharp ridge on both sides.
21c. Enlarged, showing the ventral surface and four radiating ridges.
21d. Enlarged, showing the ventral surface of a very compressed seed.
21e. Enlarged, showing the ventral surface of a smooth, ovate seed. (Wingello, J. L. Boorman, 1917.)
22. *E. erythrocorys*, sterile seed, natural size.
22a. Enlarged sterile seed.

23. *E. eximia*, sterile seeds, natural size.
23a. Enlarged, a somewhat chaffy sterile seed.
23b. Enlarged, a quadrangular sterile seed.
23c. Enlarged, a broad chaffy sterile seed.
23d. Enlarged, a slightly winged sterile seed.

24a. Enlarged, a long, flaky sterile seed.

25a. Sterile seeds, all enlarged.

26a. Enlarged, a thin, flaky, sterile seed.
26b. Enlarged, an elongated, quadrangular sterile seed.
26c. Enlarged, a subulate, sterile seed.

27. *E. pyriformis*, sterile seeds, natural size.
27a. Enlarged, sterile seed.
27b. Enlarged, sterile seed.

---

**PLATE 266.**

**Some additional Juvenile Leaves.**

*E. calycogona* Turcz.

Juvenile twig; 1a, broad juvenile leaf; 1b, intermediate leaf. (Yeeanna, Eyre's Peninsula, W. J. Spafford.)

*E. Campaspe* S. le M. Moore.

2. Juvenile leaf; 2a, a more advanced juvenile leaf; 2b, intermediate leaf; 2c, large fruit. (Kalgoorlie, Western Australia, J. M. Cusack, per C. A. Gardner.)

*E. ficiolia* F.v.M.

3. Large juvenile leaf. (Irwin Inlet, Western Australia, Dr. F. Stoward, No. 112.)

*E. vitrea* R. T. Baker.

4. Broad juvenile leaves; 4a, narrow juvenile leaves. (Penola Reserve, South Australia, W. Gill, July, 1922.)

*E. tetragona* Turcz.

5. Juvenile twig, showing the opposite character of the juvenile leaves and also the hairy young shoots.
PLATE 267.

_E. Flocktonia_ Maiden.

1. Branch of early juvenile leaves. (Bendering, Western Australia, C. A. Gardner, No. 1,686.)

_E. Baileyana_ F.v.M.

2. Early juvenile leaves; 2a, large juvenile leaf, slightly lobed at the base; 2b, juvenile leaves showing the stellate hairs on the stem and on the leaves. Note, 2a and 2b are semi-peltate. (About 2 miles east of Copmanhurst on the old Copmanhurst-Grafton road, W. F. Blakely and D. W. C. Shiress, July, 1922.)

_E. Bauverieni_ F.v.M.

3. Two pairs of juvenile leaves in the opposite stage. (Federal Pass, about half a mile from Wentworth Falls, N.S.W., Dr. E. C. Chisholm, January, 1923.)

_E. Dalrympleana_ Maiden.

4. A pair of very broad juvenile leaves. (Same locality, collector and date as No. 3)
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:

- *acaciodes* A. Cunn. (xlviii).
- *acmenioides* Schauer (xxxii).
- *affinis* Deane and Maiden (lii).
- *amyrgdalina* Labill. (xvi).
- *Andrersei* Maiden (xxi).
- *Bakeri* Maiden (lxx).
- *Baueriana* Schauer (lvii).
- *Baueriana Schauer* var. *conica* Maiden (lviii).
- *bicolor* A. Cunn. (lxxiv).
- *Boormanii* Deane and Maiden (lv).
- *Caley* Maiden (lv).
- *capitellata* Sm. (xxxvii).
- *conica* Deane and Maiden (lvii).
- *Consideniana* Maiden (xxxv).
- *coriacea* A. Cunn. (xv).
- *corymbosa* Sm. (xili).
- *Dalrympleana* Maiden (lxiv).
- *dives* Schauer (xii).
- *dumosa* A. Cunn. (lxv).
- *eugenioides* Sieber (xxxii).
- *gigantea* Hook. f. (lii).
- *globulus* Labill. (lxxi).
- *hemastoma* Sm. (xxxvii).
- *longifolia* Link and Otto (lii).
- *maculata* Hook. (vii).
- *melliodora* A. Cunn. (lix).
- *Mulleriana* Howitt (xxx).
- *numerosa* Maiden (lxxii).
- *obliqua* L'Hérit. (xxxii).
- *ochrophloia* F.v.M. (i).
- *odorata* Behr and Schlendt. (xli).
- *paniculata* Sm. (vi).
- *pilularis* Sm. (xxxii).
- *piperita* Sm. (xxxii).
- *polyanthemos* Schauer (lix).
- *populifolia* Hook. (lxl).
- *propinqua* Deane and Maiden (lxii).
- *punctata* DC. (x).
- *radiata* Sieb. as *amyrgdalina* (lxiii).
- *resinifera* Sm. (iii).
- *robusta* Sm. (lxviii).
- *rostrata* Schlcht. (lxi).
- *rubida* Deane and Maiden (lxii).
- *saligna* Sm. (iv).
- *siderophloia* Benth. (xxxix).
- *sideroxylon* A. Cunn. (xiii).
- *Smithii* R. T. Baker (lxx).
- *stellulata* Sieb. (xliii).
- *tereticornis* Sm. (xii).
- *viminalis* Labill. (lxiv).
- *virgata* Sieb. (xxv).
- *vitrea* R. T. Baker (xlviii).

* Government Printer, Sydney. 4to. Each part contains 4 plates and other illustrations.

**NOTE BY GOVERNMENT PRINTER.**

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

Sydney: Alfred James Reed, Government Printer—1925.
EUCALYPTUS TOOTIANA F.v.M. (1).
E. GIGANTEA Hook. f. (3).
E. PATENS Benth. (4).
E. DIVERSEPOLIA Bonpland. (7).
E. PILULARIS Sm. (10).
E. MEGACARPA F.v.M. (9).
E. MARGINATA Sm. (4).
E. ALPINA Lodd. (8).
Crit. Rev. Eucalyptus.

PL. 265.

SEEDS.

Eucalyptus Blaxlandii Maiden and Cambage (1).
E. Obliqua L. H. Ewing (6).
E. Virgata Sm. (9).
E. Dives Schauer (17).
E. Stellulata Sm. (17).

E. Capitellata Sm. (2).
E. Agmenioides Schauer. (9).
E. Hemsatoma Sm. (19).
E. Vitrea R. T. Baker (14).
E. Moorei Maiden and Cambage (18).
E. Globulus Labill. (29).

E. de Beuzevillii Maiden (3).
E. Piperita Sm. (7).
E. Amygdalina Labill. (11).
E. Eucalyptus Sm. (9).
E. Radiata Sm. (12).
E. Fastigata Druce and Maiden (18).
E. Andrewii Maiden (20).

([Nos. 22-27 are sterile.)]
ADDITIONAL JUVENILE LEAVES.

EUCALYPTUS CALYCOGONA Turcz. (1).
E. CAMPASPE S. le M. Moore (2).
E. FICIFOLIA F.v.M. (3).
E. VITREA R. T. Baker (4).
E. TETRAGONA F.v.M. (5).
ADDITIONAL JUVENILE LEAVES.

A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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


Part LXVI of the complete work.

(with four plates.)

Price Three Shillings and Sixpence.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER.

1926.
INDEX OF PARTS PUBLISHED.

PART I.

PART II.
2. E. obliqua L. Héritier. Plates, 5-8. (Issued May, 1903.)

PART III.

PART IV.

PART V.

PART VI.
9. E. amygdaлина Labillardière. Plates, 29-32. (Issued April, 1905.)

PART VII.
12. E. regna B. Sm. Plates, 41-44. (Issued November, 1907)
13. E. acenophilum F. M. Plates, 45-48. (Issued December, 1908.)

PART VIII.

PART IX.
32. E. nana Sm. Plates, 55-56. (Issued November, 1910.)
33. E. Sieberiana F. M. Plates, 57-60. (Issued March, 1911.)
34. E. Considerina Maiden. Plates, 61-64. (Issued March, 1912.)
35. E. hartii Sm. Plates, 65-68. (Issued March, 1913.)
36. E. hartii Sm. Plates, 69-72. (Issued September, 1912.)
37. E. acerifolia Hook. f. Plates, 73-76. (Issued February, 1913.)
38. E. acerifolia Hook. f. Plates, 77-80. (Issued July, 1913.)
39. E. acerifolia Hook. f. Plates, 81-84. (Issued December, 1913.)
41. E. acerifolia Hook. f. Plates, 89-92. (Issued April, 1914.)
42. E. acerifolia Hook. f. Plates, 93-96. (Issued April, 1914.)
43. E. acerifolia Hook. f. Plates, 97-100. (Issued July, 1915.)
44. E. acerifolia Hook. f. Plates, 101-104. (Issued February, 1916.)
A Critical Revision of the Genus Eucalyptus

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Part LXVI of the Complete Work.

(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

Price Three Shillings and Sixpence.

Published by Authority of
The Government of the State of New South Wales.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1926.
RANGE.

[N.B.—Every Part, under each species, contains a Section entitled “Range.”] What follows (pages 239 to 274) is an attempt to group and classify the species—localities there given, and at pages 280 to 305 will be found additional records of localities in order to keep them as far as possible up to date.

In the final Part these notes and tables, enumerated under “Range,” will be supplemented by such additional records as are then available.

1. Definitions of Climographs . . . . . . . 239
2. Species arranged according to Climographs . . 242
3. Species arranged according to States . . . . 264
4. Tropical Species—
   North Western Australia.
   The term “Pindan” . . . . . . . . 271

Northern Territory.
   Use of the term “North Australia” . . 272

Northern Queensland . . . . . . . . 273
5. Extra-Australian Species . . . . . . . 274
   E. Naudiniana and some synonyms, doubtful and otherwise . . . . 275

Philippines and New Britain, Papua, Timor, etc. 276
6. Australian Species cultivated abroad . . . . 276
7. Addition to Range of individual Species (as already given under each Species) . . . . 280

THE LEAF.
(Continued from Part LXV, p. 280).

The Intermediate Leaf.
1. Preliminary . . . . . . . . . . . . . . 306
2. The “Saplings” of Howitt . . . . . . . . 306
3. A cycle of Intermediate Leaves . . . . . 307
4. Figures of Intermediate Leaves . . . . . 310
   Explanation of Plates (268-271) . . . . 313
The late J. H. Maiden, F.R.S. F.L.S.
That great man, Joseph Henry Maiden, who departed this life at Turramurra, Sydney, on the 16th November, 1925, was a bright example of those depicted in the above lines, and in his multitudinous volumes giving the results of careful botanical investigations he has left behind him a noble monument to his energy, his capacity, and his high sense of duty due to the nation.

Born at St. John’s Wood, London, in April, 1859, he received his early education at the City of London Middle Class School, soon showing a taste for science, and for some time was assistant to the late Professor F. Barff. He came to Australia in 1880 for health reasons, having provided himself with a return ticket, and for a few months was engaged upon tutorial duties. The climate proved so beneficial, he decided to remain, and became associated with the formation of the Technological Museum, Sydney, of which he was Curator from 1881 to 1896, and he soon began to study the native plants. Some of his early botanical lessons were learnt from the late Rev. Dr. William Woolfs, for whom he always retained the most affectionate memories. He was also a colleague in botanical work of the late Baron von Mueller in his latter days, another of the great pioneers of Australian botany. Mr. Maiden was Superintendent of Technical Education from 1894 to 1896; Consulting Botanist to the Departments of Agriculture and Forests from 1890; Lecturer in Forestry in the University of Sydney from 1913 to 1921, and Lecturer in Agricultural Botany from 1914 to 1921; Director of the Botanic Gardens, Sydney, Government Botanist, and Officer-in-Charge, Centennial Park, from 1896 until his retirement in 1924.

The particular genus which he studied most intensively was that almost exclusively Australian one—*Eucalyptus*—and he added very many new species to the list previously known, his field of investigation extending all over Australia. He also gave very close attention to the genus *Acacia*, the largest in Australia, and described numerous new species from many parts of the Commonwealth, though there was no family which escaped his critical notice. A feature of his investigations in the forest was his close attention to details, and it was his custom to stand in front of the tree or shrub under examination, note-book in hand, and enter his observations on the spot.

By his enthusiasm and energy he formed the present Herbarium at the Sydney Botanic Gardens, one of the finest in the Southern Hemisphere, and made many personal journeys in the various States for material to enrich his collections. He also, at considerable trouble, obtained type specimens which were collected in Australia in the early days, but had been housed in herbaria in other parts of the world, including some collected by Sir Joseph Banks in 1770.
His masterpiece in the field of botanical research is his "Critical Revision of the Genus Eucalyptus," of which sixty-four parts have already appeared. Part 65 is just about to issue, and about half a dozen others are going through the press, the material having been prepared by Mr. Maiden prior to his death.

Another valuable publication by the same author is the "Forest Flora of New South Wales," of which seventy-seven parts have been issued and the publication completed, or, at least, rounded off. Other publications are "Useful Native Plants of Australia," and "Illustrations of New South Wales Plants." He made numerous valuable contributions on various subjects, including weeds, to the "Agricultural Gazette of New South Wales," and the service he has rendered during his long career in the interest of forestry in this State has been very great and of the highest importance, and he was looked upon as one of the leading authorities on the subject in the Commonwealth.

In his official life as a public servant it will be readily admitted that Mr. Maiden's duties, many and varied, have been carried out with the highest degree of efficiency and success, but in addition to this there was another side of progressive life which claimed and received his devoted attention, and this was the supporting of societies which had for their object the advancement of science and education in their broadest aspects.

He was a member of the Royal Society of New South Wales for forty-two years, Honorary Secretary for twenty-two years, and President in 1896 and 1911; a member of the Linnean Society of New South Wales for forty-two years, a member of the Council for thirty-five years, and President in 1901 and 1902; President of the New South Wales Horticultural Society for twenty years, and of the Royal Australian Historical Society for two years. He was a man full of energy, and one of the most outstanding features of his activities was his industry. He never seemed to tire of writing up and placing on record any scientific facts which made for the advancement of knowledge, his contribution to the Royal Society of New South Wales being forty-five papers, the last having been presented in 1925, while his papers to the Linnean Society of New South Wales amounted to ninety-five. He was a foundation member of the Australian National Research Council in 1919, and a Vice-President at the date of his death.

He entertained a very high regard for Sir Joseph Banks, whom he styled "The Father of Australia," and his biography of Sir Joseph, written chiefly for the purpose of raising funds for a memorial to that great botanist, is considered to be a classic. Mr. Maiden was one of the chief originators of the National Wattle Day celebration in the Commonwealth, which has for its object the cultivation of an Australian national sentiment, while keeping in view the fact that this country forms part of the British Empire. In 1915 he was awarded the Linnean Medal by the Linnean Society of London, his being the first occasion upon which this medal had been won by an Australian. He was elected a Fellow of the Linnean Society of London in 1888, and in 1916 was honoured by having the Imperial Service Order conferred upon him, and also by being elected a Fellow of the Royal Society of London. In 1921 he was offered the Presidency
of the Australasian Association for the Advancement of Science, but declined it for health reasons, and in 1922 was awarded the Mueller Medal by that body, of which he was Honorary Secretary for fourteen years, and in 1924 he gained the Clarke Memorial Medal awarded by the Royal Society of New South Wales.

Maiden ranks among the half-dozen leading pioneering botanists who have contributed so much to our knowledge of the unique Australian flora, and for many years was regarded as the doyen of Australian botanists. He served as an inspiration to very many science students, probably more than ever will be known, and as some evidence of the affection and esteem in which he was held by his colleagues in science, he was, in 1916, presented with his portrait in oils. In addition to having been made Honorary Member of many Australian scientific societies, so great was his fame, that his work has been recognised in a somewhat similar manner by not less than fifteen societies in various parts of the world outside the Commonwealth, including Europe and America.

In addition to the amount of scientific work which he carried out as the result of his own investigations, he served as an outstanding stimulus to scientific progress generally, and, being a born organiser, added great strength to those institutions which were reached by his influence.

His devotion to the Botanic Gardens was inspiring, and he loved every flower that grew therein, no matter how humble. What more fitting and what more deserving tribute could be paid him, in recognition of his great services to the State and to Australia, than to erect a lasting memorial to his memory in his beloved Gardens? It may, indeed, be said of him that he left "footprints on the sands of time," for the world is richer for his labours, and his life was filled with greatness, nobility of character and sincerity.

R. H. CAMBAGE.

February, 1926.
1.—DEFINITIONS OF CLIMOGRAPHS.

GRIFFITH TAYLOR has proposed the following Climographs (as he terms them) for Rainfall Regions (rainfall is not, however, the only factor), in his "The Australian Environment (especially as controlled by Rainfall)."

<table>
<thead>
<tr>
<th>Region</th>
<th>W.1</th>
<th>Tropical Western Australia</th>
<th>...</th>
<th>Hall's Creek.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W.2</td>
<td>Arid Coast</td>
<td>...</td>
<td>Carnarvon.</td>
</tr>
<tr>
<td></td>
<td>W.3</td>
<td>Arid Centre</td>
<td>...</td>
<td>(like Nullagine).</td>
</tr>
<tr>
<td></td>
<td>W.4</td>
<td>Swanland</td>
<td>...</td>
<td>Perth.</td>
</tr>
<tr>
<td></td>
<td>K.1</td>
<td>Darwinia...</td>
<td>...</td>
<td>Darwin.</td>
</tr>
<tr>
<td></td>
<td>K.2</td>
<td>Macdonnells</td>
<td>...</td>
<td>(like Daly Waters).</td>
</tr>
<tr>
<td></td>
<td>S.1</td>
<td>Lake Eyre</td>
<td>...</td>
<td>(like Broken Hill).</td>
</tr>
<tr>
<td></td>
<td>S.2</td>
<td>Adelaide</td>
<td>...</td>
<td>(like Broken Hill).</td>
</tr>
<tr>
<td></td>
<td>Q.1</td>
<td>Cloncurry</td>
<td>...</td>
<td>Cloncurry.</td>
</tr>
<tr>
<td></td>
<td>Q.2</td>
<td>Townsville</td>
<td>...</td>
<td>Townsville.</td>
</tr>
<tr>
<td></td>
<td>Q.3</td>
<td>Brisbane</td>
<td>...</td>
<td>Brisbane.</td>
</tr>
<tr>
<td></td>
<td>N.1</td>
<td>Darling-Lachlan</td>
<td>...</td>
<td>Broken Hill.</td>
</tr>
<tr>
<td></td>
<td>N.2</td>
<td>Canberra</td>
<td>...</td>
<td>Sydney.</td>
</tr>
<tr>
<td></td>
<td>V.</td>
<td>Victoria</td>
<td>...</td>
<td>Melbourne.</td>
</tr>
<tr>
<td></td>
<td>T.</td>
<td>Tasmania</td>
<td>...</td>
<td>Hobart.</td>
</tr>
</tbody>
</table>

Each Region is illustrated by a map showing contours and Rainfall. We will see if we can place the Eucalypts in these Regions. There is a Key Map to the 15 Rainfall Regions at Fig. 14, p. 33, which will be reproduced later in the present work.

Column No. 1 gives the letter and sequence number (if any), indicating the Region, Column No. 2, the proposed name of the Region, and Column No. 3 the name of a centre of population or district (usually) as a catch-word to help to memorise the Regions.

1. Region W.1. Tropical W. A. Hall's Creek.

That portion of the Western State which lies north of the Tropic of Capricorn. Bounded on the south by the arid regions (W.2 and W.3) and on the east by the Northern Territory. At the north it includes the Kimberleys.


The boundaries are not physical, and therefore must be somewhat artificial. The region corresponds closely to Jutson's North-West Division. The two important rivers are the Gascoyne and the Murchison

Has greater aridity than W.2. The boundaries are arbitrary. The northern boundary is along the Tropic of Capricorn. The west is bounded by W.2 at E. The southern boundary is approximately the 10 inch isohyet (Bullfinch to Balladonia), while the sea-coast and the South Australian frontier (129° E) complete the boundaries.


A temperate region with a rainfall of over 10 inches (it roughly follows the 10 inch isohyet on the east). It is bounded by the ocean on the west and south, includes the south-west of local parlance, and is a triangular area. The Leeuwin is the most notable angle of the triangle.

"The south-west of the State is different in character from any other portion of Australia. Its rains fall chiefly in winter, and reach 40 inches per annum near Cape Leeuwin, which differentiates it from the rest of the State; while its geology and flora are notably different from that of the winter rain regions in Eastern Australia."


Includes the northern part of the Northern Territory, and is roughly bounded on the south by the 15 inch isohyet, and on the east by the Gulf of Carpentaria.


Includes the southern part of the Northern Territory; the western boundary is Western Australia, while the eastern is Queensland. It has three main ranges, running east and west, viz., in the north (lat. 21 deg.), the Davenport Ranges (2,000 feet); on the Tropic, a series of parallel ranges called the Macdonnells, culminating in Mount Heughlin (4,800 feet); the Musgrave Ranges in the south, culminating in Mount Woodruffe (4,000 feet).

7. Region S.1. Lake Eyre. (Like Broken Hill).

It is the northern arid region of South Australia. It may be separated from S.2 by a line joining the head of the Bight to the south of Lake Frome. This line agrees fairly with the 10 inch isohyet, and separates the Western Tableland and Lake Eyre basin from the coastal portions of the State. "In this division is one of the chief areas of internal drainage in the world."


This forms the southern moiety of the State of South Australia; it is the southern agricultural region, and roughly corresponds to what has long been termed the "counties," i.e., those portions of the State where definite land areas have been delimitated and named.

It is the extreme north west of Queensland, and has somewhat artificial boundaries, but differs considerably from the rest of that State. Elsewhere Taylor calls it the Western Plains Region. On the north its limit is the Gulf of Carpentaria, on the west the Northern Territory, on the south South Australia, and on the east an arbitrary line running along the Beal Range to Opalton (near Longreach) and thence north (along Long. 143 deg.) to Shelburne Bay.


This is the extreme north-east of Queensland, and is elsewhere referred to as the Tropical Highlands. The boundaries consist of the Pacific Ocean on the east, and the Tropic of Capricorn on the south. On the west we have an arbitrary line running from Shelburne Bay on the north, through Winton, to cross the tropic near Opalton. For the greater part of its course this line agrees fairly well with the 500 feet contour.


The southern portion of Queensland and the northern portion of New South Wales. "Temperate Highlands." The northern boundary is the Tropic of Capricorn, the southern boundary is a line joining Newcastle to the extreme north-west of New South Wales near Milparinka. On the east is the Pacific Ocean, while the western boundary runs from the corner of New South Wales to the Beal Range, and thence to the tropic near Winton.


This comprises most of the lowland region of New South Wales, including the basins of the Darling, Lachlan and Lower Murrumbidgee Rivers. Its northern boundary is somewhat north of the Dubbo, Nyngan, Bourke, Milparinka line (which agrees for a considerable distance with the boundary between the Artesian Basin and the ancient Cobar peneplain). On the east the boundary is close to the 1,000 feet contour; on the south the boundary is the Murray River, and the west South Australia.


It includes the chief highlands of the Continent. On the north is the Hunter Valley, with the Cassilis Geocol. On the west a line from near Cassilis to Wilson's Promontory. The southern and eastern boundaries are Bass's Straits and the Tasman Sea. It comprises south-eastern New South Wales, and Gippsland, Victoria.

The State of Victoria, with the exception of the eastern quarter, including Gippsland, which comes into N. 2. In spite of this truncation, it includes many elevated areas, particularly in the east.


Consists of the State of Tasmania. This Region is closely akin to Victoria. both geographically and meteorologically.

### Species Arranged According to Climograph.

<table>
<thead>
<tr>
<th>Climograph</th>
<th>No. of Species</th>
<th>Position as arranged according to Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1.</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>W2.</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>W3.</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>W4.</td>
<td>88</td>
<td>3</td>
</tr>
<tr>
<td>K1.</td>
<td>33</td>
<td>9</td>
</tr>
<tr>
<td>K2.</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>S1.</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>S2.</td>
<td>37</td>
<td>5</td>
</tr>
<tr>
<td>Q1.</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>Q2.</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>Q3.</td>
<td>95</td>
<td>2</td>
</tr>
<tr>
<td>N1.</td>
<td>34</td>
<td>8</td>
</tr>
<tr>
<td>N2.</td>
<td>115</td>
<td>1</td>
</tr>
<tr>
<td>V.</td>
<td>49</td>
<td>4</td>
</tr>
<tr>
<td>T.</td>
<td>25</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sequence</th>
<th>No. of Species</th>
<th>Climograph</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>115</td>
<td>N2.</td>
</tr>
<tr>
<td>2.</td>
<td>95</td>
<td>Q3.</td>
</tr>
<tr>
<td>3.</td>
<td>88</td>
<td>W4.</td>
</tr>
<tr>
<td>4.</td>
<td>49</td>
<td>V.</td>
</tr>
<tr>
<td>5.</td>
<td>37</td>
<td>S2.</td>
</tr>
<tr>
<td>6.</td>
<td>36</td>
<td>W3.</td>
</tr>
<tr>
<td>7.</td>
<td>35</td>
<td>Q2.</td>
</tr>
<tr>
<td>8.</td>
<td>34</td>
<td>N1.</td>
</tr>
<tr>
<td>9.</td>
<td>33</td>
<td>K1.</td>
</tr>
<tr>
<td>10.</td>
<td>32</td>
<td>W1.</td>
</tr>
<tr>
<td>11.</td>
<td>25</td>
<td>T.</td>
</tr>
<tr>
<td>12.</td>
<td>23</td>
<td>Q1.</td>
</tr>
<tr>
<td>13.</td>
<td>16</td>
<td>S1.</td>
</tr>
<tr>
<td>15.</td>
<td>11</td>
<td>K2.</td>
</tr>
</tbody>
</table>
A. In the following list we have the species arranged according to Regions, in the strict sequence of regional numbers (W.1, W.2, &c.) as enumerated by Griffith Taylor. Within the Regions they are arranged in alphabetical order.

W.1,
- argillacea.
- Cliftoniana.
- collina.
- confluentes.
- Herbertiana.

latifolia.
lirata.
Mooreana.
pallidifolia.
perfoliata.

W.1, W.2, W.3, K.1, K.2, S.1, S.2, Q.1, Q.3, N.1, V.
- rostrata.

W.1, W.2, K.1, K.2, Q.2, Q.3.
dichromophloia.

W.1, W.2, K.1, S.1, Q.1, Q.3 N.1.
microtheca.

W.1, K.1.
- brachyandra.
- Foelscheana.
- Houseana.
- latifolia.

odontocarpa.
oligantha.
ptychocarpa.

W.1 K.1, K.2, Q.1.
- pruinosa.

W.1, K.1, K.2, Q.1, Q.2.
papuana.

W.1, K.1, K.2, Q.1, Q.2, Q.3, N.1.
pyrophora.

W.1, K.1, S.1, Q.1, Q.2, Q.3.
terminalis.

W.1, K.1, Q.1.
- grandifolia.
- miniata.
- pallidifolia.

setosa.
Spenceriana.
tetrodonta.

W.1, K.1, Q.1, Q.2.
alba.

clavigera.

W.1, Q.2, Q.3.
melanophloia.
W.2.  
_Ebanoensis._  
_erythrocoris._  

W.2, W.3.  
_Ewartiana._  

W.2, W.3, W.4, K.2, S.1, S.2, N.1, V.  
_transcontinentalis._  

W.2, W.3, K.1, S.1.  
_cudesmioides._  

W.2, W.3, K.2.  
_gamophylla._  

W.2, W.3, S.1.  
_Oldfieldii._  

W.2, W.3, S.1, S.2, N.1, V.  
_oleosa._  

W.2, W.4.  
_casica._  

W.3.  
_angusta._  
_Clelandi._  
_Comitate-Vallis._  
_Jutsoni._  

_angustissima._  
_Campaspe._  
 CELASTROIDES.  
_crucis._  
_cremophila._  
_Griffithsii._  
_longicornis._  

W.3, W.4, S.1.  
_conglobata._  

W.3, W.4, S.2, N.1, V.  
_leptophylla._  

W.3, W.4, S.2, V.  
_angulosa._  

striationalyx.

fasciata.

Kruseana.

Le Souefii.

Stricklandii.

Woodwardi.

melanoxylon.

micranthera.

salmonophloia.

salubris.

Sheathiana (W.4.) ?  

torquata.

Websteriana.

pyriformis var. Kingsmilli.
W.3, W.4, S.1, S.2, N.1, V.  
*gracilis.*

W.3, K.1, K.2, S.1, S.2, N.1, Q.3.  
*intertexta.*

W.4.  
*accedens.*  
*albida.*  
*annulata.*  
*astringens.*  
*buprestium.*  
*Burracoppinensis.*  
*calophylla.*  
*Cooperiana.*  
*cornuta.*  
*corrugata.*  
*cyindrisriflora.*  
*decipiens.*  
*decurva.*  
*Desmondensis.*  
*diptrera.*  
*diversicolor.*  
*Dongarraensis.*  
*doratoxylon.*  
*Drummondi.*  
*Dundasi.*  
*erythronema.*  
*falcata.*  
*ficifolia.*  
*Forrestiana.*  
*Gardneri.*  
*gomphocephala.*  
*goniantha.*  
*gossa.*  
*Guilfoylei.*  
*hamatoxylon.*  
*incrassata.*  
*Jacksoni.*  

W.4, S.2.  
*Flocktoniae.*

W.4, S.2, V.  
*calycogona.*

Kalganensis.  
Kesselli.  
Kondininensis.  
Lane Poolei.  
Lehmanni.  
Leptopoda.  
macrandra.  
marginata.  
Megacarpa.  
Merrickae.  
Mundijongensis.  
nutans.  
Occidentalis.  
Orbifolia.  
Ovularis.  
Pachylyoma.  
Patens.  
Platypus.  
Preissiana.  
Redunca.  
Rudis.  
Sargenti.  
Sepulcralis.  
Spathulata.  
Staerii.  
Stovardi.  
Tetragona.  
Tetraptera.  
Todtiana.  
Uncinata.  
Xanthonema.
K.1.
aspera.
Hilliana.
Jenseni.
K.1, K.2 (?).
ferruginea.
K.1, K.2, Q.1.
pachyphylla.
K.1, Q.1, Q.2, Q.3, N.2.
trachyphloia.
S.1
Isingiana.
S.1, S.2, Q.3, N.1, N.2, V.
albens.
S.2.
cladocalyx.
cneorifolia.
cosmophylla.
S.2, Q.3, N.1, V.
bicolor.
S.2, Q.3, N.2, V
elatophora.
goniocalyx.
S.2, Q.3, N.2, V, T.
obliqua.
S.2, Q.3, V.
macrorrhyncha.
S.2, N.1.
Gillii.
S.2, N.1., N.2, V.
microcarpa.
S.2, N.1., V.
Behriana.
dumosa.
S.2, N.2, V.
vitrea.
S.2, N.2, V, T.
coriacea.

patellaris.
phaenicea.
Umbravirensis.
Pimpiniiana.
fasciculosa.
Kalangadoensis.
McIntyreensis.
Muelleriana.
odorata.
fruticetorum.
ovata.
S.2, V.
  Baxteri.
  diversifolia.

Q.1.
  Normantonensis.

Q.1, Q.2.
  leptophleba.

Q.1, Q.2, Q.3.
  peltata.

Q1, Q.2, Q.3, N.1, N.2.
  crebra.

Q.2.
  Abergiana.
  Brownii.
  Culleni.
  Howittiana.
  microneura.

Q.2, Q.3.
  Andrewsii.
  Cambageana.
  citriodora.
  Cloeziana.

Q.2, Q.3, N.1;
  populifolia.

Q.2, Q.3, N.2.
  corymbosa.
  grandis.
  micrantha.

Q.3.
  acaciaiformis.
  approximans.
  Auburnensis.
  Baileyana.
  Bakeri,
  Banksii.
  Bloxsomei.
  decorticans.
  Dunnii.
  Forsythii.
  Laseroni.
  ochrophloia.

ieucoxylon

Whitei.

tessellaris.

Raveretiana
  Shirleyi.
  Staigeriana.
  Torelliana.

drepanophylla.

exserta.

Raveretiana.

similis.

pellita.

tereticornis.

Peacockeana.

Planchoniana.

rariflora.

Rummergi.

scoparia.

Seeana.

Stopfordii.

Taylori.

Thozetiana.

Watsoniana.

Yagobiei.
Q.3, N.1
Piligaaensis.

Q.3, N.1, N.2.
affinis.
Blakelyi.

Q.3, N.1, N.2. V.
melliodora.

Q.3, N.1, V.
acacioides.

Q.3, N.2.
acmenioides.
amplifolia.
Baneraiti.
Baneriana.
Caleyi.
capitellata.
Dawsoni.
Deanei.
eximia.
eugenioides.
hemiphloia.
intermedia.
Kirtoniana.
laropinea.

Q.3, N.2, V.
fastigata.

Q.3, N.2, V, T.
globulus.

N.1.
Barmedmanensis.

N.1, N.2.
Dwyeri.

N.1, N.2, V.
polyanthemos.

N.1, S.2, Q.3.
Morrisii.
N.2.  
adjuncta.  
agglomerata.  
altior.  
angophoroides.  
apiculata.  
Bauerleni,  
Benthamii,  
de Beuzevillei.  
Beyerii.  
Blaxlandii.  
Boormanii,  
Camfieldii,  
canaliculata.  
Chisholmi.  
cinerea.  
Consideniana.  
Dalrympleana.  
fraxinoides.  
hamastoma.  
hybrida.  
Kybeanensis  
ligustrina.  

N.2, Q.3.  
pilularis.  
quadranulata.  

N.2, V.  
Bosistoana.  
botryoides.  
cinerea var. multiflora.  

N.2, V., T.  
gigantea.  
regnans.  

N.2, T.  
aggregata.  
Gunnii.  

V.  
alpina.  
Blackburniana.  
Kitsoniana.  

longifolia.  
Macarthuri.  
maculosa.  
Maideni.  
Mitchelliana.  
Moorei.  
nitens.  
notabilis.  
Nowraensis.  
ottusiflora.  
Pararamattensis.  
parrifolia.  
Penrithensis.  
praeox.  
pulverulenta.  
pumila.  
Shiressii.  
squamosa.  
Smithii.  
stricta.  
virgata.  
Westoni.  

N.2, V., T.  

strellulata.  

dives (V.).  
numerosa (V.).  

N.2, V., T.  

Sieberiana.  
Perriniana.  

neglecta.  
Studleyensis.  
Yarraensis.
B. In this list the species are arranged under Climograph numbers, irrespective of whether a species belongs to more than one Region.

W.1.

alba
argillacea.
brachyandra.
clavigera.
Cliftoniana.
collina.
confluentes.
dichromophloia.
ferruginea.
Foelscheana.
grandifolia.
Herbertiana.
Houseana.
latifolia.
lirata.
melanophloia.

W.2.

cæsia.
dichromophloia.
Ebbanoensis.
erythrocorys.
eudesmioides.
Ewartiana.
faecunda.

microtheca.
miniatula.
Mooreana.
odontocarpa.
oligantha.
pallidifolia.
pappana.
perfoliata.
pusio.
pthyocarpus.
pyrophora.
rostrata.
setosa.
Spenceriana.
terminalis.
tetradonta.
gamophylla.
microtheca.
Oldfieldii.
deleosa.
rostrata.
striatally.
transcontinentalis.
W.3.  
angulosa.  
angusta.  
angustissima.  
Campaspe.  
celastroides.  
Clelandi.  
Comita-Vallis  
conglobata.  
crucis  
eremophila.  
eudesmoides.  
Ewartiana.  
gamophylla.  
gracilis.  
Griffithsii.  
texta.  
Jutsoni  
Kruseana.  

W.4.  
accedens.  
albida.  
angustissima.  
anulata.  
astringens.  
Burraacoppinensis.  
buprestium.  
caesia.  
calophylla.  
calycogona.  
Campaspe.  
celastroides.  
conglobata.  
Cooperiana.  
cornuta.  
corrugata.  
crucis.  
cylindriflora.  
decipiens.  
decurva.  
Desmondensis.  
diptera.  
diversicolor.  
Dongarraensis.  
doratoxylon.  
Drummondii  
leptophylla.  
longicornis.  
melanoxyylon.  
micranthera.  
Oldfieldii.  
oleosa.  
pyriformus  
pyriformis var.  Kingsmilli.  
rostrata.  
salmonophloia.  
salubris.  
Sheathiana.  
Le Souefii.  
Stricklandi.  
torquata.  
transcontinentalis.  
Websteriana.  
Woodwardi.  

Dundasi.  
eremophila.  
erythronema.  
falcata.  
ilocifolia.  
Flocktonia.  
foecunda.  
Forrestiana.  
Gardneri.  
gomophonecephala.  
goniantha.  
gracilis.  
Griffithsii.  
grossa.  
Guilfoylei.  
haematoxylon.  
incurrata.  
Jacksoni.  
Kalqanensis.  
Kesselli.  
Kondininensis.  
Lane Poolei.  
Lehmannii.  
leptophylla.  
leptopoda.  
longicornis.  

longicornis.
W. t—continued.

macrantha.
macrocarp.
margnata.
meqacarpa.
melanoxylon.
Merrickae.
micranthera.
Mundijongensis.
nutans.
occentisals.
orbifolia.
ovularis.
pachycloma.
patens.
platypus.
Preissiana.
pyriformis.
pyriformis var. Kingsmilli.

K.1.

alba.
aspera.
brachyandra.
clavigera.
dichromophloia.
eudesmioides.
ferruginea.
Folscheana.
grandifolia.
Hillii.
Houscana.
tertexta
Jensi
latifolia
microtheca
miniata
odontocarpa.

redunca.
rudis.
salmonophloia.
salubris.
Sargentii.
sepulcralis.
Sheathiana.
spathulata.
Staerii.
Stowardii.
tetragonon.
tetraptera.
Todtiana.
torquata.
transcontinentalis.
uncinata.
Websteriana.
xanthocyna.

oligantha.
pachyphyllea.
pallidifolia.
papuana.
patellaris.
phonicca.
puinosa.
pychocarpa.
pyrophora.
rostrata.
setosa.
Spenceriana
terminalis
tetrodonta
trachyphloia
Umbrawarrensis.

K.2.
dichromophloia.
ferruginea.
gamophylla.
tertexta.
pachyphylla.
papuana.

pruinos.
pyrophora var. polycarpa.
pyrophora.
rostrata.
transcontinentalis.
S.1.

- albens.
- conglobata.
- eudesmioides.
- ferruginea.
- gracilis.
- intertexta.
- Isingiana.
- microtheca.

Oldfieldii
- oleosa.
- Pimpiniana.
- pyriformis.
- pyrophora.
- rostrata.
- terminalis.
- transcontinentalis.

S.2.

- albens.
- angulosa.
- Baxteri.
- Behriana.
- bicolor.
- calycogona.
- cladocalyx.
- cneorifolia.
- coriacea.
- cosmophylla.
- diversifolia.
- dumosa.
- elaeophora.
- fasciculosa.
- Flocktoniae.
- fruticetorum.
- Gillii.
- goniocalyx.
- gracilis.

- intertexta.
- Kalangadovensis.
- leptophylla.
- leucoxyxon.
- macrophylla.
- McIntyrensis
- microcarpa.
- Morrii.
- Mulleriana.
- obliqua.
- odorata.
- oleosa.
- ovata.
- rostrata.
- rubida.
- transcontinentalis.
- viminalis.
- vitrea.

Q.1.

- alba
- clavigera.
- crebra.
- dicromophloia.
- grandifolia.
- leptophleba.
- microtheca.
- miniata.
- Normantonensis.
- pachyphylla.
- pallidifolia.
- papuana.

- peltata.
- pruinosa.
- pyrophora.
- rostrata.
- setosa.
- Spenceriana.
- terminalis.
- tessellaris.
- tetrodonta.
- trachyphloia.
- Whitei.
Q.2.

Abergiana.
alba.
Andrewsi.
Brownii.
Cambageana.
citriodora.
clavigera.
Claziana.
corymbosa.
crebra.
Cullenii.
dichromophloia.
drepanophylla.
exserta.
grandis.
Howittiana.
leptophleba.
maculata.

Q.3.

acaciiformis.
acacioides.
acmenioides.
affinis.
albens.
amplifolia.
Andrewsi.
approximans.
Auburnensis.
Bailegana.
Bakeri.
Bancoftii.
Banksii.
Baueriana.
bicolor.
Blakeyi.
Bloxsomei.
Caleyi.
Cambageana.
capitellata.
citriodora.
Claziana.
conica.
corymbosa.

crebra.
dealbata.
Deanei.
decorticans.
dichromophloia.
drepanophylla.
Dunnii.
elrophora.
eugenioides.
eximia.
exerta.
Forsythii.
globulus.
goniocalyx.
grandis.
hamastoma.
hemiphloia.
intermedia.
intertexta.
Kirtoniana.
lacopinea.
Laseroni.
macorrhynecha.
Q.3—continued.
maculata.
melanophloia.
melliodora.
micrantha.
microcarya.
microthea
Morrisii.
Muelleriana.
nova-anglica.
oblata.
ochrophloia.
paniculata.
Peacockeana.
peltata.
peltata.
Pilligensis.
pilularis.
Planchoniana
polyfollia.
propinqua.
punctata.
pyrophora.
radiata.
rariflora.
Raveretiana.
resinitfera.
robusta.
rostrata.
rubida.
Rudder.
Rummery.
salix.
seoparia.
Seeana.
siderophloia.
sideroxylon.
similis.
Stopford.
Stuartiana.
tereticornis.
terminalis.
tessellaris.
Thozetiana.
trachyphloia.
umbra.
viminalis.
Watsoniana.
Yagobiei.

N.l.
acacioides.
affinis.
abens.
Barmedmanensis.
Beyeri.
Blakelyi.
conica.
crebra.
dealbata.
dumosa.
Dwyeri.
Gillii.
gracilis.
hemipholia.
intertexta.
leptophylla.
melliodora.
microcarpa.
microthea.
Morrisii.
odorata.
oleosa.
Pilligensis.
polyanthema.
polyfollia.
pyrophora.
pylomphora var. polycarpa.
rostrata.
sideroxylon.
tessellaris.
Tenandrensis.
transcontinentalis.
<table>
<thead>
<tr>
<th>Species</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>acmenioides</em></td>
<td><em>eximia</em></td>
</tr>
<tr>
<td><em>adjuncta</em></td>
<td><em>fastigata</em></td>
</tr>
<tr>
<td><em>affinis</em></td>
<td><em>fraxinoides</em></td>
</tr>
<tr>
<td><em>agglomerata</em></td>
<td><em>fruticetorum</em></td>
</tr>
<tr>
<td><em>aggregata</em></td>
<td><em>gigantea</em></td>
</tr>
<tr>
<td><em>albens</em></td>
<td><em>globulus</em></td>
</tr>
<tr>
<td><em>altior</em></td>
<td><em>goniocalyx</em></td>
</tr>
<tr>
<td><em>amplifolia</em></td>
<td><em>grandis</em></td>
</tr>
<tr>
<td><em>angophoroides</em></td>
<td><em>Guernyi</em></td>
</tr>
<tr>
<td><em>apiculata</em></td>
<td><em>hamastoma</em></td>
</tr>
<tr>
<td><em>Bancrofti</em></td>
<td><em>hemicyclia</em></td>
</tr>
<tr>
<td><em>Baueriana</em></td>
<td><em>hybrida</em></td>
</tr>
<tr>
<td><em>Bauerleni</em></td>
<td><em>intermedia</em></td>
</tr>
<tr>
<td><em>Behriana</em></td>
<td><em>Kirtoniania</em></td>
</tr>
<tr>
<td><em>Benthannii</em></td>
<td><em>Kybeanensis</em></td>
</tr>
<tr>
<td><em>Begeri</em></td>
<td><em>laxepinea</em></td>
</tr>
<tr>
<td><em>Blakelyi</em></td>
<td><em>liquiitana</em></td>
</tr>
<tr>
<td><em>Blazlandi</em></td>
<td><em>longifolia</em></td>
</tr>
<tr>
<td><em>Boormani</em></td>
<td><em>Macarthuri</em></td>
</tr>
<tr>
<td><em>Bosistoana</em></td>
<td><em>maculata</em></td>
</tr>
<tr>
<td><em>botryoides</em></td>
<td><em>maculosa</em></td>
</tr>
<tr>
<td><em>Caleyi</em></td>
<td><em>Maideni</em></td>
</tr>
<tr>
<td><em>Camfieldi</em></td>
<td><em>melliodora</em></td>
</tr>
<tr>
<td><em>canaliculata</em></td>
<td><em>micrantha</em></td>
</tr>
<tr>
<td><em>capitellata</em></td>
<td><em>microcorys</em></td>
</tr>
<tr>
<td><em>Chisholdi</em></td>
<td><em>Mitchelliana</em></td>
</tr>
<tr>
<td><em>cinerea</em></td>
<td><em>Moorri</em></td>
</tr>
<tr>
<td><em>cinerea var. multiflora</em></td>
<td><em>Muelleriana</em></td>
</tr>
<tr>
<td><em>conica</em></td>
<td><em>nitens</em></td>
</tr>
<tr>
<td><em>Consideniana</em></td>
<td><em>notabilis</em></td>
</tr>
<tr>
<td><em>coriacea</em></td>
<td><em>nova-anglica</em></td>
</tr>
<tr>
<td><em>corymbosa</em></td>
<td><em>Novae-anglica</em></td>
</tr>
<tr>
<td><em>crebra</em></td>
<td><em>numerosa</em></td>
</tr>
<tr>
<td><em>Dalrympleana</em></td>
<td><em>obliqua</em></td>
</tr>
<tr>
<td><em>Dawsoni</em></td>
<td><em>obtusiflora</em></td>
</tr>
<tr>
<td><em>dealbata</em></td>
<td><em>ovata</em></td>
</tr>
<tr>
<td><em>Deanei</em></td>
<td><em>paniculata</em></td>
</tr>
<tr>
<td><em>de Beuzevillei</em></td>
<td><em>Parramattensis</em></td>
</tr>
<tr>
<td><em>dives</em></td>
<td><em>parvifolia</em></td>
</tr>
<tr>
<td><em>Dwyeri</em></td>
<td><em>pellita</em></td>
</tr>
<tr>
<td><em>elaeophora</em></td>
<td><em>Penrithensis</em></td>
</tr>
<tr>
<td><em>eugeniodes</em></td>
<td><em>Perriniana</em></td>
</tr>
</tbody>
</table>
N.2—continued.
pilularis.  
piperita.  
polyanthemos.  
pracox.  
propinqua.  
pulverulenta.  
pumila.  
punctata.  
quadriangulata.  
radiata.  
regnans.  
resinifera.  
robusta.  
rubida.  
Rudderi.  
saligna.  
Shiressii.  
siderophloia.  
sideroxylon.  
Sieberiana.  
Swaithii.  
squamosa.  
stellulata.  
stricta.  
Stuartiana.  
Taylori.  
tereticornis.  
trachyphloia.  
umbra.  
viminalis.  
virgata.  
vitrea.  
Westoni.  
V.  
acacioides.  
albens.  
alpina.  
angulosa.  
Baxteri.  
Behriana.  
bicolor.  
Blackburniana.  
Bosistoana.  
botryoides.  
calycogona.  
cinerea var. multiflora.  
coracea.  
Dalrympleana.  
diversifolia.  
dives.  
dumosa.  
eksiphora.  
fastigata.  
fruticetorum.  
gigantea.  
globulus.  
goniocalyx.  
gracilis.  
Kitsoniana.  
leptophylla.  
leucoxylon.  
macorrhyncha.  
maculata.  
melliodora.  
microcarpa.  
Muelleriana.  
neglecta.  
numerosa.  
obiqwa.  
oleosa.  
ovata.  
polyanthemos.  
regnans.  
rostrata.  
rubida.  
sideroxylon.  
Sieberiana.  
stellulata.  
Studleyensis.  
transcontinentalis  
viminalis.  
vitrea.  
Yarransii.
C. This table is self-explanatory, and it will be found convenient for posting records ascertained later.

<table>
<thead>
<tr>
<th>Species</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>K1</th>
<th>K2</th>
<th>S1</th>
<th>S2</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>N1</th>
<th>N2</th>
<th>V</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amygdalina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corculata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cordata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coriacea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gigantea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Globulus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gunnii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irbyi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnstoni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obliqua</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ovata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perriniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regnans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risdoni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sieberiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simmondsii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenia'a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unialata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urmigeria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vernicosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viminalisi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

T. This table is self-explanatory, and it will be found convenient for posting records ascertained later.
<table>
<thead>
<tr>
<th>Species</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>K1</th>
<th>K2</th>
<th>S1</th>
<th>S2</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>N1</th>
<th>N2</th>
<th>V</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banksii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barmesmanensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baueriana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bauerleni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baxteri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bebraiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benthami</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beyri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bicolor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackburniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blacklegyi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blazlandi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bloomsomei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boormani</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bossistaena</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>botrydes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>branchiandra</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brownii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>burrettii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burracopinensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>caesia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calyclis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>calophylla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>caulocarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambeyana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campespe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>canaliculata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>capilliventra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>caespitosa</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>clesiostrodes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chisholmii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cineraria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cineraria var. multiflora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>citriodora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chodocalyx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>clavorosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clelandii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cliftoniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cloeziana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coniferotricha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coriacea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>collina</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comine-Vallis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>connuens</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>connubula</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conica</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Considensiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cordata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coriacea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cornuta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>corrupata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>corvusosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cosmocephala</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>crebra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>crustis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cullenii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cylindriiflora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
<td>W4</td>
<td>K1</td>
<td>K2</td>
<td>S1</td>
<td>S2</td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>N1</td>
<td>N2</td>
<td>V</td>
<td>T</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dalrympleana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Darwinii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>de Hauronii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deaupisi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>de Beaucellei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decipiens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decoriens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desmonedensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dicksonophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dipera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversicolor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dongarraensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>doratozyon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>drepanophylla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drummondii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dumosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dvaidisi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dumnii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dwyeri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ebbeanocensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cleophora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eremophila</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>erythrocorys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>erythronema</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eudesmonoides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eugenoides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kverkiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>erinina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>esserta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>falcata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fasciculosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fastigata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ferraquosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ferriginea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ficifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocktoniae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fuscata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fossochama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreynii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fraxinoides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fruticetorum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gamophylla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gagnieri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gigantea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gillii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>globulosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gomphoceraphala</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gomphostoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gomphostoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>goniocalyx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gracilis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grandifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grandis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Griffithii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grossa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
<td>W4</td>
<td>K1</td>
<td>K2</td>
<td>S1</td>
<td>S2</td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>N1</td>
<td>N2</td>
<td>V</td>
<td>T</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Guilfoylei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gunnii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>haemastoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>haematoxylon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hemiplia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbertiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hillii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Houseana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Houcattiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hybrida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>incrassata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>intermedia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>intertexta</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irbii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isingiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jacksoni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jenseni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnstoni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>jugalis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jutsoni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalangadoensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalanensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kesseli</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kertoniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitsoniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kruuseana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kondininensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kybeanensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leucopinea var. minor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane-Pooli</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laseroni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>latifolia</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lehmanni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leptophleba</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leptophylla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leptopoda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leucoxylon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lignatrina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>litrearia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>longicornis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>longifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macarthurii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>macandra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>macrocarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>macrocarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>macrorhyncha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maculata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maculatum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maideni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>margiata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>McIntyre's</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>megacarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>melanophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>melanoxylon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
<td>W4</td>
<td>K1</td>
<td>K2</td>
<td>S1</td>
<td>S2</td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>N1</td>
<td>N2</td>
<td>V</td>
<td>T</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td><em>Melliodora</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Merrickae</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Micrantha</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Micranthera</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Microcarpa</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Microcarya</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Microcwenia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Microtheca</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Miniata</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Mitchelliana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Mooreana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Moorei</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Morrisii</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Muelleriana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Mundijongensis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Naudiniana</em> (Ex. A.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Neglecta</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Nitens</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Nitida</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Normantonensis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Notabilis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Noea-auglicia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Normana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Numerosa</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Nutans</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Obliqua</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Obtusiflora</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Occidentalis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ochrophloia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Odontocarpa</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Odoata</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Oldfieldii</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Oleosa</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Oligoaula</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Orbifolia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ovata</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ovulans</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pachyloma</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pachyphylla</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pallidifolia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Paniculata</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Papuan</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Parramattensis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pareifolia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Patellaris</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Patens</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Peacockiana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pelitifolia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pelitata</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Penrithensis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Perthensis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Perfoliata</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Perpiniana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Piperita</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
<td>W4</td>
<td>K1</td>
<td>K2</td>
<td>S1</td>
<td>S2</td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>N1</td>
<td>N2</td>
<td>V</td>
<td>T</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Planchniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>platypus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>polyanthemos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>populifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>praecox</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preissiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>propinqua</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pruinosa</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ptychoctarpa</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pulverulentia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>punica</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pumila</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pyreformis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>var. Kingsmilli</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pyrophyora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>var. polymorpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quadrangulata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>radiata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rariifora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rassaretiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>radicans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>regina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resinifera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rissoi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>robusta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>restata</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rubida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rudder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rudis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rummeryi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>saligna</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>salmonophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sallesis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sargentii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schlechteri (Ex. A.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>scoparia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sepulcralis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>setosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheathiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shirley</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>siderophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sideroryloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sieberiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sindis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simmondsii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smithii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Le Souchi</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>spathula</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spenderiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>spennosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staritii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stingeriana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stellata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopfordi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>striatetlyc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Species arranged according to States.

In 1884, in the concluding Part (X) of "Eucalyptographia," Mueller gave a "Geographic Schedule." He groups the species into States, under Renantherae, Porantherae, Strongylantherae, and Orthantherae.

The following enumeration of species gives us (up to the date of this Part only), as:

Western Australia ... ... 141 New South Wales ... ... 160
South Australia ... ... 50 Queensland ... ... 95
Victoria ... ... 68 Northern Territory ... ... 37
Tasmania ... ... 25 Extra Australian ... ... 5

N.B.—1. The above enumeration does not contain fossil species.

2. There are additional species (descriptions already written out) which will be added to the enumeration in the last Part.
<table>
<thead>
<tr>
<th>Species</th>
<th>W.A.</th>
<th>S.A.</th>
<th>N.T.</th>
<th>T.</th>
<th>V.</th>
<th>N.S.W.</th>
<th>Q.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abergiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>acaciiformis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>acacioides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>acacidens</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>acacenioides</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>affinis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>agglomerata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aggregrata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>aduncata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>alba</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>albicans</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>albidus</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>alpina</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>altor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>amplifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>amphilamina</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Andreou</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>angophoroides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>angulosa</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>angusta</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>angustissima</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>annulata</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>apiculata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>approximans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>argilacea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aspera</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>astringens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auburnensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bauerleni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Baileyana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bakeri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bancrofti</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Banksii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Barnetwanensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Baurania</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Baxteri</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bealami</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Behrianii</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Beyeri</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bicolor</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Blackburniana</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Blackleyi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Blacklandi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Blasemeli</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Blaxmanii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Boorwaana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bosistoana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>botryoides</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>brachyandra</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Brownii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>buprestium</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Buraccoopinensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>cassinia</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcidia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>calophylla</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>calycogona</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambageana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Camfieldi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Campaspe</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Species</td>
<td>W.A.</td>
<td>S.A.</td>
<td>N.T.</td>
<td>T.</td>
<td>V.</td>
<td>N.S.W.</td>
<td>Q.</td>
</tr>
<tr>
<td>------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>----</td>
<td>----</td>
<td>--------</td>
<td>----</td>
</tr>
<tr>
<td>canaliculata</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>capitellata</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cleastroides</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chisholmi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cincerea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>citriodora</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cladocalyx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>clavigera</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clelandis</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cliftoniana</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleistina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>enorifolia</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cocifera</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>colina</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comite-Vallis</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>consolor</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>confusens</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conglobata</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conica</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Considensiana</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperiana</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cordata</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cordieri (Ex A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coriacea</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cornuta</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>corrugata</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>corpusbosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cosmosphilla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>crobra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cruciis</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cullenii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cylindriflora</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dalrympleana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deanei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deaktaba</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decnici</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>de Buzenvellei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decipiens</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decorticans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decarva</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desmondensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dichromophloina</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diptera</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversicolor</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diversifolia</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dongarraensis</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>doratozylon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>drepanophylla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drummondii</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dunosa</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunias</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dwyeri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ebnanensis</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cleopkora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cernophila</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>crythrocorys</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>W.A</td>
<td>S.A</td>
<td>N.T</td>
<td>T</td>
<td>V</td>
<td>N.S.W</td>
<td>Q</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>----</td>
<td>----</td>
<td>-------</td>
<td>----</td>
</tr>
<tr>
<td>erythronema</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eudesmioides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eugenioides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecartiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>erminia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>eusetera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>eulata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>fasciculosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fastigata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ferruginea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ficifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocktonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>facunda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Felschiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forrestiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreyhi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>frazinoides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fruitectorum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>gamophylla</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardnerii</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gigantica</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gillii</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>globulus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>gomphocephala</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gonanthia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gonocalyx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>gracilis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>grandifolia</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>grandis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Griffithsii</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grossa</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guifoylei</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gunnii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>halmastoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>halmatorygion</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hemipholia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Herbertiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hilii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Houseana</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hovittiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>hybrida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>incrassata</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>intermedia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>interteza</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Irbii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isingiana</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jackson</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jenseni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnstone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Julsoni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalangadooensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalaganensis</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kesseli</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Klettania</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Species</td>
<td>W.A.</td>
<td>S.A.</td>
<td>N.T.</td>
<td>T.</td>
<td>V.</td>
<td>N.S.W.</td>
<td>Q.</td>
</tr>
<tr>
<td>--------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>----</td>
<td>----</td>
<td>--------</td>
<td>----</td>
</tr>
<tr>
<td>Kitsuniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kondininensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kruseana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kybeanensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>laevopinea var.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane Poolei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laseroni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>latifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lehmanni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leptophleba</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leptophylla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leptopoda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>leucoxyylon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ligustrina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>linearis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lirata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>longicornis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>longifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luckmanni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macarthuri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>macrandra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>macrocarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>macorrhyncha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maculata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maculosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maidenii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>marginata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>McIntyreensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>megacarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>melanophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>melanoxyylon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>meliodora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merricka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microantha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microanthera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microcarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microcarya</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microcarya</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microtheca</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microtheca</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>miniata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitchelliana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mooreana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moorei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morrisii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muelleriana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mundijongensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naudiniana (Ex A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neglecta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>niveus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nitida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normantonensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>notabilis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nova-anglica</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nowraensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>numerosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nutans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>W.A.</td>
<td>S.A.</td>
<td>N.T.</td>
<td>T.</td>
<td>V.</td>
<td>N.S.W.</td>
<td>Q.</td>
</tr>
<tr>
<td>----------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>----</td>
<td>----</td>
<td>--------</td>
<td>----</td>
</tr>
<tr>
<td>obliqua</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obtusiflora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>occidentalis</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ochrophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>odontocarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>odorata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldfieldii</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>oleosa</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>oligantha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>orbifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ovata</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ovularis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pachyclama</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pachyphylla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pallidisfolia</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>paniculata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>paripina</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parramattensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>parcellaria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>patellaris</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>patens</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peacockeana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pellita</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>pelletata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennthensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>perfoliata</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perriniana</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>planiceps</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piligeranesis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pilularis</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pimpiniana</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>piperita</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planchoniana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>platypus</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>polyanthemos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>polynuifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>praeox</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precissiana</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>propinqua</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pruinosa</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ptychocarpa</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pulvillulenta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pumila</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>punetata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pyriformis</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>var. Kingsmilli</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pyrophora</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>var. polycarpia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quadrangulata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>radiata</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rariflora</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rasseretiana</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>redunca</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>regnans</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resinifera</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reidoni</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>robusta</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rostrata</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Species</td>
<td>W.A.</td>
<td>S.A.</td>
<td>N.T.</td>
<td>T.</td>
<td>V.</td>
<td>N.S.W.</td>
<td>Q.</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>----</td>
<td>----</td>
<td>--------</td>
<td>----</td>
</tr>
<tr>
<td>rubida</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Rudderi</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>rudis</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rumpheryi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>saligna</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>salmonophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>salubris</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sargentii</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schlechtleri Ex. A.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>scoparia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Secana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>sepulcralis</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>setosa</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skeathiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shiresii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Shirley</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>siderophloia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>sideroeglon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sieberiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>similis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Simmondsii</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smithii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Le Souefii</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>spathulata</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spencieriana</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>squamosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sterici</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stagneriana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Stellulata</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopfordi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>striatocalyx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stuardi</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stricklandii</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stricta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Studleyensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stuartiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>truncata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tamiova</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taylori</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenandreasisis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tereticornis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>terminalis</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>tessellaris</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>tetragona</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tetrapeta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tetradonta</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoetiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Tsiitana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torrelliana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Torquata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>trachyploia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>transcontinentalis</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>umbra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Umbrawarrensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>uncinate</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>unialata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>urinaqera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
Tropical Species.

The tropical areas of Australia, going from west to east, include:—

1. North-western Western Australia; Pindan.
2. Northern Territory.
3. Northern Queensland.

In the Climographs of Griffith Taylor, the following lie entirely within the tropics, viz., W.1, K.1, K.2, Q.1, Q.2. The southern boundary line between Q.2 and Q.3 is the tropic.

The term "Pindan" being occasionally used in defining the class of country a few species of tropical Eucalypts frequent or avoid, in North-Western Australia (W.1), I wrote to the Surveyor-General of that State, who obligingly replied as follows:—

1. The word seems to have been applied by the natives of the Kimberley region to certain country lying back from the rivers, the natives inhabiting these areas being called "Pindan" natives, to distinguish them from those living along the rivers.
2. The term is never applied to the country along the rivers, nor to the rich black soil plains lying back from them, but refers mainly to that back country consisting of sandy loam or sand and gravel, covered with scrub and thickets, and being generally poor grazing country.
3. The word "Pindan" may be applied to vegetation, as for instance a wattle growing in the pindan country may be called a "Pindan" wattle, or thickets "Pindan" thickets, &c.
4. There is no doubt that the term "Pindan" applies to country, and not to timber, except as stated in paragraph 3 above. It applies only to the Kimberley region, and I believe there is no Pindan country in East Kimberley.
5. I enclose extracts from the New Volumes of (a) the "Encyclopaedia Britannica," and (b) a Geological Report by Mr. E. T. Hardiman bearing on the question. (a) (10th Edition, vol. xxxiii, p. 823.)

To the Pliocene belong the "Pindan," large sandy plains developed on each side of the river Fitzroy, and stretching away to the southward into Warburton's Desert, and constituting also the great sandy plains of the interior, which form one of the characteristic features of West Australia.

(b). "Geology of Kimberley District" (1884), p. 14, par. 92.—Pindan Sands and Gravels. These, which are named in consequence of their occurrence chiefly in the wooded country which the natives term "Pindan."

The question reached Mr. W. Catton Grasby, F.L.S., Agricultural editor of the Western Mail, (Perth) in due course, and in this paper of 25th January, 1923, he printed a mass of information on the subject, and invited his readers to supplement it.
The term "North-West Australia" was used by the naturalists of the early part of the last century to include the coast-line from the North-West Cape to Port Essington (i.e., parts of both Western Australia and the Northern Territory). The specimens collected by the H.M.S. "Beagle" naturalists in the thirties were all labelled "N.-W. Coast" if obtained anywhere west of the Gulf of Carpentaria.

In the "Flora Australiensis," Bentham, by "North Australia" includes North-Western Australia, as well as the Northern Territory. By the term "North Australia," in his "Census of Australian Plants," Mueller means the same as Bentham, with the addition of an indefinite part of North Queensland.

I drew attention to the difficulty about the use of the term "North Australia" in an appendix to Ewart and Davies' "Flora of the Northern Territory," pp. 317 and 327 (1917), to which I refer my readers. In the present work, under "Range," I have usually been very careful to verify localities and their inclusion in political areas. Sometimes the data are vague. What follows is reduced from my paper on Eucalypts in Ewart and Davies' work, with very few alterations and additions.

Northern Territory.—The basis of our knowledge of the Eucalypts of the Northern Territory is Mueller's "Monograph of the Eucalypti of Tropical Australia" (Journ. Linn. Soc., iii, 81, 1859), which, however, includes cognizance of some North and South Queensland species.

The species enumerated for the Territory in the above work are (in the order given):

1. _E. rostrata_ Schlecht. (Leichhardt's Overland Expedition.)
3. _E. patellaris_ F.v.M. (Roper River.)
5. _E. polycarpa_ F.v.M. ( _E. pyrophora_ var. _polycarpa_).
10. _E. latifolia_ F.v.M. (Roper River.)
11. _E. aspera_ F.v.M. (Sandstone tableland, Victoria River and Sturt's Creek, &c.).
12. _E. ferruginea_ Schauer (Sandstone tableland).
15. _E. tetrodonta_ F.v.M. (Arnheim's Land, Port Essington.)
15. *E. brachyandra* F.v.M. (Upper Victoria River.)
16. *E. clavigera* A. Cunn. (Macadam Range.)
17. *E. odontocarpa* F.v.M. (Sturt's Creek.)
18. *I. pachyphylia* F.v.M. (Hooker's Creek.)

In the "Flora Australiensis," (vol. iii, 1866), Bentham adds the following species, sometimes giving useful additional localities to those given by Mueller.

19. *pruinosa* Schauer.
20. *oligantha* Schauer.

2. *brachypoda* Turcz. (A synonym of *E. microtheca* F.v.M.)
22. *pallidifolia* F.v.M. (Hooker's Creek.)
13. *alba* Reinw. (MacArthur River, Gulf of Carpentaria). *E. alba* and *E. platyphylla* seem to be conspecific, but the point is not absolutely settled.)
23. *grandifolia* R. Br. (Islands of the Gulf of Carpentaria.)
24. *setosa* Schauer. (Gulf of Carpentaria.)
25. *pyrophora* Benth. (Upper Victoria River and Depot Creek.)

Northern Queensland.

In "Eucalyptographia" under *E. clavigera* Mueller enumerates the following species (excluding those already enumerated) from North Australia, and points out that the Sections Renantheras and Hemiantherae are unrepresented:—

*Abergiana* F.v.M. (A North Queensland species; I am not aware of a Northern Territory locality.)
*Cloëzianna* F.v.M. (Recorded only from Queensland, so far as I am aware. See present work, II, 158.)
*exserta* F.v.M. (Confined to Queensland so far as we know at present.)
*lepophleba* F.v.M. (Confined to Queensland so far as we know at present.)
*maculata* Hook f. (By this is meant *E. citriodora*, confined to Queensland.)
*melanophloia* F.v.M. (See the note under *E. crebra* F.v.M. above.)
*perfoliata* R.Br. (I only know this from North-west Australia, as stated in *B. Fl.*, iii, 254.)
*populifolia* Hook. f. (This does not extend further north than Northern Queensland.)
*resinifera* Sm. (This species certainly does not extend to the Northern Territory; probably an allied species, *E. pellita* F.v.M., which extends to Northern Queensland, is meant.)
*tereticornis* Sm. (I have not received it from the Territory, but its occurrence there is not unlikely, as it occurs in Papua.)
*Torelliana*. F.v.M. (Only known from Northern Queensland.)

In my view, it is not safe to add any one of the above species to the flora of the Northern Territory without more evidence.
In subsequent parts of the “Eucalyptographia,” Mueller includes:


(I do not admit *E. bicolor* to the flora of the Northern Territory on such evidence as is available at present. It is recorded from North Queensland. See present work, II, 9.)

Then we have “Report on the work of the Horn Scientific Expedition to Central Australia,” Part III, Geology and Botany (1896). Botany, pp. 117-194, by Prof. Tate. The Eucalypts enumerated (from the Macdonnell Range) at pp. 158-9 are:

- 2. *microtheca* F.v.M.
- 18. *pachyphylla* F.v.M.
- 28. *Oldfieldii* F.v.M., also var., with leaves ovale-oblone to ovate-obcordate one to one-and-a-quarter inches long. Slopes of Mt. Sonder. (Note added 1924.—I have not seen *E. Oldfieldii* from the district, and the “var.” is probably *E. Websteriana* Maiden.)
- 4. *tessellaris* F.v.M. (I have not seen specimens.)
- 1. *rostrata* Schlecht.
- 24. *gamophylla* F.v.M.
- 23. *setosa* Schauer.
- 5. *terminalis* F.v.M.
- 29. *eudesmioides* F.v.M.

(In the above list only *oleosa, Oldfieldii,* and *eudesmioides* are additions to the flora of the Territory. I suspend my judgment as regards the two former, as stated.)

Region K.1. (Darwinia) includes the northern part of the Northern Territory, as we have already seen, and Region K.2 the southern part (the Macdonnells). Summaries as to the species known to date to occur in these two areas will be found at p. 252, and need not be repeated here.

**Extra-Australian Species.**

With the exception of two species extending to Timor, and two or three, or perhaps one, single somewhat doubtful species from the Indian Archipelago, the Eucalypti are all Australian, where they constitute a large portion of the forest vegetation. (*B. Fl.* iii, 186).

In “Eucalyptographia,” Decade 4, under *E. alba,* Mueller only records *E. alba* (also the same species under several synonyms), *E. papuana,* and a then unknown species which was afterwards described as *E. Naudiniana.*
Philippines and New Britain.—E. Naudiniana F.v.M., Philippine Islands, and New Britain (see Part XII, p. 81). Mr. E. D. Merrill, then Botanist, Bureau of Science. Manila, Philippine Islands, drew my attention to the fact that Eugenia binacag Elmer ("All Manobos know it as 'Binacag'") ("Leaflets Philippine Botany," vol. vii, p. 2,351, 1914), and Eucalyptus binacag Elmer (op. cit., vol. viii, p. 2,776, 1915), Agusan Province, Mindanao, Philippines, are synonyms of the above species. Elmer adds, "In my opinion there are more than one species of Eucalyptus in the island of Mindanao." See also Merrill in Philippine Journal of Science," C. Botany, x, 3rd May, 1915, 207.

The following paper by Merrill is interesting because it not only deals with the synonymy of E. Naudiniana, but with certain "doubtful species" referred to in Part I of the present work.


Populus deglubata Reinw. ex Blume l.c. in syn.
Eucalyptus versicolor Blume Mos. Bot. I (1849), 84 (type!).
Eugenia binacag Elm. Leaf. Philp. Bot. 7 (1914), 2351.
Eucalyptus binacag Elm. l.c. 8 (1915), 2776.
Arbor versicolor Ramp. Herb. Amb. 3: 122, t. 80.

Rumphius's material, on which his figure and description of Arbor versicolor were based, was from Ceram, not from Ambonina. The description and the figure, as far as they go, are unmistakably a Eucalyptus. I feel quite confident that Eugenia deglupta Blume, from Celebes; E. versicolor Blume, from Ceram; E. multiflora Rich and E. binacag Elm., of Mindanao; and E. Naudiniana F. Muell., of the Bismark Archipelago, are all referable to a single species, which is now definitely known from a half-dozen localities in Mindanao, from New Guinea, and from the Bismark Archipelago, and with the inclusion of Blume's species, from Celebes and Ceram. There is not a character given by Blume for either Eucalyptus versicolor or E. deglupta by which the two can be definitely distinguished from each other or from Eucalyptus Naudiniana F. Muell. Eucalyptus moluccana Roxb., as described, must represent a different species, at least entirely different from Eucalyptus Naudiniana F. Muell. and the Philippine synonyms cited here Eucalyptus versicolor Blume is based wholly on Rumphius's description of Arbor versicolor, and it is to be noted that Blume, by error, cites t. 53 instead of t. 80 as representing the species. The latter figure is Eugenia subflavca Koord and Valeton, as I have here determined it (see p. 395).

Eucalyptus sarassa Blume, Mus. Bot. I (1849) 84, unaccompanied by any word of description, was based on Kaju sarassa Rumph., incidentally mentioned by Rumphius, Herb. Amb. 3, 122, following the description of Arbor versicolor. It is indeterminable from any data now available, and there is little or no evidence that it belongs to Eucalyptus.

Taking the above synonyms in order, Eucalyptus deglupta and Populus deglubata will be found under "Doubtful Species" in Part I, p. 12 of the present work; E. versicolor at p. 17; E. multiflora and E. Naudiniana, both under E. Naudiniana, Part XII, pp. 79-81, and Part LXI. p. 13. Eugenia binacag and Eucalyptus binacag have been already dealt with (quoting Elmer); E. Sarassa, see Part I, p. 16.
E. tereticornis has been doubtfully recorded for the Philippines. I asked Prof. D. A. Herbert (late of Western Australia) of the College of Agriculture at Los Banos, to look into the matter, and he reports, as regards his neighbourhood, that in 1910 the Forestry School had planted a large number of exotic plants at random, and that E. tereticornis was amongst them. It has done pretty well, in spite of the competition with the tangle of native species. In March, 1922, it was about 25 feet high.

Papua.—C. T. White in Proc. Roy. Soc., Q., xxxiv, 47 (1922) has the following notes on Papuan species:—


E. alba Reinw. (E. platyphylla F.v.M.). Bail. Rep. Visit B.N.G., 27. Port Moresby (the common broad-leaved form). Astrolabe Range (leaves much narrower, even to narrow-lanceolate). This tree is readily distinguished in the field by its clean white trunk and branches. (The type comes from Timor. It also occurs in Java, but its western limit in Malaysia is unknown. See Part XXV, p. 97.)

E. clavijera A. Cunn. Port Moresby; Astrolabe Range. This Eucalypt is fairly common, and is easily distinguished by the blackish tessellated bark at the butt-extending for about 5 to 10 feet up the trunk.


The last paper on the subject appears to be that by Dr. L. Diels in "Beitrage zur Flora von Papuasien, viii," 423 (1922), edited by Dr. C. Lauterbach. Dr. Diels records four species, viz., E. papuana, E. alba, E. Naudiniana, and E. Schlechteri. of which the last species is new. See (Part LXI, p. 7.)

6. AUSTRALIAN SPECIES CULTIVATED ABROAD (CEYLON, INDIA).

I have given notes on the above subject at some length in my "Forest Flora of New South Wales," Part LXVIII, pp. 373–395, and, as regards Ceylon, in Part LXXI, p. 18.

I give an extract from a letter from Mr. T. Petch, Government Botanist and Mycologist, Peradeniya, Ceylon, dated 5th June, 1923:—

E. sidrophloia is grown on Combewood Estate, Walawakelle, Lat. 6°50 N., Long. 80°40 E., elevation about 4,000 feet. Most of the Australian species of Eucalyptus which we have flourished only in the up-country tea districts, at an elevation of 4,000-6,000 feet. E. robusta comes down to 2,500 feet. At Peradeniya (1,600 feet) we have only (planted, I presume) E. alba and E. citriodora, the former of which grows also at sea-level.
Commissioner F. Booth Tucker, of the Headquarters of the Salvation Army, who has resided in India for very many years, during which time he has given particular attention to Eucalyptus, and who has travelled in Australia, writes to me in June, 1924, concerning E. tereticornis. He sent seed of the "Ani" variety "from our Himalayan Eucalypti. It grows at an elevation of 4,000 feet. The trees are mature, having been there for about thirty years, and attaining a good height. They appear to be of the tereticornis species, and do well in all parts of India. We are now trying them in England."

Further, as regards India, the following admirable statement by Mr. R. N. Parker, F.C.H., Forest Botanist, Forest Research Institute and College, Dehra Dun, U.P., India, dated 25th October, 1923, has been specially prepared for me, and is published with his kind permission. See also his "Forest Flora of the Punjab, &c."
(2nd ed., Lahore, 1924):

Eucalypts were first tried in Northern India in or about the year 1860. The reason for so much attention having been paid to trees of this genus was undoubtedly at first the belief that they might be beneficial in reducing the incidence of malaria. The great success of various species of the genus in the Nilgiri Hills, where E. globulus Labill. was first grown in 1843, led to the starting of plantations by Government in 1892 with the object of supplying cheap fuel and timber to the settlements in the hills of Southern India. It was not unnaturally hoped that similar success would be obtained in North India, where about this time much anxiety was felt regarding the fuel supply owing to the rapid extension of railways which at that time consumed mainly wood fuel. Consequently Eucalypts were tried all over Northern India, both at Government Horticultural and Botanic Gardens, and by the Forest Department. The species tried at first were mainly those from S. E. Australia, doubtless because the seed of these species from that area had given good results in the Nilghiris.

In considering the results it is necessary to deal with two areas separately, viz., the plains and low hills up to 3,000 or 5,000 feet, i.e., the level to which the snow descends in winter and the hills above this level and up to 8,000 feet.

In the plains it was found that the species that had proved successful in the Nilghiris would not thrive, and as early as 1876 Sir D. Brandis, Inspector General of Forests (Indian Forester, II, 1876, pp. 136-144) recommended only two species out of all those that had been tried. These two were E. rostrata Schl. and E. resinifera Sm. The latter was undoubtedly not E. resinifera Sm., which has since been proved to be quite unsuited to the plains of North India, but E. tereticornis Sm. At the same time he recommended trying species from the more tropical parts of Australia. Since this date it is doubtful if a single year has passed without E. globulus having been tried somewhere in North India, as its behaviour during the first few years is apt to be very deceptive. As a rule, when planted out, E. globulus dies as soon as the monsoon rains commence, but occasionally it will live and even grow fairly rapidly for a year or two, after which it either ceases growth and lingers on for some years more or dies suddenly. Many other species behave in exactly the same way, so that reports relating to the growth of young trees are very unreliable.

Up to date over 100 species of Eucalyptus have been tried in the plains of North India and the growth of several kinds is so good that it has led to many attempts to establish plantations.

At only one place, viz., Kapurthala, on sandy soil, with a high subsoil water level have these efforts resulted in establishing anything approaching a regular plantation. Elsewhere the result has always been a few trees or scattered groups of trees doing well and a mass of rubbishy plants which refuse to grow. The reason for the failure of almost every attempt to make plantations using species known to thrive is sometimes white ants, which may kill many of the plants by eating the roots, though they do not appear to injure any species once it has reached a height of 8 or 10 feet. Sometimes heavy rain during the monsoon, followed as it so often is, by a spell of hot muggy weather with very still air, kills off thousands of plants, especially if they are less than 1 foot high. At other times it is not very evident what the cause of the
failure is, and the only suggestion I can make is that it may be due to the young plants being unable to compete with grass and weeds. Plants that do not start growth straight away after planting never seem to recover, and though they may linger on for years, they seem unable to grow up into satisfactory stems. In South Africa, where there are very successful Eucalyptus plantations, great stress is laid on weeding and cultivating the plantations until the saplings have closed overhead. This has never been done in India, as it is not essential with most trees, but is now being tried with Eucalyptus in the Punjab, and if the method does not prove successful, I think all hope of using Eucalyptus for forest operations in North India must be abandoned.

At present, therefore, in North India, Eucalypts are only used as ornamental and shade trees, for which they are very popular owing to the rapid growth and great height reached. They are common and conspicuous in all large stations, and usually stand well above most other trees. None of the species hitherto tried are really easy to raise, and even the best are liable to suffer badly if the monsoon starts early and catches the plants when they are small. The monsoon season with high relative humidity combined with a high temperature and stagnant air is undoubtedly the unfavourable period for most species. Frost in winter with a shade temperature down to 26 deg. F. has never, as far as I know, done any damage.

The following species do well, of which the first three are by far the commonest.

E. tereticornis Sm. This is the most widely grown and most successful. There are trees 128 feet high and 8-10 feet girth at Changa-Manga in the Lahore district.

E. rostrata Schl. Almost as common as the above, but not so straight in growth. I have measured trees over 13 feet in girth.

E. citriodora Hook. A very popular species in gardens owing to its scented foliage, but does not reach a large diameter.

E. maculata has been repeatedly tried in Lahore, but hitherto has always failed.

E. melanophloia F.v.M. This is the best of the Ironbarks grown. With irrigation it has reached 6 feet girth in 18 years.

E. paniculata Sm. If Eucalypts were grown for timber in North India, this is the species I should recommend.

E. crebra F.v.M. Rather slower in growth than E. paniculata.

E. siderophloia Benth. Grows about as well as E. crebra.

E. sideroxylon A. Gunn. Can be grown, but does not really thrive, being branchy and crooked.

E. Staigeriana F.v.M. Grows well in Saharanpur, but seems to have nothing to recommend it except its scented foliage.

E. robusta Sm. Frequently grown and ornamental when young, but usually soon becomes branchy and stag-headed. The only good old specimen I have seen was growing in a swamp.

E. Kirtoniana F.v.M. This in India is extremely variable in bark. It is sometimes like E. robusta in bark, and sometimes like a poor specimen of E. tereticornis, with intermediate bark-forms. I am inclined to think that it is a hybrid between these two species and closer E. robusta than E. tereticornis. Trees nearly always show both horizontally and vertically placed foliage. The growth varies greatly, being sometimes good and sometimes rather poor.

E. rudis Endl. This species was only introduced in 1911, but has attracted considerable attention owing to its rapid growth. With irrigation in Lahore it has reached 30 feet in height by 1 foot 8 inches girth in 3 years from date of sowing the seed, and 60 feet by 4 ft. 11 in. girth in 10 years.

E. saligna Sm. There are some very fine specimens at Amristar up to 7 feet in girth. In Dehra Dun with a heavy rainfall (82 in.) it has done best out of 53 species tried, having reached 55 ft. in height and 4 ft. 3 in. in girth in 10 years.

E. microtheca F.v.M. Grows well, but is rather apt to be crooked.

E. melliodora A. Cunn. As for the above, but not so good.
E. alba Reinw. Plants grown from Javan seed lived for three years, and then died. Plants from Australian seed (E. platyphyllo F.v.M.) have in some cases done very well.

E. punctata DC. A single tree of this species is doing very well in Dehra Dun.

E. drepanophylla F.v.M. This species is growing well in several places, but the growth is slow. It stands a heavy rainfall better than any species tried so far.

E. terminalis F.v.M. Grows well in Dehra Dun, but is very difficult to get through the first monsoon.

One or two others can perhaps be added to the above list, as there are some specimens scattered about in North India which cannot be identified for want of complete material. Moreover, several other species have been grown and have flowered and fruited, but the growth in some cases is so poor that they do little more than exist. In the case of E. bicolor A. Cunn., there are some very ornamental specimens in Delhi, whereas in Lahore, Saharanpur, and Dehra Dun the growth of this species has been very poor. It seems possible that some species cannot stand even temporary water-logging of the soil, either by irrigation or heavy rain, and if this is the case it would account for the growth of E. bicolor being unsatisfactory in Delhi and bad in Saharanpur and Lahore. I suspect that under somewhat different soil conditions to those normally prevailing in North India the growth of the following species would be better or in the case of the first-named, more uniformly satisfactory than it has been hitherto:—E. hemiphloia F.v.M., E. ochrophloia F.v.M., E. polygonantha Schau., E. populifolia Hook.


In the hills the result of trials up to date has been very much the same as in the plains. Isolated trees have sometimes been got to grow well, but all attempts to introduce Eucalypts on a large scale have failed. The Jagdeo plantation, at about 5,600 feet in the Kumaon Hills, may be mentioned as an example of the results obtained. Between 1875 and 1885 over 50,000 Eucalypts were planted. Now several trees are still remaining, but nothing that can be called a plantation. For some ten years commencing with the year 1906 Eucalypts have been tried in the Simla Hills at elevations varying from 2,000 to 7,000 feet. In these experiments over 60 species have been tried, and some species have been got to grow at each place, but hitherto no method of introducing them on a large scale has been devised.

The object of trying to introduce Eucalypts in the Himalaya has always been to obtain cheap firewood for the various “hill stations.” The only solution of the firewood difficulties in the hills seems to be to obtain a large yield from a small area, so as to reduce transport charges to a minimum. At present there seems to be no prospect of Eucalypts being of assistance. Apart from all other difficulties, the land available for forest plantations is always more or less steep and rocky, all the gentle slopes with deeper soil being cultivated. The centres of fire-wood consumption are mainly at 6,000 and 7,000 or even 8,000 feet, whereas over 5,000 feet the rate of growth of the Eucalypts hitherto tried even on fairly good soil is no longer abnormally rapid, and on shallow, rocky soil it is rather slow.

At present Eucalypts are occasionally seen in the Himalaya as isolated specimens, usually in gardens. The species most often seen is E. globulus Labill. E. tetetecoris Sm. and E. rostrata Schl. are occasionally seen, and in the Kumaon hills E. deabata A. Cunn. Above 5,000 feet they are very apt to be badly broken by snow, and the only good species I have seen above this elevation have been a few trees of E. globulus Labill., planted on rather exposed ridges where the soil happens to be deep.

Eucalypts in North India show no tendency to reproduce themselves naturally in the plains. Even in gardens self-sown seedlings are never observed. On the other hand in the Kumaon hills at 5,000 feet, I have seen a few self-sown seedlings of E. deabata A. Cunn. in the neighbourhood of planted trees. Both
this species and *E. globulus* Labill. reproduced themselves rather freely in a forest of *Pinus longifolia* Roxb. in Kumaon at about 5,500 feet after a severe forest fire, but most of the regeneration died off, apparently from white ants and drought, and it is doubtful if very much will become established.

If correspondents will let me know what species have succeeded and what failed, in their respective countries, we may be able to help them, should they desire to obtain further information as to suitable species for cultivation.

As regards species already introduced, besides herbarium specimens of flowers and fruit and also juvenile leaves, information should be given as to where they were grown, approximate elevation above sea-level, miles from sea, soil and drainage, nature of bark, colour of timber—indeed, any information conveniently available.

7. ADDITIONS TO RANGE OF INDIVIDUAL SPECIES.

The number in front of a species-name is that given to the species when it was first dealt with in the present work. Thus the meaning of No. 118, as applied to *E. acaciaformis*, for example, will be seen when Part XXII, p. 261, is turned to. The notes on Range now given are supplementary to those originally recorded.

There are many more or less wide areas of Australia which remain to be explored botanically and otherwise. Every step in this direction will help our knowledge of the distribution of Eucalypts. I am referring chiefly to the drier and more inaccessible areas, such as are readily indicated by the Climographs.

The numbers of species attributed to certain areas are doubtless affected by the thoroughness, or the reverse, of the botanical investigation of those areas, particularly during recent years. As regards many species, we find them as far as the edge of the "Never-Never Country," and then we lose sight of them. A fair presumption is that we shall find these species again when we can explore further. We must not entertain the idea that any part of Australia has been fully explored botanically. All that we can safely say is that some parts have been better explored than others. I have often been asked if all the species of Eucalyptus have now been described, or nearly so, and have invariably replied that, in my opinion, we are not much past the beginning of the subject. The questions of distribution which await settlement will assist in the solution of fascinating problems of phylogenesis. Completion of the material (particularly in the direction of seedlings and juvenile leaves), attributed to doubtful or doubted species, will probably further prove that a number must be called out of abeyance.
118. *E. acaciaformis* Deane and Maiden.

On quartz-felsite, Moredun Creek, 12–14 miles south-east of Tingha, New South Wales. The first record known to the finder west of the Great Northern railway line (R. H. Cambage, No. 4444, July, 1924.)


**New South Wales.**—Very common throughout the district (Ramornie, Upper Clarence River), and usually on the light soils in association with *E. corymbosa* and *E. tereticornis*. Keeps very largely to the mountain tops, and to the cool sides also. (W. F. Blakely and D. W. Shiress).

**Queensland.**—Dr. H. I. Jensen gives the following notes on its occurrence in this State:—"'Stringybark.' Calciphobe. In sandy soil, on sandstone, shallow, dry-soil tablelands. At head of Dawson tributaries, head of Maranoa; chiefly on Bundamba sandstone and other siliceous sandstones. It is associated with *Casuaria inophloia* Lysicarpus ternifolia and *E. decorticans*, also with Xylomelum pyriforme and *E. trachphloia.*"


A Cabbage gum of moist, sandy loam overlying sandstone and quartzite, Lennard River, near Lukin's Old Station, Charnley and Ord Rivers, Dillen's Springs, Western Australia. (W. V. Fitzgerald.)

Banks of the Upper Drysdale River near Mount Hann, in sandy soil in basaltic country, forming open savannah with *E. spenceriana*, but never far from the river; from thence south-west in the direction of Mount Agnes in low-lying flat country, with the same associate tree. (Kimberleys, C. A. Gardner, No. 1566.)

On enquiring whether he thought that *E. platyphylla* is a synonym, Mr. Gardner replied:—

*E. alba*, although apparently common in the eastern and southern Kimberleys, is comparatively scarce in the western portion. The specimens in the Departmental herbarium are from the Upper Drysdale River. I saw other trees near the Calder and Prince Regent Rivers, and a small forest on the Upper Charnley River, but could observe no differences in the leaves or flowers. I think that all the trees seen by me were *E. alba*, and that *E. platyphylla* is probably a synonym.

Tree of 40 feet, banks of Katherine River, Northern Territory. (C. E. F. Allen, No. 681, the *E. pastoralis* of S. le M. Moore.)

Dr. H. I. Jensen says:—

*E. alba* is widespread on the flats throughout North Queensland. It is the typical Poplar Gum of the Northern Territory; grows on heavy grey clay soil. The dwarfed hill variety of *E. alba*, which I regarded in the Northern Territory as a different species, has not been observed by me at all in North Queensland.

He adds that it is calciphile on heavy loams and heavy subsoil, from Central railway, Queensland, to far north. It is mostly on alluvial and detrital flats, associated with *E. terminalis* and *E. grandifolia*. 
Queensland. This Gum tree begins to appear about Rockhampton, and soon is the prevailing tree, on the poor, dry, sandy land of the tropics . . . It grows on the poorest sandy soil and does not seem to require much moisture, though doubtless, being in the tropics, it gets a good deal more than it would be likely to receive in more temperate portions of Australia. (Rev. J. E. Tenison-Woods, Proc. Linn. Soc., N.S.W., VII, 332), as E. platypylla.

334. E. angulosa Schauer.

Near Ravensthorpe, Western Australia, March, 1921. (W. F. Hooton, through C. A. Gardner, No. 1853).

42. E. bicolor A. Cunn.

I have received from the British Museum (Dr. A. B. Rendle, F.R.S.) the following:—

No. 200. Strangford’s Plains, Allan Cunningham, in Oxley’s First Expedition, 1817.

No. 201. Lachlan River, same Expedition.

Turning to Oxley’s work, we find—

The plains south of the (Macquarie) river, and lying from Goulburn’s to Macquarie’s Range, were named Strangford Plains . . . (p. 89). Within one hundred yards of the bank of the river, and there alone, were seen the only timber trees we had met with in the country, if huge, unshapen Eucalypti, which would not afford a straight plank ten feet long, may be so denominated. (p. 83).

These trees were probably E. bicolor. Compare also Part XI, p. 6 (footnote) of the present work.

257. E. Blaxlandi Maiden and Cambage.

New South Wales.—“97 mile-post on the Sydney-Goulburn road. On the eastern or lower side of the road. At Hanging Rock, a good deal of it. Long, straight trees. Yield excellent timber.” (Andrew Murphy.)

41. E. Bosistoana F.v.M.

There is plenty (or there was some years ago), from Bairnsdale eastwards, especially along the valleys of the lower reaches of the Mitchell, Nicholson, and Tambo Rivers, and on the higher country near Buchan, as well as around Cuninghamac and the shores of Lake Tyers. There are also fairly large quantities still, eastward of Orbost, in the valleys of the Cann and Genoa Rivers, and in lesser quantities in some of the smaller river valleys between these rivers, and at a few points on the shores of Mallacoota Inlet. (H. Hopkins, Bairnsdale, Victoria).

157. E. brachyandra F.v.M.

North-west Australia. An inhabitant of rough sandstone ranges and gorges, occurring in rocky, frequently inaccessible, situations, and usually in rocky crevices in scanty soil. It extends northwards from the Artesian Range to the vicinity of Napier Broome Bay, being restricted to the sandstone formations. (Kimberleys, C. A. Gardner, see also Part XXX, p. 220).
Through the kindness of Mr. W. C. Grasby, I have received specimens from Mr. C. A. Fauntleroy, Uberin Hill, "in a gully of the granite hill," Dowerin, W.A. (Mr. A. E. Arney informed Mr. Grasby that the species also occurs about 70 miles east of Katanning, but no specimens were produced.)

59. *E. Caleyi* Maiden.

Stanthorpe (W. R. Petrie, through C. T. White). This is the first recorded locality for Queensland. Its range in New England and its slopes, both in New South Wales and Queensland, will doubtless bring to light many additional localities.

3. *E. calycogona* Turcz (typical form).

*Western Australia.*—I have also received specimens from Bruce Rock, Merriden district, W.A. (Dr. F. Stoward, No. 18).

On loamy flats in the Salmon Gum and Morrel forest. Harrismith, about 40 miles east of Narrogin. (C. A. Gardner.)

*South Australia.*—Additional localities (normal species) are Murray Bridge to Callington (J. M. Black); "Mallee," Parilla Forest, near Pinnaroo, near the South Australian-Victorian border (W. Gill); Yeelanna and Butler, Eyre's Peninsula (W. J. Spafford, No. 3).

*Victoria.*—"White Mallee," Sea Lake (W. W. Watts, No. 451), also Nandaly (W. W. Watts, No. 467), both in the Mallee country. This species occurs sparingly mixed with other Mallees, *E. Ichriana, E. fruticetorum,* and *E. acaeioides (viridis)* at Wedderburn, where it is locally known as "Water Mallee." (F. W. Wakefield.)

Diligent search has hitherto failed to find it in New South Wales, but I expect to find it in that State just north of the Victorian Mallee country.

269. *E. Cambageana* Maiden.

Occurs on Mt. Coolon abundantly on slate schist country where the soil is deep, and on dacite and alluvial; Mt. Playfair district on Walloon shales; Emerald to Drummond Range on Star Beds (shales and calcareous mudstones); Alpha and Pine Hill on alluvial over desert sandstones; Taroom district on Walloon (calcareous) shales and on felspathic sandstones; Cracow-Camboon district on deeper soils of diorite and dacite derivation. It is widely distributed, principally on rich deep soils. It commences in the Dividing Range and extends well into North Queensland, and is calciphile. (Dr. H. I. Jensen).

256. *E. Camfieldi* Maiden.

About 2½ miles north-west of Wondabyne railway station (near Hawkesbury River, New South Wales), on hard ironstone and sandstone gravel, one small patch about 12 feet in diameter; plants not more than 4 feet high; aspect westerly, the usual situation for the plant. (Blakely and Shiress, 10th June, 1923.)
83. *E. Campaspe* S. le M. Moore.

Diorite Hill, near Coolgardie (District Forester Ferguson); Montana Hill, Coolgardie, in stony soil, also on the flat country surrounding Coolgardie, forming small open forests with *E. Clelandi* and *E. Griffithsii*. (C. A. Gardner.)

189. *E. clavigera* A. Cunn.

*North Western Australia.*—In Kimberley district, between the Edkins Range and King Edward River, in sandy soil, with *E. miniata* or *E. tetradora*, or more frequently it is the sole associate of *E. Spenceriana* on basaltic plains and hills. Edkins Range, No. 1078; Walcott Inlet, No. 1088. Never seen very far from the coast. (C. A. Gardner.)

Queensland.—are where I have been, *i.e.*, between Cairns, Cooktown, and Croydon (Dr. H. I. Jensen, April, 1920.)

77. *E. Clelandi* Maiden.

*Western Australia.*—Montana Hill, Coolgardie, in sandy loam (granite soil) with *E. Campaspe* and *E. torquata*. (C. A. Gardner, September, 1922.)


*North-Western Australia.* See Part XXXVIII, p. 290. Mr. W. V. Fitzgerald writes—"I note you refer to some fragmentary specimens collected on Bold Bluff and Packhorse Range as belonging to this species. I collected on the elevations named during 1905 and on Mount Anderson and Grant Range during the following year, and was then informed by Mr. Mayo Logue that 'Desert Gum' did not extend further north than Grant Range and was common south of the Fitzroy River. I did not observe any examples east or north-east of the King Leopold Ranges. The summit of Bold Bluff forms a small plateau (a few hundred-yards in area) on which I found the following Eucalypts, *E. Mooreana*, *E. tata* and *E. collina*, the last being a very different looking member of the Corymbone in comparison with *E. Cliftoniana*.

71. *E. Cloeziana* F.v.M.

Irvinebank-Emuford Area. On the arkose-like greywackes of the district, as near Mount Albion, we have a Yellow Jacket (*E. trachyphloia*); on lode formation a gum-topped Bloodwood known as "Dead Finish" is common (*E. Cloeziana*?). (Dr. H. I. Jensen, Queensland Agricultural Journal, xviii, p. 300, 1922.)


"Mountain Peppermint. The type of this tree was taken from the form growing on the summit of Mount Wellington, Tasmania, and is the extreme form of the group of variations included in this species." (L. Rodway.)

*North Western Australia.*—Summit of Mount Broome; Hill C 92, near Synnott Range; Synnott Range among quartzite rocks. (W. V. Fitzgerald, MSS.)


In low-lying places in the Salmon Gum forest, Harrismith, Western Australia. (C. A. Gardner.)

Grass patch, in sandy loam, in the Mallee lands, in open thickets. Interesting locality, as far removed from the sea. (C. A. Gardner, No. 2,220.)

235. *E. conica* Deane and Maiden.

*New South Wales.*—Cox's Creek, Boggabri (R. H. Cambage, No. 4,415.)

*Queensland.*—Inglewood (C. J. Smith, through C. T. White).

See Parts XIII, p. 124, and XLII, p. 64. I ask for additional localities in order that its range may be better defined.

174 *E. cornuta* Labill.

Base of Warrangup Hill, Stirling Range, Western Australia, extending almost to the summit. (C. A. Gardner, No. 1,956.)

80. *E. corrugata* Luehmann.

Mr. Walter Gill recently collected it near Kalgoorlie, Western Australia, which increases its range a little, since it was previously only known from the vicinity of Southern Cross.

205. *E. corymbosa* Sm.

One of the commonest trees in the Copmanhurst (Clarence River) district, found on various classes of soil, and always present on both lower and higher altitudes; it associates with all the other species in the district; the same cannot be said of its congeners. (W. F. Blakely.)

51. *E. crebra* F.v.M.

Concerning Queensland localities, Dr. H. I. Jensen remarks:—"Narrow-leaf Ironbark, calciphobe, occurs in loams with clay subsoil, often stony throughout, often gravelly surface soil; Dividing Range, near Box Vale, widespread through State—Rewan, Dawson, Brown Waters. On sandstone, shale, granite, metamorphic rock, sometimes with *E. populifolia*, sometimes with *E. maculata*, but more often with *E. hemiphloia* and *E. Cambageana.*
351. *E. crucis* Maiden.

Yorkrakine Rocks, 6 miles north-east of Westonia, also 18 miles north-west of Westonia, Western Australia, in scanty soil at the foot of bare granite rocks. In both localities, with a profusion of *Marianthus erubescens*. (C. A. Gardner, No. 1,750, 5th October, 1922.

279. *E. Dalrympleana* Maiden.


The Valley of the Giants, Marrangaroo, New South Wales, so named on account of the large trees of this species, *E. fastigata* and *E. Blarlandi*, which grow there to a considerable size. (W. F. Blakely and Dr. E. C. Chisholm.)

165. *E. dealbata* A. Cunn.

See Part XXXII, p. 48, Plates 134, 135. At p. 49 I have stated that it has been recorded from Albury, New South Wales, but the specimens are not quite satisfactory, nor are the Tumbarumba ones normal. These localities (especially the former) are close to Victoria, and they make one pause before inferring that, on this evidence, the species occurs in Victoria. Professor Ewart tells me that he cannot find any trace of the specimen (quoted by Mr. Baker; C. Walter was an old collector of Mueller’s); “all our records for *dealbata* are from New South Wales localities only.” I cannot, therefore, accept it as a Victorian plant at present.

Queensland.—In Part XXXII it is not recorded from Queensland, but only near the New South Wales-Queensland border. I have since received it from Inglewood, Queensland—“ Box tree, shrubby growth.” (Forest Overseer Cecil J. Smith, per C. T. White. Dr. H. I. Jensen extends the range—“ Tumbledown Gum, calciphobe; sandy loam—sandy subsoil, good capillary power; north of Roma and Mitchell on siliceous sandstone tracts, also in Carnarvon Range on sandstone; Bundamba, Walloon, Ipswich, siliceous sandstones also on brown sandstones and on Star sandstone. On granite at Stanthorpe; commonly associated with *Angophora lanceolata* and sometimes with *Callitris glauca* (robusta).

Specific localities are sandy hills and creek banks, Bungywongorai Creek, Orallo district, Roma (H. I. Jensen), where it is called “Crooked Grey Gum.” Also near Boxvale Station, north of Roma, called “Crossed Gum.”


A medium-sized tree, grows at the foot of a steep cliff in company with *E. agglomerata* and *Angophora lanceolata*. Not common, Hazelbrook, Blue Mountains, New South Wales (E. Steinberger.)

Dr. H. I. Jensen reports that this Queensland species is calciphobe, and that it is found on sandy soils with stone (sandstone, sometimes schist) near the surface, always on dry ranges and tablelands: Kilmorey, Dividing Range, Dawson headwaters on hills, Meteor, Consuelo, Moolagumba Creek, Glenhaughton Ranges; siliceous sandstone all ages, Star to Cretaceous-Tertiary. It is associated with *Acacia doratoxylon*, Clematis Creek, with *Callitris glauca* and *calcarata*, Glenhaughton.

78. *E. decarva* F.v.M.

Bremer Bay, Western Australia (J. Wallstead).

217. *E. dichromophloia* F.v.M.

*North Western Australia.* Not often met with, but always occurring in poor sandy soil among sandstone rocks, either on hills or in valleys, the trees growing in clumps or small patches. Mount Reid, King Edward River; near Mount Connor, Admiralty Gulf; Vansittart Bay (with large, almost globular fruits), sandstone ridges to the south of Napier Broome Bay. (C. A. Gardner, Kimberleys.)


Yumali (Dist. T., South Australia; White). In scrub south of Lameroo. Here a small mallee; leaves rather broad and very thick, resembling those of *E. capitellata*. (J. M. Black, *Trans. Roy. Soc., S.A.*, xliii, 1919.)

79. *E. doratoxylon* F.v.M.

Occurring (as seen by finder) only above 2,000 feet elevation, forming small thickets with numerous other shrubs, notably *Hakea floridu*, and, with the exception of *E. megacarpa*, the highest Eucalypt on the Stirling Range, Western Australia, Mount Toolbrunup, at an altitude of 2,000–3,000 feet, in black soil, among sandstone shales; also Warrungup Hill, in similar situation. (C. A. Gardner, No. 1,932.)

199. *E. dumosa* A. Cunn.

Grasspatch, in sandy loam, on flats in open Mallee lands. (C. A. Gardner, No. 2,221.)


Near the rabbit-proof fence on gravelly rises, also in low-lying spots. Harris-smith, Western Australia. (C. A. Gardner.)
E. eximia Schauer.

With reference to certain localities, north of Sydney, quoted by me at Part XLII, p. 31:

In a circle with a radius of two miles from my school there is a fair quantity of it. It is most noticeably confined to the ridges. It is often called "Rock Apple" here because of its fondness for rocky sandy ridges. I do not think I have seen any on the flat country, and the top of the ridge is always more fully covered with it than the slopes. The miners say here it is greatly infested with borers. I do not know if it occurs beyond the two mile radius. Abernethy I think is from 15 to 20 miles from Sawyer's Gully. (Mr. H. L. Macara, Abernethy.)

75. E. falcata Turcz.

On gravelly ridges in poor lateritic soil, with E. Gardneri, &c. Harrismith, Western Australia (C. A. Gardner).

197. E. ferruginea Schauer.

Large tree, with rough bark, growing on ironstone formation, Frew's Pond, Northern Territory. (C. E. F. Allen, No. 653.)

5. E. facunda Schauer.

Western Australia.—Mingenew, rather common, but small trees; In C. of E. churchyard at Dongarra; Pindar, at the 93\frac{1}{4} mile-post, a fair number found within say a distance of a mile. Common on grass land west of Mullewa; not rare at Broome Hill, though apparently not previously recorded from thence. (The above collected by J.H.M.)

224. E. Foelscheana F.v.M.

North Western Australia. North West Kimberley, to the north of Admiralty Gulf, occurring both on basaltic and sandstone-quartzite formations. Somewhat difficult to distinguish from E. latifolia in habit and bark, but the leaves are quite different. Admiralty Gulf, Mitchell River and Vansittart Bay. A few trees were seen on the Carson River, but the range of this species cannot be said to be very great in Western Australia. (C. A. Gardner.)

It was doubtfully quoted by me as a native of tropical Western Australia at Part XLI, p. 6.

180. E. gamophylla F.v.M.

North of Waycliffe Well, Northern Territory. (Captain S. A. White, No. 52.)

355. E. Gardneri Maiden.

Gravelly slopes of hills or steep lateritic ridges. Harrismith, Western Australia (C. A. Gardner.)
106. *E. gigantea* Hook f.

Mr. R. T. Baker records it (under the name of *E. delegatensis*) as from Delegate Mountain (W. Baerelen). Mr. Andrew Murphy, the well-known seed collector, says he has never found it "within 50 miles of the Delegate township." I do not go as far as that, but as I have not seen it in the Delegate district, I would like information as to where it occurs in the district (see Part XX, p. 294).

"Best described as a Gum-topped Stringybark. Locally known as Mountain Ash. Growing in company with *E. coriacea* and *E. amygdalina* (*radiata*), the former predominating, on granite. Headwaters of the Kangaroo Creek (Cotter River, Murrumbidgee River) at an elevation of about 4,000 feet." (C. Weston.)

74. *E. Gillii* Maiden.

The normal form of this species is restricted to South Australia (Flinders Range and farther north), and the Broken Hill district of New South Wales, so far as we know at present. As regards the latter State, the following is an additional definite locality. "Height, 30 feet; in bases of rocky valleys in wild rocky hills; Mundi Mundi Trig. Station, Broken Hill district." (E. C. Andrews).

"Small straggling Mallee 5-8 feet high. Growing on slopes of North Pap on schist, just below hard quartzite outcrop, 35 miles north of Broken Hill. Have observed several trees in poor condition without flowers or fruits about 17 miles north-east of Broken Hill. (A. Morris, No. 1,302.)

var. *petiolaris* Maiden.

This form is restricted to South Australia, so far as we know at present, and includes *E. socialis* F.v.M. var. *laurifolia* F.v.M. (See Part XXV, p. 177, and figs. 3a, 3b, Plate 67).

The original came from "Pine forest near Gawler Town (Behr.). The modern Gawler is on the North Railway line, about 25 miles north of Adelaide. I have identical specimens from considerably further north, viz., Laura, and Wirrabara Forest (W. Gill), which are east of Port Pirie, and approach the Flinders Range. Mount Lyndhurst (Max Koch, No. 113). In the Flinders Range district. (Maiden in *Journ. Roy. Soc., N.S.W.*, LI, 69, 1919.)

81. *E. goniantha* Turcz.

Bentham (*B.Fl. iii, 248*) records it from "Franklin (Frankland) River, Maxwell (in fruit only with rather broad leaves)." (See Part XVI, p. 200). Mueller ("Eucalyptographia," under *E. diversicolor*) says that this specimen belongs to *E. diversicolor*. *E. goniantha* deserves the close attention of Western Australian collectors. (See Maiden in *Journ. Roy. Soc., N.S.W.*, xvii, 232, 1913.)

101. *E. goniocalyx* F.v.M.

Tantowanglo Mountain, near Cathcart, southern New South Wales (W. A. W. de Beuzeville).
209. *E. gracilis* F.v.M.

Heavy loam, in the Harrismith district, Western Australia (C. A. Gardner)

191. *E. grandifolia* R.Br.

Just as widespread in Northern Queensland as in the Northern Territory. It grows in damp places. Dr. H. I. Jensen, who calls it "Bloodwood," says it is both calciphobe and calciphile, and grows in loams, often clay subsoil, drier ground. It frequents all formations except very siliceous sandstone and very rocky ground. It is associated with *E. papuana* and *E. Foelschiana* in the Northern Territory, also with *E. alba*. (See also Part XXXVII, pp. 188-91.)

Northern Territory.—"I note you mention (p. 188) specimens numbered by me 506 and 1,272 as being referable to *E. grandifolia* R.Br. On looking up my field notes, I find these came with trees of 30-40 feet in height, with a stem-diameter of about 1 foot; with bark and timber similar to those of *E. clavigera* A. Cunn." (Jensen.) I have looked up the original specimens, which are, however, fragmentary. No. 1,272 is, in my opinion, *E. grandifolia*, of which it has the fruits; the rachis is a little rough. No. 506 has broad broad, lanceolate, undulate, glabrous leaves, the fruits are few, and would pass for either *grandifolia* or *papuana.*

*E. grossa* F.v.M.

A Mallee. Stock rather small, carrying 6-8 stems of 8-12 feet in height, rarely 15 feet, straggling, and rather widely branched, 3-5 inches diameter. Bark stringy-fibrous, or fibrous-flaky, light to dark grey in colour, rough and persistent up to the ultimate twigs. Timber pinkish, or red, soft, but very tough. Leaves ovate, dark green, thick and rigid, shiny, erect or spreading. Flowers not seen, but said to be yellow. Buds reddish, fruits reddish, becoming a purplish-brown, on thick terete peduncles, nearly as thick as the cylindrical fruits.

Occurs in small patches near Salmon Gums, in low Mallee thickets, or more frequently in thickets of Melaleuca, in yellow loam. (C. A. Gardner, No. 2,228.)

Figured at Plate 18, Part IV, also Plate 72, Part XVI. This is an addition to the few localities already recorded, see p. 210, Part XVI.

*E. hemipholia* F.v.M.

Inglewood, Queensland (Cecil J. Smith, through C. T. White), also Silverwood, Darling Downs (C. T. White, No. 1,743.)

**North Western Australia.**—"White Gum. Occurs throughout the sandstone areas in swampy, sandy places, and along the banks of creeks among rocks. It attains its greatest proportions in the Glenelg-Prince Regent districts. It is comparatively scarce north of the Moran River, and does not occur in the vicinity of Vansittart and Napier Broome Bays. The southern boundary appears to be the Charnley River, near Mount Dagleish, extending south-easterly to Mount Barnett." (C. A. Gardner, Kimberleys.)


On gravelly rises, forming small thickets. Harrismith. 10 miles north of Wagin, in sandy, gravelly, arid soil. Gravelly hills, Narrogin, on rising ground in sandy, gravelly soil among large masses of laterite with *E. astringens*. All Western Australia. (C. A. Gardner.)

154. *E. Kirtoniana* F.v.M.


**Northern Territory.**—"Waterside Eucalypt." Rough bark, Newcastle Waters. (C. E. F. Allen, No. 636.)

**Queensland.**—Springsure, "Comparatively small trees of about 20-30 feet high, growing on the common at Springsure near the base of the Virgin Rock. Reminds me somewhat of *E. haemastoma*." (J. L. Boorman, July, 1913); Roma, Queensland, "Spreading and gnarled trees, bark coarse and blotched, smooth above. Grows near water." (Rev. J. H. Simmonds, September, 1910); Gowrie, Little Plain (W. F. Gray, October, 1911).

233. *E. Kruseana* F.v.M.

A straggling shrub of 8 to 10 feet. Collected near Lake Cowan, 50 miles south of Kalgoorlie, at the head of the Lakeside wood line (in fruit), October, 1922. (Coll., S. L. Kessell.)

223. *E. latifolia* F.v.M.

**North Western Australia.** Upper Moran River, near Mount Hann, forming open forests on basaltic soil with *E. papuana* and *E. Spenceriana*. Sandstone valleys near Mount Agnes, in sandy soil, with *E. miniata*. Kimberleys (C. A. Gardner). This adds Western Australia to the range of this species. See Part XLVIII, p. 2.

**Northern Territory.** "Mountain Bloodwood," Mataranka Station, 300 miles south of Darwin. (C. E. F. Allen, No. 684.)
176. *E. Lehmannii* Preiss.

*Western Australia.*—Occurs on Middle Island (Recherche Archipelago), 80 miles eastward of Esperance Bay. (Hon. Walter Kingsmill, M.L.C., July, 1920.)

Warrungup Hill, one of the central peaks of the Stirling Range, about half way up the hill, at an altitude of about 1,000 (C. A. Gardner, No. 1,955.) It would appear that the flowers and fruits of *E. Lehmannii* are considerably smaller in size from an inland locality such as the present, and that the gross forms all come from the coast or coastal islands.

*E. leptophileba* F.v.M.

Kambul, near Mareeba, North Queensland. (C. T. White, No. 1,512.)

332. *E. leptophylla* F.v.M.

*Western Australia.*—Near Southern Cross, in low-lying places near salt lakes, in red, stony soil; also near Harrismith. (C. A. Gardner.)

*South Australia.*—Ooldea, Transcontinental Railway line. (Prof. J. B. Cleland, Nos. 64, 69.)

58. *E. leucoxyylon* F.v.M.

*New South Wales.*—Round Bend, parish of Nowong, county of Taila, Lower Murray, below Euston. A group of about 100 trees in the locality, some very old and decayed. A girth of 9 feet measured 4 ft. 3 in. from the ground. (Foreman McCartney, Forest Department, Deniliquin). In this State, previously only recorded from Barham, Deniliquin district.

211. *E. longicornis* F.v.M.

On clay flats in the Salmon Gum forest, intermixed with *E. conglobata*. Also Narrogin.

Narrogin (1904), on laterite hills, in sandy soil near the reservoir, in open forests of *E. calophylla* and *E. redunca* var. *elata*. (C. A. Gardner.)

239. *E. maculata* Hook.

See Part XLIII, p. 85, with reference to my desire to better define the Victorian localities and the most southern locality of New South Wales, we have—

*Victoria.* The isolated patch of this species near Nowa Nowa on the bridle track between Orbost and Buchan appears to be the only place in Victoria where this tree is found. I have not seen or heard of it anywhere else. I know the country between Nowa Nowa and the border of N.S.W. pretty well, and I believe that *E. maculata* is entirely restricted to the small colony on the slope of the Tara Mountain. (Harry Hopkins, Bairnsdale.)

Another way of putting it is, "Painted line, Buchan to Orbost." (A. W. Howitt.)
New South Wales.—The District Forester at Moruya reports that Parish Wallagoot, county of Auckland, is the most southerly area of Spotted Gum (E. maculata) country known to him (September, 1920). Base of Mount Dromedary to coast, south of Corunna Lake (E. Reader, 19th July, 1880.) In Melbourne Herbarium.

**E. megacarpa** F.v.M.

Attains the highest altitude of any Eucalypt observed by Mr. C. A. Gardner on the Stirling Range. It occurs near the 2,500 feet altitude line, on the western side of Toolbrunup, forming thickets with *E. doratoxyloïd*, and extending a little higher than the latter; on sandstone shales. Also observed on the summit of Warrungup, and extending almost to the summit of Bluff Knoll (3,640 feet) with *Casuarina decussata*.

53. **E. melanophloia** F.v.M.

*Queensland.* On all the barren stony ranges right up to the Mitchell River, and even perhaps beyond, the traveller cannot help noticing a stunted gum tree with deeply furrowed black bark... It never grows in good soil, and mostly prefers rocky ground. I have seen it abundantly inland as far north as the waters of Carpentaria. (Rev. J. E. Tunison-Woods, *Proc. Linn. Soc., N.S.W.*, VII, 323).

North Western Australia. See Part XII, p. 73. Upper Isdell River, between Isdell Range and Mount Marmion, on ironstone gravel. Tree of 30-60 feet, trunk to 30 feet, diameter 1-1½ feet, bark persistent on stem and branches, rugged, iron-grey, very thick and longitudinally fissured, timber deep red and extremely hard. The young shoots are frequently glaucous; the trunks of old trees are often piped. “Iron Bark” of Kimberley. (W. V. Fitzgerald-MSS.)

66. **E. melliodora** A. Cunn.

New South Wales.—Charles Fraser, No. 251, on Oxley’s Second Expedition, 1818.

123. **E. miniata** A. Cunn.

*North Western Australia.*—Glenelg River (Martin); on all elevations between Lennard, Fitzroy, Barker, Isdell, Adcock, Hann, Barnett, Charnley, Sprigg, Calder Ord, Denham and King Rivers; near Wyndham, Dillen’s Spring; Inglis’ Gap, King Leopold Range. On sandstone and quartzite. (W. V. Fitzgerald MSS.)

Napier Broome Bay to Derby. It is most abundant from the King Leopold Range north easterly to the Prince Regent River, after which it becomes associated with *E. tetradonta*, the latter becoming the dominant tree further northwards. There are smaller stunted specimens in the “Pindan” (see p. 271), near Derby which do not exceed 30 feet in height, and are separated from the main habitat by about 90 miles. The species is restricted to the sandstone and quartzite areas, covering the tablelands, rough ranges and valleys. It is never seen on basaltic formations, and seldom where laterite is present. Also in the Kimberleys. (C. A. Gardner.)

Queensland.—Dr. H. I. Jensen says that, as regards Queensland, it is calciphobe, that it is found on gravelly and stony soils on rocky ground, that its geological formation is granite and schist porphyry, and that it is associated with *E. grandifolia*, *E. latifolia*, &c. See also Part XXII, p. 38, and Part XLVII, p. 198.
25. *E. microcorys* F.v.M.

Like *E. pilularis*, it prefers the cool side of the hills and keeps well up in the shelter of the bushes on the mountain side. It is not very plentiful in the Copmanhurst district, no doubt owing very largely to the long settled state of the country. We noticed it along the Clarence River just below Copmanhurst; on Mount Mullengen, 4 miles north of the latter place; Mount Harriet, 3 miles south-west of Copmanhurst and along the Orara River, near Ramornie Meat Works, all northern New South Wales. (Blakely and Shiress.)


*South Australia.*—Mount Patawurile, near Moolooloo. (E. H. Ising, October, 1918, through J. M. Black). The first record of the species in South Australia. Some smaller fruits of this specimen show a remarkable resemblance to some belonging to *E. dealbata* A. Cunn.

*Queensland.*—Paroo, Bulloo Range. (Dr. W. MacGillivray, per C. T. White, September, 1923.)

144. *E. neglecta* Maiden.

Mr. H. B. Williamson finds this species growing on Spring Creek, Cobungra, also in the Omeo district, Victoria. (*Virt. Nat.,* xxxix, 23, June, 1922.)

Mr. P. R. Sims, District Forester, Bright, Victoria, informs me that he has collected this species along the top reaches of the Buckland River, at least 34 miles upstream from Porepunkah township, where the Buckland junctions with the Ovens. The new locality is about 40 miles as the crow flies in a north-westerly direction to Omeo, the only locality previously recorded for the species.


I have seen specimens from Berricana (J. S. Swanson, also Blair Athol (Forest Foreman Massey), both Central Queensland. (Both through C. T. White.)


*Tasmania.*—I have seen specimens collected by the French collector Verreaux (see my "French Botanists" in *Journ. Roy. Soc., N.S.W.*, xlv, 153, 1910) from the following localities:—

No. 35, Brown’s River; No. 43, Mount Nelson; Nos. 51, 53, 54, 55, "dans la ville" (Hobart); No. 68, Mount Wellington; No. 69, Sandy Bay; Nos. 70, 71, Mount Wellington; No. 294, "Camp in Heaven, alentours de Port McCarrie, March, 1845" (? Macquarie Harbour, west coast of Tasmania).

*Victoria.*—It ascends from sea-level to 3,000 feet (Harry Hopkins.)
182. *E. occidentalis* Endl.

Wagin Lake, Western Australia, “the northern limit of the species.” (C. A. Gardner.)

255. *E. odontocarpa* F.v.M.

Between Tennant’s Creek and Running Spring, No. 23 (Northern Territory); also Waycliffe Well, No. 37. (Captain S. A. White.)

92. *E. Oldfieldii* F.v.M.

A Mallee at Southern Cross, Western Australia. (H. Steedman.)

73. *E. oleosa* F.v.M. ("A Red Morrell.")

Occurs on the stony rises near Lake Lefroy, Widgiemooltha. Observed at Coolgardie and Widgiemooltha, on the Norseman railway, Western Australia. (C. A. Gardner, No. 1,754.) See p. 502, Part LIX (under *E. longicornis*).

171. *E. pachyloma* Benth.

*Western Australia.*—Bremer Bay, South Coast. (J. Wellstead.)

Warrungup Hill (near the summit, 2,000 feet, Stirling Range) intermixed with *E. megacarpa* (mountain form) and *E. doratoxylon*. Also sandy foothills of the Stirling Range, forming extensive clumps in arid stony soil with *E. Lehmannii*. Extends also on to the plains, north and south. (C. A. Gardner.)

226. *E. pachyphylla* F.v.M.

*Northern Territory.*—Barrow Creek; between Tennant’s Creek and Running Spring. (Captain S. A. White, Nos. 243 and 36).

119. *E. pallidifolia* F.v.M.

*Queensland.*—Seen at various points on the slightly elevated Cretaceous sandy or gravelly areas, avoiding all basic formations. It was first met with about 15 miles north of Donors Hill, and was last seen near Cloncurry on what appears to be Silurian slate. Mr. Ross McLean, of Bowen, informed me that this species was very common towards the western border of North Queensland, but was rare east of the Flinders. (R. H. Cambage in *Journ. Roy. Soc., N.S.W.*, xlix, 434, 1915, with Plate lvii, fig. 1, showing its general appearance).

The White Gum on the Etheridge is probably this species. (Dr. H. I. Jensen.)

*North Western Australia.*—The type came from the Northern Territory (Part XXII, p. 29), and Mr. C. A. Gardner tells me it is also found in North Western Australia, under the name of “Micums” or “Ridge Gum.” A medium-sized tree, with a smooth yellowish-white bark, Mount Florence, near Roeburne, 24th August, 1922. (Coll. D. McVicar, No. 1,819.)
Locally known as "Mam." There is a statement as to the range of this species in the Roeburne district of Western Australia at p. 99 of W.A. Forests Department Bulletin No. 32, by C. A. Gardner.

192. *E. papuana* F.v.M.

_North Western Australia._—A tree with two distinct forms: a small tree of the sandstone ranges in poor soil, of low stature, known as "Desert Gum," and a more luxuriant form found on alluvial flats and river valleys known as "White Gum."

_Desert Gum_ is a tree with an erect trunk of 8 to 15 feet, and spreading, somewhat flexnose branches, the twigs being of a reddish-brown colour. The bark is pinkish or buff-coloured, mottled with brown, or sometimes quite white, decorticating in small flakes. The leaves are a dark shining green. The timber is brown and dense. Found on sandstone elevations or in valleys in sandy soil, from the Prince Regent River to Vansittart Bay, where it descends to the Mangrove fringe. The capsules are thin, and drop from the trees early.

_White Gum_, a handsome tree of 30 to 50 feet, with an erect trunk and numerous spreading flexnose pendulous branches. Trunk to 20 feet and 20 inches diameter, the bark rather thin, white or greyish-white, smooth and decorticating in small thin grey flakes. The leaves are narrower than the Desert Gum, and thicker. Common on the Black Soil plains of the Leuand and May Rivers in rich black loam, also near Derby in sandy soil. (C. A. Gardner, Kimberleys.)

The expedition had a very trying time, and many specimens had to be left behind. In view of the fact that our knowledge of _E. papuana_ and _E. grandifolia_ is not complete, it would have been very desirable to have had specimens from so excellent an observer. Indeed, there is reason to suppose that some specimens attributed to _E. tessellaris_ (especially those recorded by travellers without strict botanical examination), may perhaps turn out to be other than that species.

_Queensland._—Sugar Gum, Cabbage Gum, calephille; on heavy and light loam of considerable thickness in alluvial and arenaceous formations in damp places through Northern Queensland; on all formations except limestone plains, and it is associated with _E. terminalis, E. alba_ and _E. grandifolia_.

The above notes are by Dr. H. I. Jensen, who observes that it is just as widespread in Northern Queensland as in the Northern Territory, and in similar positions, i.e., in damp places. He goes on to say (April, 1920):

I doubt very much that it is _E. papuana_ which is classed as Desert Gum from Emerald, Central Queensland (Part XXXVII, p. 197) unless Boorman's specimen was collected near a spring and confused in some way with a Desert Gum. _E. papuana_ associates usually with _Pandanus_, wherever I have seen it. Its association with Bloodwood (which is also in the tropics a water seeker), as recorded by Miss Zara Clark (same page), points to her specimen being _E. papuana._

I have looked at these specimens again, and they both appear to be _E. papuana._

243. _E. perfoliata_ R.Br.

_North Western Australia._—The following notes from Mr. C. A. Gardner supplement the localities given in Part XLIV, p. 104, for a rare species. "Restricted to the sandstone formations, and occurring in poor sandy soil. Prince Regent River (the northern limit of the species), Artesian Range, Edkins Range, and Mount Marmion; all in stony places."
138. *E. Perriniana* F.v.M.

_Tasmania._—A planted tree at Ellislea, on the Dee, was (March, 1918) bearing fruit in an extraordinary quantity rarely seen in the genus. It is semi-pendulous, and the branches brittle; the timber is, therefore, inferior in value. Purplish glaucous branchlets, diameter 2 ft. 6 in.; height 50 feet. On the Strickland it grows on poor sandy soil and is scrubby, rarely attaining the size of the Ellislea tree. (Maiden in _Pap. & Proc. Roy. Soc., Tas._, 1918, p. 86.)

Eight Mile, near Kiandra, at above 5,000 feet. Lobb's Hole Road (W. A. W. de Beuzeville, August, 1922).

124. *E. phanicea* F.v.M.

_Northern Territory._—Pine Creek (C. E. F. Allen, No. 470).

1. *E. pilularis* Sm.

_Victoria._—Having re-examined the Victorian specimen that Mr. Baker (_Rep. Aust. Assoc. Adv. Science_, xiv, 505, 1913) quotes on my authority (Part I, p. 38), I withdraw it, believing it to be *E. Muelleriana*, Howitt. It is, however, not quite satisfactory. Professor Ewart informs me, on Mr. St. John's authority, that the specimen attributed to that gentleman was taken from a tree growing in the Melbourne Botanic Gardens. But Professor Ewart also sends me, for examination, a specimen of *E. pilularis* collected at National Park, Sealer's Cove, Wilson's Promontory (J. W. Audas and P. R. H. St. John, 22nd October, 1909), which, although incomplete, is, in my view, sufficient to validate record of the species as Victorian, Professor Ewart also thinks that the McLister River record (Mueller, _B. Fl._ iii, 208) is probably correct, although the specimen has disappeared from the Melbourne Herbarium. The most southern New South Wales record for *E. pilularis* known to me is Mogo, near Moruya, and it is hoped that specimens will be collected to connect this with the Victorian one. (J. H. M. in _Journ. Roy. Soc._, Vic. xxxiv, N.S., 79, 1921.)

_Northern New South Wales._—We noticed that this species favours the cool or south side of the ridges and mountain spurs, and at the same time keeps well up on the ridges, sometimes capping them. Where a gorge is narrow and deep it descends to the lowest level, and it is in such situations that the largest specimens are seen. A belt of this timber skirts the south side of Mount Mullengen 4 miles north of Copmanhurst, and another belt extends from Sugarloaf, 5 miles southwest of Ramornie, for a couple of miles along the ranges to the south of Sugarloaf. (Blakely and Shiress.)

_var. pyriformis* Maiden.

Large trees, similar in appearance to *E. pilularis*, and at the same time growing alongside the normal form. Trunk half-barked, the lower portion Peppermint-like, but of a more flaky nature, the remainder of trunk and branches smooth and white, splashed with very pale green streaks. Young tips or young branchlets more or less glaucous. Half way up and on the top of Mount Mullengen, 4 miles north of Copmanhurst, also on a ridge almost half a mile south east of the Mount. (The same.)

I still am unable to say that the morphological differences already observed between this variety and the normal species constitute a new species, but I by no means say that the differences will always be considered of varietal rank.

32. *E. piperita* Sm.

It was collected by J. Backhouse in 1835, No. 249. As regards its claim to be a Victorian species (see Part X, pp. 300, 302, 304), I think it is a doubtful Victorian plant at present. (See also my "Forest Flora of New South Wales," Part xxxiii, p. 38, Plate 124, 1909).
31. *E. Planchiana* F.v.M.

The Grafton-Copmanhurst road runs through a belt for a couple of miles, between 3 and 5 miles from Copmanhurst. Good specimens may be seen not far from the junction of the Eastonville and Copmanhurst roads, in company with *E. Bauerian*, *E. Baileyana*, *E. cornis*, *E. acuminoides* and *E. tereticonis*. Mr. C. Savidge of Copmanhurst informed us that it is known locally as "Yellow Jacket," and is one of the best timbers in the district for fencing. Unfortunately it is not very plentiful, as we did not see it in any other part of the district. (Blakely and Shiress.)

62. *E. polyanthemos* Schauer.

Red Box is another lowland species that very rarely ascends to the hills, and when it does, becomes considerably altered in appearance and character. This tree is not very plentiful, being mostly confined to the country between the Tambo River and Merriman's Creek, on the fringe of the Red Gum (*E. tereticonis*) areas. A little of it is met with through the forests along the Tambo Valley and in East Gippsland, where it is generally of very inferior quality. The best timber is obtained from the forest near Fernbank, Heyfield, and Longford. (Harry Hopkins, Bairnsdale.)

The above remarks apply to North and East Gippsland, (See Part XIII, p. 112.)

40. *E. populifolia* Hook.

Mr. Harry Hopkins, says, in "Advance Australia," for October, 1909: "Another species, not common in Victoria, but which extends eastward through New South Wales and to Queensland, according to von Mueller, is *E. populifolia*—the poplar-leaved or shining box tree. I have not seen it west of the Tambo River." He has sent me specimens from Orbost and the Tambo River, whose foliage simulates that of *E. Baueriana* a good deal. Although I reject it as a Victorian plant on the evidence, I somewhat confidently look forward to its collection in the Mallee country, or north-west.

*Queensland.*—Dr. H. I. Jensen remarks on its Queensland localities: "Poplar Box," calciphile; found on heavy clayey subsoil, capillarity poor, water capacity good. It is a widespread western slopes species, but extends to the coast in the central district, and as far north as Mount Coolon, on calcareous sandstones, shales, alluvials of Walloon, Ipswich and Bowen formations; not common on volcanic rocks. The northern Mount Coolon variety has a long leaf resembling that of *E. hemiphloia* in shape, but the characteristic inflorescence and capsules. Associates—*E. melanophloia* on calcareous sandstone on dry drained slopes, with *Acacia harpophylla*, *Eremophila Mitchellii* on flats and deep clay soils. With *E. Normanbankensis* on flats at Mount Coolon.

54. *E. pruinosa* Schauer.

*Northern Territory.*—Between Running Spring and Powell's Creek, No. 7; also between Tennant's Creek and Running Spring, No. 35. (Captain S. A. White.)

244. *E. ptychoscarpa* F.v.M.

*North West Australia.*—Dillen's Spring (W. V. Fitzgerald).

A species very infrequently met with, and growing in small patches, all of which were on the banks of creeks or around springs. I quote all the localities in which it was seen—Hann's Springs, Hann's Pass, King Leopold Range, in moist sandy soil in sandstone valley. Tree of 50 feet. East end of Edkins Range, near Mt. Shadforth, in sandy soil along creeks. Mount Agnes (Central Kimberley) in rough sandstone valley. Mitchell and Carson Rivers, in sandy moist soil on river-banks. The largest trees seen were in Hann's Pass. (C. A. Gardner, Kimberleys.)
218. *E. pyrophora* Benth.

North Western Australia.—"Derby, in sandy soil in the ‘Pindan’ (i.e., thicket-like patches (see p. 271) with *Adansonia Gregorii*, *E. papuana*, and *Acacia impressa*. No. 1,644. As far as I have seen the species, it is confined to the plains south-west of the King Leopold Range." (C. A. Gardner, Kimberleys).

I have not seen true *pyrophora* from Western Australia, nor indeed var. *polycarpa* from that State, but do not think their presence unlikely. See Part XI, p. 324.

Cordillo Downs Station, north of Cooper’s Creek, South Australia, and also over the border in Queensland. (Professor J. B. Cleland, per J. M. Black, July, 1924.)

var. *polycarpa*.


132. *E. quadrangulata* Deane and Maiden.

New South Wales.—Nundle district, 38 miles east of Tamworth, parish Vant, county of Hawes. It occurs on the eastern fall of the Great Dividing Range, at an average elevation of 2,300 feet above sea-level. (Forest Overseer Mattson.) It was first sent from this locality by Assistant Forester E. H. F. Swain in 1911, but the specimens were so poor that it was thought they might be *E. Stuartiana*. Mr. Forester Gordon Burrow, in forwarding Mr. Mattson’s specimens in 1917, reported—"The quantity available in the proposed State Forests in the Nundle division is 408,000 superficial feet."

A large tree at the Comboyne, New South Wales. It only grows on small areas on top of the highest points. It is known as "Box," or "Fuzzy Box." (Dr. E. C. Chisholm.)

Mr. W. F. Blakely found this species at Stanwell Park (35 miles south of Sydney, on the coast), which is the nearest locality to Sydney so far recorded.

50. *E. Raveretiana* F.v.M.

Queensland. Comet River, between Cometville and Springsure. I think it is best seen in the bed of the Nogoa River, not far from the town of Emerald. I have not seen it except in the beds or on the banks of important streams. On the Dawson River it is common, and also on the Medway at the foot of the Drummond Range; I saw it also on the Pioneer River under the Main Range near Mackay. Again on the Herbert it appears, on the Ross, Haughton, and more rarely on the Burdekin Rivers. I do not remember ever having noticed it west of the Dividing Range. (Rev. J. E. Tenison-Woods, *Proc. Linn. Soc., N.S.W.*, vii, 331.)

172. *E. redunca* Schauer.

On gravelly rises, in sandy, gravelly soil. Harrismith, Western Australia (C. A. Gardner). Also in sandy, yellow-white loam, in Mallee thickets, grasspatch. (C. A. Gardner, No. 2,219.)
E. redunca var. elata Benth. In sandy, gravelly soil on hills, Narrogin (C. A. Gardner.)

12. E. regnans F.v.M.

"I notice (in No. 61 of the Critical Revision) that you were speculating on the occurrence of E. regnans in the south-east part of New South Wales (in connection with its affinity with E. fastigata). In the course of two days' excursions in the forests around Mallacoota and Wangarabelle, and two trips across to Eden, and thence to Bombala and Delegate, I did not see any sign of E. regnans, but it may occur in the hilly country south of Delegate and near the Victorian border, or further eastward of Bombala, if there is any 'jungle country' in these localities." (H. Hopkins.)

168. E. rostrata Schlecht.

North West Australia. Barker River, in sandy soil on the river banks, also Lennard River and Isdell River (already recorded at Part XXXIII, p. 69). The species does not occur, so far as I know, further north than the localities mentioned. It loves a sandy soil, and this is seldom seen on rivers further north, where many of them gorge through rock, or have banks of rich loam. (C. A. Gardner, Kimberleys.)

Northern Territory.—Daly Waters (C. E. F. Allen, No. 658).

South Australia.—See Part XXVII, p. 145, with figs. 1a to 1d, Plate 114 (as E. ovata). It is among a patch of open forest of E. rostrata, Myoponga, 45 miles south of Adelaide. (Walter Gill.) This is a puzzling form, admittedly possessing characters of both E. rostrata and E. ovata, and I placed it with the latter. On further consideration, I think it is better with E. rostrata, although it is not typical.

Cordillo Downs Station, Prof. J. B. Cleland (same particulars as E. pyrophora).

161. E. Secana.

E. Secana is fairly common throughout the Copmanhurst district, N.S.W. It occurs on Ramornie Station, 3 miles west of Copmanhurst; on the Orara River, 10 miles south of Ramornie; Main Creek, 4 miles west, and on Purgatory Creek, 7.8 miles north-west of Ramornie. Also 13 miles north of Copmanhurst, on the Copmanhurst-Yulgilbar road. We also saw large quantities of it between Grafton and Copmanhurst and also between Carmarna and South Grafton. At various places along the Grafton-Glen Innes road as far as Mann River it is plentiful, but we did not notice it beyond the latter place. (Blakely and Shiress).

196. E. setosa Schauer.

Northern Territory.—Tablelands, 250 miles north of Alice Springs (C. E. F. Allen, No. 676). Daly Waters (Captain S. A. White, No. 202), with leaves distinctly petiolate.
Dr. H. I. Jensen favours me with the following notes—"Hairy Bloodwood; calciphobe; found on very barren, siliceous, sandy soil on stone; on granite and sandstone formations, associated with Bombax and E. latifolia. In Northern Queensland, as in the Northern Territory, it is found on dry sandstone and quartzite, and on very acid granite country."

Between Running Spring and Powell’s Creek, Northern Territory. (Captain S. A. White, No. 4.)

57. E. sideroxyylon A. Cunn.

*New South Wales.*—Collected near Mount Caley, in Oxley’s First Expedition, 1817 (Allan Cunningham, No. 205). Also a second specimen labelled "Interior, 1817." Both presented by the British Museum, through Dr. A. B. Rendle, F.R.S. Doubtless co-types. See also Part XII, p. 82.

There is a tree with pink flowers a few miles from Wallendbeen Station, Wallendbeen. Almost unknown in the district, and, therefore, rare. Height 40 feet, diameter 2 feet. (Alona M. Mackay, 1919.)

33. E. Sieberiana F.v.M.

*New South Wales.*—"On granite hill near Mr. Tivey’s." Kybean River, Monaro, the most s.w. locality known to me. (R. H. Cambage.)


In association with E. nitens. Big Badja, Cooma. (W. A. W. de Beuzeville.)

179. E. spathulata Hook.

On gravelly ridges, or in lower situations in a sandy loam, forming thicket-like patches with E. leptophylla and E. eremophila. Harrismith (C. A. Gardner.)

Six miles north of Nyabing, on the Kukerin Road (F. M. C. Schock). Eight miles east of Dumbleyung; also in Dumbleyung. In sandy, swampy places, forming thickets, with a prolific growth of Melaleuca. (C. A. Gardner.)

Typical form between Ravensthorpe and Pingerup (Ralph S. Stamford, through E. Cheel, June, 1924).

var. grandiflora, Benth.

*Western Australia.*—Ravensthorpe (Ralph S. Stamford, through Mr. E. Cheel).

91. E. squamosa Deane and Maiden.

*New South Wales.*—Near the 41-mile post on the main road, about 2 miles on Springwood side of Blaxland Station. Only six trees observed, associated with E. corymbosa as usual; E. Considiniana not uncommon. The squamosa specimens have
the usual appearance of the coastal trees, and this somewhat rare species becomes an addition to the flora of the Blue Mountains. (W. F. Blakely and Dr. E. C. Chisholm, October, 1922.)

In clumps up to 20 feet high, about 2 miles north-west of Wondabyne railway station (north of Hawkesbury River, New South Wales). (Blakely and Shiress.)

52. *E. Staigeriana* F.v.M.

We know so little about the restricted range of this valuable tree, that the following notes by Mr. F. G. de V. Gipps will be useful:—(1) Between Wolfram Camp and Thornborough. (2) On the old Limestone Goldfield (between the Palmer and Mitchell Rivers). Both localities are Northern Queensland.

Dr. H. I. Jensen remarks that it is "Calciphobe, is found on loam, with stony subsoil, on rough hills; on slates and schists and quartzites. It is absolutely the predominant tree for miles around Maytown (Palmer Goldfield), and I have seen it nowhere else. It grows on very rough, steep, greywacke formations, and sends its roots into the rock. The most frequent associate is *E. crebra*.”


A specimen labelled 469 Sieber, and which bears a very old label of *E. piperita* Sm., has been received from the British Museum.

*New South Wales (Southern).*—Other localities not specifically recorded are Tumbarumba (T. H. Williams), Nimitybelle and Currockbilly, Wog Wog (J. L. Boorman). (Western).—The most easterly locality in the Blue Mountains is Wentworth Falls, in a stony creek near the station. (Not to be confused with the “narrow-leaved form” (*E. Moorei*).) It does not occur from thence to Cox’s River. Kanimbla Valley and Cox’s River (J.H.M.), Capertee (J. L. Boorman).

(Northern).—Barrington Tops (J. L. Boorman); parishes Scott and Nundle, county Parry, county Bligh (Forester at Gulgong); parish Bundella, county Pottinger, Chandler’s Peak, Guyra (J. L. Boorman).

158. *E. tereticornis* Sm.

Disseminated throughout the Ramornie-Copmanhurst district, Upper Clarence River, New South Wales, being found in almost every class of soil and situation. It is just as plentiful on some of the ranges as it is on the flats. (Blakely and Shiress.)

216. *E. terminalis* F.v.M.

*North Western Australia.*—A common tree of the sandstone and quartzite areas north of the Charnley River in long. 125 deg. E., extending to the extreme north of the State. As far as I have observed it, is confined to sandstone, quartzite, and laterite areas. I have never seen it in basaltic country. It attains
its greatest dimensions in moist situations, and is frequently associated with *E. houseana*. It is very scarce to the west of the Prince Regent River, but very common in the central Kimberleys. The tree is seldom seen on hills, preferring the moister situations of the valleys. Specimens collected, No. 1576, Mount Shadforth, Edkins Range, in sandy soil in valleys, a tree of 60 feet (in fruit); No. 1387, Prince Regent River, in valleys in the sandstone ranges. (C. A. Gardiner, Kimberleys.)

**Queensland.**—Dr. H. I. Jensen favours me with the following notes, chiefly as regards Northern Queensland, and says that it "seems to be the predominant Bloodwood, and, as in the Northern Territory, it grows principally on good, damp soil. It is calciphile; is found on deep alluvial limestone, basalt loams, loamy subsoil, in Central and North Queensland on all coastwise streams indicating plentiful moisture and good soil; associated with *E. corymbosa, E. tessellaris, E. papuana* and *E. alba."

*E. terminalis* from the "far interior of New South Wales" (Baker and Smith "Research," &c., 2nd Edin., p. 33) is probably *E. pyrophora* Benth.

193. *E. tessellaris* F.v.M.

**Queensland.**—Dr. H. I. Jensen favours me with the following notes:—"It is calciphobe in west and calciphile and calciphobe on coast. In western districts it is found on arenaceous, deep loams; in coastal districts on heavier soils, often volcanic, but good drainage and capillarity. Localities, East Moreton, Darling Downs, Roma and Mitchell, David's Range, Carnarvon Range, Springsure, Taroom district, getting scarce north of Bogantungan; on basic igneous rocks in East Moreton, sandy sandstone loams of all sedimentary periods in the West and Dawson Mackenzie country, but not on highly siliceous sandstone, except in damp places. The tree requires lime, but not excess. The amount of lime in the leached volcanic soils of East Moreton and in the desert sandstone soils of Mitchell is probably much the same. Grows with *E. dealbata, Angophora lanceolata* and *Callitris* in Roma, Mitchell districts, with *E. melanophloia* in East Moreton on volcanic rocks; with *E. hemiphloia* in Brisbane district; with *E. papuana* in the Central district. It occurs in the Cairns coastal belt, but the trees ascribed to that species inland are probably *E. papuana* and *E. grandifolia."

121. *E. tetroptera* Turcz.

**Western Australia.**—South-west of Ellen Peak, Stirling Range, on the Cape Riche Road. (Mr. W. Dunn, of the Porongorups, verbally to me.)

254. *E. tetrodonta* F.v.M.

**North Western Australia.**—East of the Prince Regent estuary, southwards to Phillips Range, and northwards to Vansittart and Napier Broome Bays. It is frequently associated with *E. terminalis*, and in the southern parts of the habitat mentioned; they form mixed open forests with *E. miniata*, which is the predominating tree of the sandstone areas south of Mount Hann. To the north, however, *E. miniata* takes a secondary place, the forests become denser, and the dominant tree of the sandstone quartzite and laterite areas is *E. tetrodonta*. The sclerophyllous woodlands to the south of Admiralty Gulf, Vansittart and Napier Broome Bays are largely composed of this species. It is not a widely spreading tree, and the trees are in sufficiently dense patches to be termed forest. It is never found on basaltic country. (C. A. Gardner, Kimberleys.)

**Queensland.**—"Stringybark, calciphobe; on light sandy soil of deep nature. Found in both North Queensland and the Northern Territory on sandstone and granite." (Dr. H. I. Jensen.)
Northern Territory.—Between Katharine River and Daly Waters. (Captain S. A. White, No. 174.)

47. _E. Thozetiana_ F.v.M.

Queensland.—Scrubs of the River Mackenzie. A large tree (E. Bowman, 1871; in Herb., Melbourne). See also Part III, p. 82.

231. _E., trachyphloia_ F.v.M.

Queensland.—Dr. H. I. Jensen favours me with the following observations:—

"Yellow Bloodwood; calciphobe; on deep sandy loam; in the Roma, Mitchell, Springsure, and Rolleston districts; on 'Walloon,' 'Bundamba,' 'Ipswich,' and 'Bowen' sandstones and 'Desert' sandstone; associated with _E. tessellaris_, _Angophora lanceolata_, _Lysicarpus ternifolia_ at Mitchell, and with _E. decorticans_ at Kilmorey.

210. _E. transcontinentalis_ Maiden.

Western Australia.—"Near Westonia, forming open forests intermixed with _E. salmonophlia_ _E. longicornis_, and sp. No. 1,753. The branchlets and flower buds are not as glaucous as in the typical form." (C. A. Gardner).

27. _E. umbra_ R. T. Baker.

Top of Kariong, 807 feet above sea level, about 6 miles west of Wondabyne railway station. (Blakely and Shiress.)

Chambigne, _via_ South Grafton (Forest Assessor F. D. Deverell).

100. _E. urnigera_ Hook.

A Tasmanian tree, varying greatly in stature, according to edaphic conditions, and mostly confined to an altitude between two and three thousand feet. (L. Rodway.) It, however, exceptionally occurs at a higher elevation. See Part XVIII, p. 262.

148. _E. viminalis_ Labill.

Collected at Bathurst Plains, New South Wales, Oxley's First Expedition, 1817, by Allan Cunningham, No. 197.

68. _E. uncinata_ Turcz.

Ten miles north of Wagin, Western Australia, on gravelly plains. (C. A. Gardner, No. 1,910.) Sand hills near the Pink Lake, Esperance, Western Australia, in sandy soil overlying limestone. (C. A. Gardner, No. 2,212.)

From the foot to the top of Trig. Station, Kariong, 807 feet, and two other smaller peaks to the south, about 6 miles west of Wondabyne railway station. On the former it extends from the southern end, around the eastern side to a spur running due east. It is quite possible that it extends further north on Kariong. The distance is roughly about half a mile. (Blakely and Shiress.)

230. *E. Watsoniana* F.v.M.

**Queensland.**—Concerning the range of this little known species, Dr. H. I. Jensen writes:—"Known as "Yellow-wood"; it is calciphobe, and is found on gravelly loose arenaceous soils in the Carnarvon and Dividing Ranges, northern spurs and slopes, Springsure, Rolleston districts, Glenhaughton, Taroom district. A central Queensland species; geological formation conglomeratic sandstones of 'Bowen' formations and on 'Carboniferous-Star' sandstone, also on metamorphic rocks, stony ground. It is associated with *E. trachypiloia*, *E. maculata*, *E. citriodora* and *E. papuana* (rarely)."

"On useless sandstone country on Cadanga Creek, a tributary of the Burnet River; also at Auburn." (H. S. Bloxsome.) I have seen Mr. Bloxsome's specimens, but not Dr. Jensen's. (See also Part XLII, p. 41.)

175. *E. Websteriana* Maiden.

**Western Australia.**—Mr. Fitzgerald Fraser sends through Mr. W. C. Grasby this rare species from the Mount Jackson district, only found on granite hills, September, 1919. In the following year Mr. R. J. Larsen sent it from Lake Lefroy, with the following notes in his letters as to habitat, &c. "It grows on a granite and greenstone hill near Lake Lefroy. Seems to keep to the hillsides and gullies. I have not seen it elsewhere. None of the local people know anything about the shrub." He goes on to say: "Not very common as far as seen. Seems to grow on the fringe of other Eucalypts and further up the hillsides and nearer the barren porphyry granite outcrops, being, I take it, more hardy. Lake Lefroy is about 40 miles from Coolgardie. I believe it is also found at Kanowna, 30 miles from Coolgardie, and Mount Jackson is 100 miles or so further west still."

These localities are as follows:—

Lake Lefroy, lat. 31°15', long. 121°30'; this is north-east of Widgiemooltha.

Mount Jackson, lat. 30°15', long. 119°20', is between, say, Goongarrie (Kalgoorlie to Menzies) and the No. 1 Rabbit-proof fence. It is almost due north of Southern Cross. In other words, the species has been found along the Widgiemooltha, Coolgardie, Mount Jackson, an imaginary line drawn north-west.
THE INTERMEDIATE LEAF.

1. Preliminary.

All through this work I have differentiated between the youngest leaves and the mature ones, by describing what I have (somewhat vaguely, as already admitted at p. 203, Part LXV), called the Intermediate Leaf. I have made a greater point of presenting the youngest (juvenile) leaf, and treatment of the intermediate one has hitherto been more incidental and causal. I now desire to emphasise this Intermediate Leaf, which has been ignored by most writers on the genus.

2. The "Saplings" of Howitt.

Howitt was the first botanist to describe the "Sapling leaves." The following extracts are taken from his papers on "The Eucalyptus of Gippsland," in Trans. Roy. Soc., Vict., vol. ii, Part I, p. 93 (1891). I quote some of this descriptions including such leaves, which, of course, refer to Gippsland plants. There are a few additional references to "sapling" leaves, but as they are somewhat involved, owing to his own uncertainty as to species, I have admitted them.

By "saplings" in the phrase "seedlings and saplings," Howitt refers to the (usually) coarse or large secondary leaves, intermediate between those of the seedlings and those of the (usually) falcate-lanceolate leaves which are the sign of maturity. They are common on the younger saplings, and I have elsewhere called them "intermediate leaves." I am afraid that the word "saplings" in Howitt's phrase, is too vague for a technical term.

He probably followed Bentham in B.Fl., iii, 185, who speaks of "leaves in the young saplings," or (p. 187), "adventitious barren branches of older trees."

The saplings of these Eucalypts may also readily be distinguished from each other. Those of E. piperita (E. eugenioides is probably meant, J.H.M.) remain rough up to 10 feet in height, the leaves then become unequal-sided, ovate-lanceolar, or ovate-pointed, having the upper surface slightly darker green, and more shining than the lower . . .

E. capitellata soon produces unequal-sided cordate leaves, fully twice the size of those of E. piperita, and of a lighter shade of green; moreover, they hang more vertically, and are consequently more equally tinted on both sides. In size, and the inequality of the sides, they resemble the sapling-leaves of E. obliqua, but are readily distinguished by not being attenuated, as those of E. obliqua are . . .

The saplings of E. Muelleriana are distinguishable from all the others by having opposed leaves, even up to two or three feet in height. The leaves are lanceolar and unequal-sided, but in a less degree than others of the group. The upper page is very shining, and the lower much duller and paler in hue. The apex is more or less acute, and the lateral veins are more numerous and less spreading than in E. capitellata. Even in saplings from 8 ft. to 10 ft. high, the leaves have a general tendency to assume a horizontal position, thus producing a peculiar shining appearance of their upper pages, which is characteristic of this tree when young . . .
The saplings of *E. obliqua* have somewhat large, very unequal-sided leaves, broadly lanceolar, or even cordate, and always attenuated, thus being, as I have pointed out, distinguished from *E. capitellata*, whose sapling leaves are not attenuated.


Let us take the actual examples of intermediate leaves in two species; this will enable us to better grasp the subject.

1. Range of leaves in *E. capitellata*. It would be very desirable to profusely figure complete series of intermediate leaves of all species, but this is not practicable in the present state of our finances. Besides showing the great diversity of leaves, the present drawings (see Plates 270 and 271), of *E. capitellata*, and notes concerning it and *E. agglomerata*, will incidentally serve to show the diversity of the leaves of two species until recently looked upon as identical.

*E. capitellata* Sm., corner of Pittwater and Spit Roads, 8 or 9 miles north-east of Gordon Railway Station, Sydney.

a. Main shoot or sucker close to the ground. Individual leaves are described as follows, under numbers:—

1. Sessile, orbicular-cordate, obtuse, venulose on both surfaces, paler beneath; not stellate, 8 cm. by 9 cm.

2. Shortly petiolate, ovate, venulose, as in (1); 10 cm. by 8 cm.

b. From a side branch of a shoot or sucker.

3. Sessile, opposite, cordate-acute, slightly rough on both surfaces, faintly venulose, 5 cm. by 4\(\frac{1}{2}\) cm. Stems rough.

4. Petiolate, alternate, elliptical, acute, 6\(\frac{1}{2}\) cm. by 4\(\frac{1}{2}\) cm.

5. Petiolate, alternate, obliquely lanceolate, paler beneath, darker above, venulose; 8\(\frac{1}{4}\) by 4 cm.

c. Growth from a plant 5 feet high. Still shoot or sucker growth.

6. Petiolate, alternate, obliquely lanceolate, paler beneath, venulose, the intramarginal nerve distant from the edge; 10\(\frac{1}{2}\) by 4\(\frac{1}{2}\) cm.

7. Petiolate, alternate, broadly and obliquely lanceolate, venulose, intramarginal nerve distant from the edge; 12\(\frac{1}{2}\) by 8\(\frac{1}{2}\) cm.

8. Petiolate and very broadly obliquely lanceolate, venulose, intramarginal nerve fully 1 cm. from the edge; 19 by 10\(\frac{1}{2}\) cm.

(Most of the other leaves on c. approximate to No. 7.)
D. Terminal branch of a young plant about 7 feet high; also shoot or sucker.

9. Petiolate, alternate, obliquely and broadly oblong, mucronate, venulose, intramarginal nerve close to the edge; 7 by 5 cm.

10. Petiolate, obliquely and broadly oblong, mucronate, venulose; 9 by 5 cm.

11. Petiolate, broadly elliptical, mucronate; 10 by 6 cm.

12. Petiolate, oblong, mucronate, 8 by 3 1/2 cm.

13. Petiolate, oblong-lanceolate, apex acuminate, venulose, intramarginal nerve distant from the edge; 11 by 3 1/2 cm.

(The young tips of the above are purple brown.)

e. Mature leaves, adult foliage.

14. The mature leaves range from falcate-lanceolate to oblong-lanceolate, sometimes obscurely nerved. In the majority of cases the nerves are more or less prominent. Both surfaces a dark, glossy green, 11 to 17 cm. long and from 2 1/2 to 4 cm. broad.

2. *E. agglomerata* Maiden., Yerrinbool, near Mittagong, New South Wales. (J. L. Boorman, September, 1921.).

[Although the Intermediate Leaves of this species have been worked out, as given below, the corresponding drawings have not been reproduced, in view of the close parallelism of the series with those of *E. capitellata*.]

A. The earliest shoots or suckers. All on the same twig.

1. Opposite, almost sessile, ovate, acute, margin crenulate, hispid, lower surface paler than the upper surface, minutely stellate-hispid; 4 cm. by 2 cm.

2. Opposite or nearly so, shortly petiolate, ovate or slightly obliquely ovate, crenulate, hispid, 4 1/2 by 3 cm.

3. Alternate, ovate-lanceolate, crenulate, hispid on both surfaces, 5 1/2 by 3 cm.

4. Alternate, lanceolate, oblique, acute, hispid on the lower surface, smooth on the upper; margin almost entire, 5 by 2 cm.

B. Another shoot or sucker.

5. Alternate, narrow lanceolate, acute, dark green above, pale beneath, not stellate, 5 by 2 1/2 cm.

(The next two leaves (6) are broader.)

6. Alternate, broadly ovate-lanceolate, apex acuminate, distinctly oblique, the upper margin extending along the petiole about 5 mm. further than the lower margin; 7 by 3 cm.

7. Alternate, broadly and obliquely ovate, apex acuminate, 7 by 4 cm.

8. Alternate and intermediate between 6 and 7.
c. From a more advanced young shoot.

9. Alternate, broadly and obliquely lanceolate, venulose on both surfaces, intramarginal nerve close to the edge; $9 \frac{1}{2}$ by $4 \frac{1}{2}$ cm.

10. Same as 9, but broader, i.e., 5 cm.

Then we approximate to the mature leaf.

It can now be clearly seen that the proper expression should be, not the intermediate leaf, but an intermediate leaf, i.e., one of a number of leaves intermediate between the two extremes of juvenile and mature leaves.

Let us now briefly consider examples from the Corymbosæ and the Eudesmiæ.

3. *E. dichromophloia* F.v.M., figs. 3a, 3b, 3c, Plate 202, Part XLIX.

The leaves figured at 3a are sessile, stem-clasping and scabrous, owing to stellate hairs. In this juvenile scabrous state the margins are crenulate, and the leaves have cordate bases and bluntish apices, with a length of 7–8 cm. and a breadth of 4–5 cm. Still, in the opposite stage we have two different additional forms, 3b and 3c, which may be classed as Intermediate leaves, and they form, with 3a, a series more or less characteristic of the *Corymbosæ*.

3b differs from 3a in absence of hairs, in being more elongate and tapering, having perhaps twice the length of 3a, and about the same width. 3b has the secondary venation even more conspicuous than 3a, and thicker in texture, the venation somewhat curved, parallel and distant, making an angle of about 50–60 degrees with the midrib. The margin is somewhat crenate, and this form is on the verge of becoming shortly pedunculate, and both 3a and 3b have a tinge of yellowishness. 3c shows a marked difference. The petioles are rather long, the leaves are pale-coloured, and similar on both sides, are rather broader than 3b, and the venation very different. In 3c, the secondary veins are scarcely visible, very fine and parallel, and at an angle of about 50–60 degrees with the midrib. Beyond this the mature, alternate leaves are much narrower.

In *E. eximia* Schauer, we may have—

1. Small leaves, persistent after the cotyledon leaves, succeeded by

2. Larger leaves which, while still in the falcate-veneined stage, are—

   (a) Cordate-based, or
   (b) Peltate, or
   (c) Petiolate without auricular or peltate bases.

We also find the axis more or less glandular, showing a tendency to contain oil.
4. *E. erythrocorys* F.V.M. (*Eudesmia*). In plants cultivated at the Botanic Gardens, Sydney, we may have suckers stellate-tomentose throughout, a little darker above than beneath, first and second lower leaves broad spatulate, long petioled, distantly alternate, internodes long. Third pair of leaves opposite, oblong to lanceolate, petiolate. Fourth pair broad lanceolate, alternate. Fifth pair similar, but opposite.

Another branch which is much older and more advanced shows at least 4–5 pairs opposite, broadly lanceolate, semi-peltate. The sixth pair is also semi-peltate, but narrow-lanceolate; the next reaches the mature or adult stage, i.e., narrow lanceolate to falcate-lanceolate, rounded at the base, but not semi-peltate. In the adult stage, nearly every alternate pair of leaves is opposite, a character which I have not noticed in any other species.

This species is similar to *E. calophylla* and *E. globulus*, to mention no others, in that it produces sucker-like leaves on the branches amongst the adult foliage, which are similar to the basal ones just described, even to those stellate-tomentose. This, of course, affords an example of Diel’s Law.

The juvenile and intermediate leaves of this species very much resemble those of *E. Baileyana*, but those of the latter are more tomentose underneath, and the colouring is much whiter. On the other hand, the colouring of the very young tips and particularly that of the upper internodes (which is a hoary purple), is the same in both species.


I offer a selection of figures of Intermediate leaves which have already appeared in this work, and they will be useful for reference. Intermediate leaves are intermediate in shape, thickness and venation, between Juvenile and Mature ones. For a note that requires emphasis, see under *E. Foelscheana* below.

<table>
<thead>
<tr>
<th>Species</th>
<th>Part.</th>
<th>Page:</th>
<th>Plate.</th>
<th>Figure.</th>
<th>Page:</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. alba</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. altior</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. amplifolia</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. Andreisi</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. angophoroides</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. Behriana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. de Beuzevillei</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. Bosistoana</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. botryoides</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. calophylla</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. Camfieldi</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
E. cinerea ... ... ... ... 21 21 89 6
E. Clelandi ... ... ... ... 16 215 69 8b
E. conica ... ... ... ... 13 132 60 6
E. corystymbosa ... ... ... ... 39 303 161 7b
E. cosmophylla ... ... ... ... 21 22 91 3b
E. crucis ... ... ... ... 50 514 242 7b
E. dealbata ... ... ... ... 32 63 134 5b
E. decipiens ... ... ... ... 14 163 63 4c
E. dichromophloia ... ... ... ... 49 290 202 3a, 3b, 3c
E. eugenioides ... ... ... ... 8 253 39 2b
E. eximia ... ... ... ... 42 68 172 1c, 2
E. fasciculosa ... ... ... ... 14 162 61 15
E. fastigata (see regnans) ... ... ... ... ...

E. Foelscheana F.v.M. ("Common Bloodwood") at Katharine River, Northern Territory; large tree, rough bark about halfway up trunk of tree, extending at times to the large branches. Limestone country (C. E. F. Allen, No. 719). This is known as the Narrow-leaved form.

"Large Bloodwood," dark reddish, rough bark, right up to small branches; leaves generally shorter than No. 719, growing in sandy limestone country. Katharine River railway terminus. Heart-wood very large, known to bushmen as "Ringed (plenty of kino veins) Bloodwood" (C. E. F. Allen, No. 723, March, 1923). This is known as the Broad-leaved form.

I have referred to this leaf-variation in Part XLI, p. 4. I believe that the broad-leaved form represents the intermediate leaves, and the narrow-leaved form the mature ones. The former is less "grown-up" than the other. The subject is important, because trees which have a preponderance of broad or narrow leaves, as the case may be, are by bushmen looked upon as distinct species.

E. fruticetorum ... ... ... ... 11 58 52 7b
E. gomphocephala ... ... ... ... 21 22 92 2b
E. grandifolia ... ... ... ... 37 199 153 2a
E. grandis (E. saligna var. pallidivalvis) 23 61 100 8
E. Griffithsii ... ... ... ... 16 216 71 6a
E. Guilfoylei ... ... ... ... 20 311 87 1c
E. hæmatotylyon ... ... ... ... 43 101 177 5 and 6a.
E. hemiphloia F.v.M. Intermediate leaves described at Part 58, p. 435, also "lower leaves" and "upper or intermediate leaves" of the above and microcarpa and albens contrasted, p. 443.
<table>
<thead>
<tr>
<th>Species</th>
<th>Part.</th>
<th>Page.</th>
<th>Plate.</th>
<th>Figure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Hillii</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Irbyi</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Jenseni</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Muelleriana (E. leucopinea var. minor)</td>
<td>8</td>
<td>252</td>
<td>38</td>
<td>16a</td>
</tr>
<tr>
<td>E. Lehmanni</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. leptophleba</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. longifolia var. multiflora</td>
<td>58</td>
<td>494</td>
<td>239</td>
<td>2b</td>
</tr>
<tr>
<td>E. macandra</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. maculosa</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. megacarpa</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. melliodora</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. microcarpa</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. microcorys</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. minutula</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Mundijongensis (erroneously as E. reducna var. elata)</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. neglecta</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. nilensis</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Normantonensis</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. nova-anglica</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. odorata var. purpurascens</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Oldfieldi</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. oleosa</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. papuana</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. peltia</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Penrithensis</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. pilularis var. pyriformis</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. piperita</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. Planchnoniana</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. polyanthemos</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. propinqua</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. pythocarpa</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. pumila</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. pyriformis var. elongata</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>E. pyrophora</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

In Part 50, p. 305, the "juvenile leaves" there described should be "intermediate leaves."

In Part 19, p. 272, see also Part 19, p. 272.

E. Planchoniana. Petiolate, lanceolate, over 27 cm. long and 7 cm. broad, but not seen in the earliest stage; equally pale green on both sides, of medium thickness, intramarginal vein distinctly removed from the edge; secondary veins spreading, and at an angle of about 40–50 degrees with the midrib. It is a big intermediate leaf that is figured at 3a, Plate 210, Part LI.
Better examples of the intermediate leaf are figs. 2a for *E. regnans*, and 7 for *E. fastigata*.

**E. Stricklandi.** Accompanying these (juvenile leaves) and probably forming a denser, more self-shaded growth, are much thinner leaves, of a brighter green, but otherwise very similar to the preceding. These are intermediate leaves.

Those shown at Part LI are intermediate leaves. Juvenile leaves were not available.

---

**Explanation of Plates (268-271).**

**PLATE 268.**

Additional Juvenile Leaves.


2. *E. fuscata* Schauer, Goomalling, 30 miles from Northam, W.A. (Percy Murphy, June 909).

PLATE 268—continued.

4. 4a, 4b. E. Forrestiana Diels, 4, very thick and glaucous. Between Esperance and Norseman, W.A.,
October, 1903 (C. R. P. Andrews, the type); 4a, 4b, Mr. Babington, Esperance, 1903 (Received
from Dr. Stoward, No. 164, in 1916).

5. 5a, 5b: E. fruticetorum F.v.M., very thick and glaucous. Inglewood, Victoria (J. Blackburne, 1st
June, 1906).

6. 6a, 6b, 6c. E. gracilis F.v.M.; 6a, Minnipa, Eyre’s Peninsula, South Australia (W. J. Spafford,
August, 1916); 6b, 6c, Lake View, Griffith, N.S.W., Line 61 (D. H. Campbell, L.S., April, 1918).

PLATE 269.
Additional Juvenile Leaves.

1. E. doratoxylon F.v.M., Mt. Toolbrunup, 3,000 feet, Stirling Range, W.A. (C. A. Gardner, 23rd April,
1923).

2. E. tetraperta Turcz., Cultivated, Botanic Gardens, Sydney, 7th October, 1921.

Intermediate Leaves.

3. E. longifolia Link and Otto, Moruya, N.S.W. (J.H.M.)


5. E. clavigera A. Cunn., Piece of the type, showing peduncles. Allan Cunningham, No. 242, “Third

PLATE 270.
Series to show range of leaves (Juvenile, Intermediate and Mature) in E. capitellata Sm., all from Corner
of Pittwater and Spit roads, just north of Port Jackson (Sydney). (W. F. Blakely and
J. L. Boorman, 21st October, 1921.)

Nos. 1-8. Numbers 1 and 2 from the same twig; numbers 3, 4, 5 from another twig; numbers 6, 7, 8
from a third twig. (Continued on next plate and each leaf and twig fully described at p. 307).

PLATE 271.
Continuation of the series of leaves found in E. capitellata begun in Plate 270.

Nos. 9-14. Numbers 9, 10, 11, 12, 13 from the same twig; 14 (two figures) from the same tree, though
not from the same twig.

[Ordinarily these figures would be numbered 1, 2, 3, etc., but they follow on the numbering
of the same species in Plate 270, as a matter of convenience].

1a, 1b, slightly pedunculate leaves from the same twig of E. setosa Schauer, Daly Waters, Northern
Territory, (Captain S. A. White, 23rd April, 1922, No. 202).

2a. E. Gouldii Ward.

2b. E. largiflorens Muell. (E. bicolor A. Cunn.) for comparison.

E. Gouldii is an American fossil species, since ascertained to be erroneously attributed to Eucalyptus.
A description will be found at Part LV., p. 229. The two figures now given (E. Gouldii and
E. largiflorens) are referred to in Lester F. Ward’s paper “A New species of Eucalyptus from the
Dakota Group of South Western Kansas” (Bull. Torrey Bot. Club, XXIV, p. 576, text fig. 1, 2
(1897) Kansas).

I have received the drawings of two leaves (now reproduced) and a photostat of the paper
itself from Dr. W. A. Taylor, Chief of the Bureau of Plant Industry, United States Department
of Agriculture, and thank him for same.
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales"* with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:—

<table>
<thead>
<tr>
<th>Species</th>
<th>Author</th>
<th>Year</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>acaciodes</td>
<td>A. Cunn. (xlvii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>acmenioides</td>
<td>Schauer (xxxi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>affinis</td>
<td>Deane and Maiden (lvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>amygdalina</td>
<td>Labill. (xvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andrewsii</td>
<td>Maiden (xxii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baileyana</td>
<td>F.v.M. (xxxv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bakeri Maiden</td>
<td>(lxx)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baueriana Schauer</td>
<td>(lvii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baueriana Schauer var. conica</td>
<td>Maiden (lviii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behriana</td>
<td>F.v.M. (xlvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bicolor</td>
<td>A. Cunn. (xliv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boormani Deane and Maiden</td>
<td>(xlv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bosistoana</td>
<td>F.v.M. (xliii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caleyi Maiden</td>
<td>(lv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>capitellata</td>
<td>Sm. (xxviii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conica Deane and Maiden</td>
<td>(lviii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Considcria Maiden</td>
<td>(xxxvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>coriacea</td>
<td>A. Cunn. (xv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>corymbosa</td>
<td>Sm. (xii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>creba</td>
<td>F.v.M. (liii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dalrympleana Maiden</td>
<td>(lxiv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dies Schauer</td>
<td>(xix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dumosa A. Cunn.</td>
<td>(lxxv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>engeniodies Sieber</td>
<td>(xxix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fruticetorum</td>
<td>F.v.M. (xlii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gigantea</td>
<td>Hook. f. (li)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>globulus</td>
<td>Labill. (lxvii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>goniocalyx</td>
<td>F.v.M. (vi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hamastoma</td>
<td>Sm. (xxxvii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hemiphloia</td>
<td>F.v.M. (vi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>longifolia</td>
<td>Link and Otto (ii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luekmanniana</td>
<td>F.v.M. (xxvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>macrorrhycha</td>
<td>F.v.M. (xxvii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>maculata Hook.</td>
<td>(vii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maiden F.v.M.</td>
<td>(lxix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>melanoophloia</td>
<td>F.v.M. (liv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>meliodora A. Cunn.</td>
<td>(ix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>microcorys</td>
<td>F.v.M. (xxxviii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>microtheca</td>
<td>F.v.M. (lii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muelleriana</td>
<td>Howitt (xxx)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>numerosa Maiden</td>
<td>(xvii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obliqua L'Hérit.</td>
<td>(xxii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ochrophyloia</td>
<td>F.v.M. (l)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>odorata Behr and Schlectendal</td>
<td>(xli)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>oleosa</td>
<td>F.v.M. (lx)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>paniculata Sm.</td>
<td>(viii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pilularis Sm.</td>
<td>(xxxiii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>piperita Sm.</td>
<td>(xxxiii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planchoniana F.v.M.</td>
<td>(xxiv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>polyanthemos Schauer</td>
<td>(lix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>polyphloia Hook.</td>
<td>(xlvii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>propingua Deane and Maiden</td>
<td>(lxix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pubescenta DC.</td>
<td>(x)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>radiata Sieb.</td>
<td>as amygdalina (xvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>regnans F.v.M.</td>
<td>(xviii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>resinifera Sm.</td>
<td>(iii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>robusta Sm. (lxviii)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rostrata Schlcht.</td>
<td>(lxii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rubida Deane and Maiden</td>
<td>(xlvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>saligna Sm.</td>
<td>(iv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>siderophloia Benth.</td>
<td>(xxxix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sideroxylon A. Cunn.</td>
<td>(xiii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sieberiana F.v.M.</td>
<td>(xxxiv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smithii R. T. Baker</td>
<td>(lx)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stellulata Sieb.</td>
<td>(xiv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tereticornis Sm.</td>
<td>(xi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tessellaris F.v.M.</td>
<td>(lxv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thozetiana F.v.M.</td>
<td>(xlvi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>viminalis Labill.</td>
<td>(lxiv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>virgata Sieb.</td>
<td>(xxv)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vitrea R. T. Baker</td>
<td>(xxiii)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Government Printer, Sydney. 4to. Each part contains 4 plates and other illustrations.

Note by Government Printer.

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

ADDITIONAL JUVENILE LEAVES.

EUCALYPTUS DEALBATA A. CUNN. (1). E. FOECUNDA SCHAUER. (2).
E. EUEDSIIIOIDES F. V. M. (3). E. FORRESTIANA DIELS. (4).

[See also Plates 266, 267, 269.]
ADDITIONAL JUVENILE LEAVES (1, 2). INTERMEDIATE LEAVES (3-5).

E. LONGIFOLIA Link and Otto. (3). E. DEALBATA A. Cunn. (4).
E. CLAVIGERA A. Cunn. (5).
Series to show range of leaves (Juvenile, Intermediate and Mature) in *E. CAPITELLATA* Sm. (Concluded on Plate 271).
Continuation of range of leaves in *E. CAPITELLATA* Sm. (9-15). [See Plate 270]

Slightly pedunculate leaves of *E. SETOSA* Schauer. (1a,1b)

Fossil leaf of *E. GOULDII* Ward (2a); and of *E. BICOLOR* A.Cunn. (2b) for comparison.
INDEX OF PARTS PUBLISHED—continued.


II. The Bark (and Habit). 1. Early references to Eucalyptus barks and early Eucalyptus vernaculars in general. 2. Eucalyptus bark classifications. a) True Malleses. b) False Malleses. c) Mallocks.


PART LII. 306. E. amylophylla Naudin. 307. x E. dfergiensis Trabut. 308. x E. antophtetis Trabut. 309. x E. Bourretii Trabut. 310. x E. cortoer Trabut. 311. x E. gomphocarota Trabut. 312. x E. yugofia Naudin. 313. x E. ocneaeana Endw., var. orioinensis Trabut.


PART LII. 320. x E. Barmerdonaenia Maiden n.sp. 321. x E. Tandapotana Maiden n.sp. 322. x E. Peacockiana Maiden n.sp. 323. x E. Stopfordia Maiden n.sp. 324. x E. Forschii Maiden n.sp. 325. x E. Aubernanasia Maiden n.sp. 326. x E. Yagebeti Maiden n.sp. 327. x E. Blackburniana Maiden. 328. x E. Studdycenia Maiden n.sp.

INDEX OF PARTS PUBLISHED—continued.

PART LV.
330. E. mclntyreana n.sp.
331. E. pinnata McCoy.
332. E. Banksiana Banksiana.
333. E. microphylla F.v.M.
334. E. microphylla Laccostau.
335. E. holophylla n.sp.
336. E. melaleuca n.sp.
337. E. taylorii n.sp.
338. E. aggregata Deane and Maiden.

VI. The Leaf—continued.

PART LVII.
339. E. agglomerata Maiden.
340. E. simplex Maiden.
341. E. vaughanii Maiden.
342. E. bennetii Maiden.
343. E. longicornis F.v.M.
344. E. castanea Maiden.
345. E. aggregata Deane and Maiden.

VI. The Leaf—continued.

PART LVIII.
346. E. collina W. V. Fitzgerald, n.sp.
347. E. Flocktoniana Maiden.
348. E. Herbertiana n.sp.
349. E. Cruiser-Vallis n.sp.
350. E. ciliatula Hooker.
351. E. hemiphloia F.v.M.
352. E. microphylloides var. insignis Maiden.
353. E. obtusa Miquel, n.sp.

VII. Inflorescence.

PART LX.
54. E. pruinosus Schauer.
55. E. melaleuca F.v.M.
56. E. Hominita Hook. f.
57. E. longicornis F.v.M.
58. E. propinqua. Deane and Maiden, var. minor n. var.
59. E. haemastoma Sm.
60. E. mercurialis DC.
61. E. Shiressii Maiden and Blakely, n.sp.
62. E. erucoides n.sp.
63. E. Flocktonia Maiden.

VII. Inflorescence (in part)—continued.


PART LXI.
332. E. falcata Maiden.
333. E. saxthoensu Turczaninow.
334. E. Schlechteri Diels.
335. E. apiculata Baker and Smith.
336. E. Stevedearia F.v.M.
337. E. virgate Sieb.
338. E. racemifloro A. Cunn.
339. E. Newmanniana F.v.M.
340. E. Careyi Maiden.
341. E. Bakeriana Schauer.
342. E. falcata Turcz.
343. E. Spenceriana Maiden.
344. E. radiata Sieb.
345. E. macrocarpa Maiden.
346. E. nittida Hook.
347. E. eburneifolia Maiden, var. grandifolia n. var.

Enemies of Eucalyptus.

VII. The Inflorescence and
VIII. The Fruit (concluded).

PART LXII.
355. E. Carduei n.sp.
356. E. australis n.sp.
357. E. Sargentii, n.sp.
358. E. Riddelli Hook. f., var. elata Beath.
359. E. Chelidoni Maiden and Blakely, n.sp.
360. E. Taylori n.sp.
361. E. Oleagina F.v.M.
362. E. Ferruginea F.v.M.
363. E. Nyerennia n.sp.

P LATES, 252-255. (Issued March, 1924.)

PART LXIII.
211. E. longicornis F.v.M.
175. E. Stepheina Maiden.
361. E. nutans F.v.M.

IX.—The Seed.
1. Historical.
2. Danger of Collecting Seed of Inferior Species.
5. Sterile Seeds. Use of the term "Chaff."
7. The Wing.
8. Hilum.
10. Tests.
12. Size.
13. Seeds of Species not seen by me.
14. Description of Seeds—

Series Striata—Plates, 256-269 (Issued February, 1925.)

PART LXIV.
362. E. falcata Maiden.
363. E. saxthoensu Turczaninow.
364. E. Schlechteri Diels.
365. E. apiculata Baker and Smith.
366. E. Stevedearia F.v.M.
367. E. virgate Sieb.
368. E. racemifloro A. Cunn.
369. E. Newmanniana F.v.M.
370. E. Careyi Maiden.
371. E. Bakeriana Schauer.
372. E. falcata Turcz.
373. E. Spenceriana Maiden.
374. E. radiata Sieb.
375. E. macrocarpa Maiden.
376. E. nittida Hook.
377. E. eburneifolia Maiden, var. grandifolia n. var.

Enemies of Eucalyptus.

VII. The Inflorescence and
VIII. The Fruit (concluded).

PART LXV.
368. E. Carduei n.sp.
369. E. australis n.sp.
370. E. Sargentii, n.sp.
371. E. Riddelli Hook. f., var. elata Beath.
372. E. Chelidoni Maiden and Blakely, n.sp.
373. E. Taylori n.sp.
374. E. Oleagina F.v.M.
375. E. Ferruginea F.v.M.
376. E. Nyerennia n.sp.

PlATES, 252-255. (Issued March, 1924.)

PART LXV.
1. Introduction.
3. Angles of veins in the leaf.
4. Juvenile leaves (note only).
5. Mature leaves (note only).
6. Correlation of Seedings and Juvenile Leaves (note only).—

(a) Terminology of Juvenile Leaves.
(b) Coloured Plates.

Juvenile Leaves.
7. Additional descriptions.

PlATES, 364-367. (Issued March, 1926.)
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 7.

Part LXVII of the complete work.

(WITH FOUR PLATES.)

Price Three Shillings and Sixpence.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER.

1926.
A Critical Revision of the Genus Eucalyptus

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

The author of this standard work, Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., died on 16th November, 1925, at the age of 66 years.

It is most regrettable that he did not live to see the completion of his great work, of which 65 Parts have already appeared, and the final Parts were prepared by him for publication prior to his death.

With the kind permission of Dr. Darnell-Smith, Director, Botanic Gardens, Sydney, this and the subsequent Parts will be edited by Messrs. R. H. Cambage, C.B.E., F.L.S., and W. F. Blakely, Assistant Botanist, Botanic Gardens, both of whom have been in constant touch with the late Mr. Maiden during the progress of the work

Vol. VII. Part 7.
Part LXVII of the Complete Work.
(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

Price Three Shillings and Sixpence.

Published by Authority of
The Government of the State of New South Wales.

Sydney:
Alfred James Kent, Government Printer, Phillip-Street.

1926.
Description ........................................... 315
Range .................................................... 316
Affinities .............................................. 316

PAPERS ON RANGE OR DISTRIBUTION.
1. Australia in general ................................ 318
2. Western Australia ................................... 319
3. South Australia ...................................... 322
4. Tasmania .............................................. 323
5. Victoria .............................................. 324
6. New South Wales .................................... 325
7. Queensland .......................................... 333
8. Northern Territory .................................. 336

FACTORS WHICH INFLUENCE RANGE OR DISTRIBUTION.
Introductory ........................................... 336
Altitude .................................................. 337
Geocols ................................................... 338
Geological Formations, Soils ........................ 340
   Victoria .............................................. 341
   South Australia ..................................... 342
   New South Wales .................................... 343
   Queensland ......................................... 345
   Northern Territory ................................ 349
Effect of Drought Conditions ....................... 349
Note on Species of apparently anomalous Range . 350

AGE AND AREA. ......................................... 351

The Leaf.
(Continued from Part LXVI, p. 313).
Mature Leaves ........................................ 355

Explanation of Plates (272–276) ..................... 360
DESCRIPTION.

CCCLXII. E. Bloxsomei Maiden, n.sp.

Bloodwood, cortice flavo, ligno pallido. Foliis juvenilibus petiolatis, ovatis, leniter peltatis, tenuibus, venis secundariis remotis, e costa media circiter 60–85° orientibus foliis maturis flavo-viridibus, paulo nitentibus, petiolatis, lanceolatis; falcatis, venis secundariis parallelis, approximatis, e costa media 40–45° orientibus; inflorescentia umbellis ad 9 in capitulo paniculas non confertas terminales corymbosas formantibus alabastris glaucis, calycistubo sub-cylindraceo, costato; operculo conico, calycis tubi longitudinem dimidio aequante; fructibus urceolatis, magnis, 1·5-2 cm. longis, 1 cm. maximo diametro, margine depresso, pedicellis brevibus, pedunculis longis.

A Bloodwood of medium size, with yellow flakey bark, known as "Yellow Jacket" or "Yellow Bloodwood." Timber pale-coloured, and not reputed durable.

Juvenile leaves petiolate, ovate to ovate-lanceolate, slightly peltate, thin, the rachis rough with minute glandular papillae, the secondary veins roughly parallel and distant, making angles of about 60-85 degrees with the midrib. The intramarginal vein distant from the edge.

Intermediate leaves large and broadly lanceolate, acuminate, 10-17 cm long, 5-7 cm. broad, paler than the adult leaves, slightly rough, the branches acutely quadrangular.

Mature leaves thickish, yellow-green, moderately shiny, or of an egg-shell lustre petiolate lanceolate, falcate, 12-19 cm. long, 2-3 cm. broad, secondary veins moderately distinct, parallel and moderately close, making angles of about 40-55 degrees with the midrib; intramarginal vein rather close to the edge.

Inflorescence. Umbels up to 9 in the head, forming moderately loose, terminal corymbose panicles. Each umbel on a long peduncle, each flower on a short but distinct pedicel. The buds glaucous, the calyx-tube sub-cylindrical, ribbed, and abruptly tapering into the pedicel, 10 mm. long, 5 mm. broad at the top. The operculum conical half the length of the calyx-tube and wider in greatest diameter than the calyx-tube. Anthers of the Corymbosae.

Fruits. Urceolate, large, 1·5 to 2 cm. long and 1 cm. in greatest diameter, rim countersunk, the capsule well sunk, pedicels short, peduncles long. They exhibit a longitudinal vein-like appearance when dry, owing to the shrinkage which exposes the fibro-vascular bundles.

The type is from Hippong, Herbert Schreiber Bloxsome, in whose honour the species is named. He has taken great trouble to furnish information and specimens.
RANGE.

Confined to southern Queensland, so far as we know at present.

Parish of Boondooma, 70 miles N.-W. of Wondai (Forest Guard Higgins, August, 1918). Growing in large quantities in the Chinehilla State Forest, on the Condamine water (the Main Range runs right through it). Locally known as "Yellow Jack" or "Yellow Jacket" (Forest Ranger G. Singleton, September and October, 1918, through C. T. White). "Bloodwood (Yellow-barked)." Received under this name from Dr. T. L. Banerof from Hippong, June, 1919. This is Mr. H. S. Bloxsome’s property, and I have been receiving specimens and notes from Mr. Bloxsome ever since, in spite of a very severe drought.

Found on hungry sandstone, and its precise area is not yet defined. It occurs in the Chinehilla State Forest on the west (this to the north includes Hippong, Boondooma is to the east, and is on the Boyne River). A line connecting Chinehilla (on the Brisbane to Roma Railway), and Mundubbera (west of Gayndah, on the Maryborough to Mundubbera Railway) would run approximately through the centre of the known E. Bloxsomei country, where it is more or less mixed with another yellow-barked Bloodwood (E. Watsoniana), and therefore some care in the bush is necessary. Hippong, Wondai, and Boondooma are on the Burnett waters that empty into the sea at Bundaberg.

AFFINITIES.

This new species is interesting, in that it connects E. peltata and E. Watsoniana, species whose phytogenetic relations were not very clearly defined. They exhibit similarity to the present species in bark and timber, seedlings, and in fruits. For some time I looked upon it as a variety of E. peltata, but for the reasons which follow, I think the interests of science will be better conserved by recording it as a species.

1. With E. peltata F.v.M. It differs from E. peltata in the much larger pedicellate fruits and in the scarcely peltate juvenile leaves. In the majority of specimens of E. peltata, the buds and fruits are sessile or when pedicellate, only shortly so, while they are constantly pedicellate in E. Bloxsomei. The buds and fruits appear to vary more than in E. peltata; some are nearly as small as in E. peltata, while others are considerably larger, reminding one of small fruits of E. Watsoniana.

The seedling of E. Bloxsomei differs from that of E. peltata in having alternate leaves after the first pair. In one seedling it is alternate immediately after the cotyledons. There are as many as six pairs on one seedling of E. peltata, and only two on another.
In *E. Bloxsomei*, the peltate character is more retarded; it only appears in one leaf at 6 inches, the two other leaves after are not peltate. In *E. peltata*, the peltate character sometimes starts with the second pair of leaves and continues for a long period, at least until the seedling attains a height of 12 inches.

Almost from the earliest stage, or at least from 3 inches in height, the leaves of *E. Bloxsomei* are larger and broader than those of *E. peltata*. The intermediate leaves are also produced much earlier in *E. Bloxsomei* than in *E. peltata*. The setae of *E. Bloxsomei* are finer and shorter than those of *E. peltata*.

To sum up, the seedling *E. Bloxsomei* appears to be closer to *E. Watsoniana* than to *E. peltata*. The opposite character of the leaves is the same in both species.

2. With *E. Watsoniana* F.v.M.

The large fruits of *E. Bloxsomei*, with their comparatively longer and more slender pedicels, more strongly resemble those of *E. Watsoniana* than *E. peltata*. We have specimens of *E. Bloxsomei* from Wondai with small pedicellate fruits and buds. The latter are not glaucous, as the buds of *E. peltata*. I have already dealt with some resemblances to *E. Watsoniana*. 
PAPERS ON RANGE OR DISTRIBUTION.

A select list of papers follows, dealing more or less with the distribution of the Eucalypts. It is not suggested to be a bibliography of the genus. There are interspersed in it some papers on "Plant Regions," a few mainly of historical interest, but quoted for completeness' sake.

1. Australia in General.
2. Western Australia.
3. South Australia.
4. Tasmania.
5. Victoria.
7. Queensland.
8. Northern Territory.

1. Australia in General.

Bentham, G. "Flora Australiensis," Vol. III, (1866). The first account published of the whole of the species then known, with keys, and the most comprehensive account of their distribution. After a lapse of fifty-six years it remains quite indispensable to the student of Eucalyptus. The descriptions are classical. See also "The Distribution of Australian Plants," as sketched by Bentham in the Preface to Vol. VII. The sketch is quite brief, but admirable, and refers to migration of plants in general, and hardly mentions Eucalyptus.

Hooker, J., to Darwin, in a letter, 24th November, 1881, in "Hooker's Life":

"He [Wallace] has done great things towards the explanation of the New Zealand Flora and Australian but marred it by presuming a pre-existent S.-W. Australian Flora. I am sure that the Australian Flora is very modern in the main, and the S.-W. peculiarities are exaggerations due to long isolation during the severance of the west from the east by the inland sea and straits that occupied the continent from Carpentaria to the Great Australian Bight. I live in hope of showing by an analysis (botanical) of the Australian types that they are all derived from the Asiatic continent."

Mueller, F. "Fragmenta Phytographiae Australiae," 11 Volumes and a Part (1858-1882). In Latin, contains many notes as to the distribution of the genus. Vol. II, 32-71 (1860) contains a valuable account of species hitherto described, of a few species which later proved to have been previously described, and of the following new species:—


Maiden, J. H. "Australian Vegetation," being Chapter V of the Federal Handbook of Australia for the British Association Meeting of 1914. Notes under Eucalypts at pp. 185, 186, and under individual States. The following remarks are taken from the Introduction:—

"The first impression of Australia is the vastness of its area—it covers about three millions (2,974,600) of square miles, the area of the United States being 2,973,890, while that of Europe is 3,860,368 square miles. The population of Europe is approximately 452 millions, that of Australia being 4½ millions; while our island continent is infinitely less intersected by gulfs, rivers, roads, and other means of communication, it is, therefore, not to be surprised at that much country is imperfectly explored botanically, and generalisations have often to take the place of the statements of fact which are available in older and comparatively densely populated territories."
A glance at a map of Australia will show that, with the exception of Tasmania, the boundaries of the States are almost entirely artificial and not physical ones. If we contemplate the central State, South Australia, its boundaries between Western Australia on the one hand, and Queensland, New South Wales, and Victoria on the other, consist entirely of straight lines, while most of the dividing line between New South Wales and Queensland is similarly artificial. Nevertheless it is found convenient in practice to register the records of species according to the political divisions, and later on, vague as these records are, and must be as the interior boundaries are approached, it will be found that they will facilitate the definition of truly scientific botanical areas, on ecological and other lines. Much more attention requires to be paid to the work of defining the range of individual plants, and it would be desirable to see established throughout the continent agencies or outposts in touch with organisations for the record of official or unofficial botanical survey.

Australia has been divided by Gregory ("Geography—Structural, Physical, and Comparative," pp. 258 and Plate xxix) into three main divisions—

1. The Western Plateau. A vast plateau which comprises more than the western half of the continent formed of very ancient rocks, and which does not appear to have been below sea-level during recent geological times, except in the north-western part. On the north-west and south of the Australia coast, plains skirt the foot of the plateau, containing marine rocks of several distinct periods. Owing to the arid nature of the climate in the interior, the surface of the remains of the plateau is generally level.

2. The Great Plains, extending from the Gulf of Carpentaria across the continent to the Southern Ocean, between the mouth of the Murray and the coast of western Victoria.

3. The Eastern Highlands, which occur between the Great Plains and the eastern coast; they extend from Cape York Peninsula on the north, to Bass Straits on the south, and are continued still further by the island of Tasmania. A smaller highland area joins the western plateau in the vicinity of Spencer's and St. Vincent's Gulfs as far as Lake Torrens, the Flinders Range being the highest land.

Griffith Taylor has put the classification into a somewhat different form—

(a) The Eastern Highlands.
(b) Murray—Darling Lowlands.
(c) South Australian Highlands and Rifts or the Cambrian Divide.
(d) The Great Artesian Basin.
(e) The Great Tableland or Plateau Region."

See also Griffith Taylor's recent subdivision into "Climographs" at p. 239, Part LXVI.

2. Western Australia.

Mueller (with coadjutors). "Western Australia. General information respecting the present condition of Forests and Timber Trade of the southern part of the colony, together with a report on the Forest Resources of the colony by Baron von Mueller," Perth, 1882. The report was previously published by L. Reeve & Co., London, in 1879.


The following is a translation of the notes on Eucalyptus in this admirable work:

*System and Range.*—Many authors have written about the extraordinary difficulties of the systematic treatment of the genus, and it is not our intention in this place to contribute to the discussion of critical points. We refer the reader to the literature, and confine ourselves to some notes on the systematic character of the Western Australian Eucalyptus Flora in connection with its distribution. In this connection one can distinguish several groups:

1. Pan-Australian group, which are West Australian forms only slightly different from the species of the east; for example, *E. rostrata* and its allies, the tree which forms the "Galleri-Walder" (following the courses of streams).
2. Western Australian forms with the characteristics of the Eremean plants of the southern half of Australia, e.g., *E. calygoeona*, *E. gracilis*, *E. uncinata*, *E. oleosa*, *E. dunosa*. *E. uncinata* stands rather isolated in Western Australia, and shows only slight polymorphy; the other species, however, are rich in forms also in the west, where evidently some forms have become independent and developed into very characteristic forms (*E. salubris* and others).

3. Western Australian species, which are distinctly connected with certain east-Australian forms, e.g., *E. marginata*, which, with *E. patens*, *E. Todtiana*, and *E. buxrestum*, represent a group of the genus otherwise not developed in Western Australia.

4. Western Australian forms which have no connection with eastern forms, but are greatly developed in the west. This refers specially to the series Cornutae of Bentham and the genetically allied *E. rudis*.

5. Western Australian forms which are geographically isolated, and have also in Western Australia only a single or few forms. In this group we must include, at least, at the present state of our knowledge, a considerable number of species. To it belong not only species of the Western Australian interior, as *E. pyriformes*, *E. tetrapera*, with *E. Forrestiana*, *E. Precissina*, *E. tetragona*, with *E. eudesmioides*, but also important species of the south-west coast region, e.g., *E. calophylla* with *E. ficifolia*, *E. diversicolor*, *E. gomphocephala*, *E. erythrocorys*. The further relations of these species are mostly quite uncertain, but in some one can notice faint relations to north-Australian types.

In the systematic-geographical relations of the Eucalypts of Western Australia the whole flora is reflected in manifold ways. We know, unfortunately, at present, so little of the morphology of this most important genus that it would appear idle for us to make guesses as to the origin and development of the Eucalyptus Flora of Western Australia.

The geographical distribution of the species of Eucalyptus within Western Australia calls for a few remarks, because it shows some remarkable anomalies, which can be expressed in the following sentences:—

1. Great scarcity of species from about 30 deg. south latitude to the northern limit (except on the west coast, where the scarcity commences at about 27 deg. south latitude). In this region one meets generally only the pan-Australian *E. rostrata* on the watercourses.

2. Greater number of species south-east of the Eremean area. This flora has been explored only recently, and probably incompletely; it is distinguished by very characteristic forms derived from typical Eremean forms of wide range (*E. oleosa*, *E. gracilis*, *E. dunosa*, &c.).

3. Very great number of species in the interior south-west region. The south-east dominates in this category. The Eyre district contains the greatest number of species, the Stirling district not many less. This is the rich Eucalyptus Flora already discovered by Drummond and further explored by Maxwell, which extends to the east from the Stirling Range. The flora diminishes towards the north, but the limits are not yet known. The Avon district shows a great decrease, but gains a very characteristic endemic form in *E. macrocarpa*.

4. Smaller number of species in the forest region of the south-west, which are, however, very gregarious and systematically very independent. Former papers ( (1) on p. 436) give a full account of this economically very important group, and its division into the zones of *E. diversicolor* and *E. marginata*, with the addition of *E. calophyilla* and the alluvial species.

5. Peculiar species of the littoral calcareous zone (coast limestone region). *E. gomphocephala* (in the Darling district) and *E. erythrocorys* (in the Irwin district) are systematically the most independent of all Western Australian Eucalypts.

Locality.—The genus Eucalyptus is the most important arborescent genus in Western Australia, just as it is in the greatest part of Australia. Soil and moisture determine their feature in the landscape. *E. rudis* and *E. patens* are the most important species to be met on the alluvial lands of the south-west; they are just as characteristic on the extensive lowland alluvials as in the narrow valley-like depressions of the uplands. Both species are hardly gregarious: their forests often give a park-like appearance to areas.

The granite country of the south-west region is the home of the three most important forest-forming Eucalypts of Western Australia, as mentioned above. *E. diversicolor* (Karri) and *E. marginata* (Jarrah) form the densest forests. Both exclude other species to an essential amount, except on the borders of the region, and in places where local geological changes have taken place other Eucalyptus species intermingle with them, especially *E. calophyilla*. *E. rudis* (Wandoor) forms much lighter forests. The
robust habit of this tree, its chalk-like stems, and the often considerable intermingling of it with other species (E. salmonophloia, E. occidentalis), give the Wandoo-forests a character greatly contrasting with the forests of E. marginata and E. diversicolor on its western border.

The varied Eucalyptus forests of the hard clay soil of the Eremeean areas have very different characteristics, but a single species is rarely dominant over a considerable extent of land. Generally several species compose the forest, which each take about the same part in the formation. E. gracilis and its allies, E. salubris, E. salmonophloia, E. dumosa, E. oleosa, E. uncinata, are the typical representatives of this community. As stated before, the Eucalyptus flora of the clayey Eremeean area is uniform over the whole of southern Australia, but the western part of the continent is distinguished by the more imposing height some of the abovementioned species attain. Though the habit of the trees is varied, nearly all members of this Eucalyptus vegetation incline to form an umbrella-shaped crown.

The shrub-heaths on sandy soil also can show a number of remarkable forms in Western Australia. In habit this formation is kept together by the shrubby growth, but their representatives show much diversity of taste for soils. Where a strong mixture of clay gives the sand some firmness, many species thrive well. On such places E. eudesmioides often forms dense thickets, but where the sand becomes poorer and lighter, the pan-Australian forms disappear, and leave the field for forms of the west. These are wonderful forms, ornamented with beautiful coloured flowers, such as E. pyriformis and E. tetragona, or with remarkably-shaped large, glaucous leaves, E. macrocarpa and E. tetragona.

The few places in Western Australia where a special formation causes a special flora are also distinguished by special forms of Eucalyptus, as the limestone region following along the west coast. This is the home of the strong E. gomphocephala, and further north we have the peculiar E. erythrocorys, to which Drummond gives the prize for beauty in the whole genus. Further, the steep mountains of the Stirling Range are remarkable for the peculiar forms of mostly low-growing Eucalypts which cover their slopes.


   (a) The principal trees.
   (b) Those of inferior importance.
   (c) Those of the Nor.-West. Also a number of papers more or less referring to Eucalypts.

3. The three Nor.-Wests (North-Wests) of Western Australia, viz.,
   (a) Of local land administration.
   (b) From the de Grey to the Murchison (as defined by Jutson).
   (c) The Nor.-West in its wide sense,
are defined in my paper “Notes on Acacia, No. II, Tropical Western Australia,” Journ. Roy. Soc., N.S.W., LI, pp. 71, 72 (1917).

Lane-Poole, C. E.—The “Statement prepared for the British Empire Forestry Conference, London, 1920,” contains map-diagrams showing the distribution of the following Western Australian Eucalypts:—

E. marginata, E. diversicolor, E. redunca var. elata, E. cornuta, E. gomphocephala,
     E. patens, E. salmonophloia, E. colophylla, E. occidentalis var. astringens,
     E. Jacksoni, E. Guilloyi, E. longicornis, E. foecunda (loxophleba),
accompanied by descriptions at pp. 8-11 and 13-17 of the forests themselves and of the timber.
3. South Australia.

Maiden, J. H.—"A Century of Botanical Endeavour in South Australia," the Presidential Address before Section D. (Rep. A. A. A. S., Adelaide, XI, 158, 1907), will be found useful as regards papers bearing on the distribution of Eucalypts in that State.

In the present connection the following Sections are especially referred to:—

II. (p. 161). The beginning of botanical investigation in South Australia; the sea-coast.

III. (p. 167). Land explorations.

V. (p. 180). Definitions of Plant Regions in South Australia:—


[Hooker, in his introductory essay to the "Flora of Tasmania," p. iv, has a note "On the Flora of Countries around Spencer's Gulf."]


In a presidential address to Section D (Rep. A. A. A. S., I, 312, 325, 1888) Prof. Tate (see p. 182 of my address for a fair abstract) indicated the constituent elements of the Australian Flora.

Then we have his "A Census of the Indigenous Flowering Plants and Vascular Cryptogams of Extra-Tropical South Australia," with a map and definitions of certain plant-regions (Proc. Roy. Soc., S.A., XII, 67–128, 1888–9). This was followed in 1890 by his "Handbook of the Flora of... South Australia."

5. "Report on the work of the Horn Scientific Expedition to Central Australia," Part III (Geology and Botany, March, 1896), chiefly the work of Prof. Tate, and edited by Prof. W. Baldwin Spencer. This gives a most interesting account of Plant Regions, and I have abstracted it fairly fully at pages 183–187 of my address.

Maiden, J. H.—"A Contribution to the Botany of South Australia," Trans. Roy. Soc. S.A., XXXII, pp. 252-286 (1908). Special attention was given to the Eucalypts, chiefly in the Port Lincoln district, Investigator Strait, and various islands rarely visited by botanists.

Osborn, T. G. B.—The article "Botany" in the South Australian Handbook, British Association Meeting, 1914. A valuable account, pp. 251–262, of the ecology of the State, including references to the distribution of the Eucalypts.


Cannon, W. A.—"Plant habits and habitats in the arid portions of South Australia" (Carnegie Institution, Washington, 1921).

I have made only a few references (chiefly concerning Eucalyptus) from this valuable work, e.g.,

Vegetation and plant habitats in vicinity of Oodnadatta (p. 50); General Features of the Flora of South Australia (p. 57); Vegetation and the environment at Ooldea (p. 81); Vegetation of the Nullarbor Plain (p. 85); Vegetation and environment at Tarcoola (p. 89); Vegetation and environment at Port Augusta (p. 93), at Quorn (p. 96); Mallee and the Mallee regions (p. 108); Morphological Aspects of the Xerophytic Flora of South Australia, leaf-size and leaf-form (p. 111); Features of Roots of South Australian Plants (p. 114). In addition, the valuable reproductions of Eucalyptus photographs should be noted.

Ising, Ernest H.—"Eucalypts—Adelaide to Mount Lofty" (*S. A. Naturalist*, May, 1921, p. 63, with two illustrations). A useful field paper on the distribution and habit of the eight species found on this easily accessible area, which extends about 20 miles in greatest length, and from nearly sea-level to about 1,600 feet.

1922. Adamson, R. S., and Osborn, T. G. B.—1. "On the Ecology of the Ooldea district" (*Trans. Roy. Soc. S.A.*, XLVI, 1922, pp. 539-564, and Plates 32-36 inclusive). Ooldea is within the South Australian border, on the Transcontinental Railway Line, 427 miles west of Port Augusta. It is on the eastern boundary of the Nullarbor Plain. The paper is of interest in the present connection as a pioneering one in regard to Eucalypts in such environment.


4. *Tasmania*.

Hooker, J. D.—"The Botany of the Antarctic Voyage, Part III, Flora Tasmanie, 1860. The magnificent work on which our knowledge of the nomenclature and distribution of the Tasmanian Eucalypts is based.


Rodway, L.—"Tasmanian Eucalypts," *ib.*, pp. 10-20 (1917). He divides them into "about 22" species, and gives an interesting account of each. He places one-half in Section A (Renanthera), with two sub-sections, the "Peppermints and the Messmates or Stringies." Section B (Parallelanthera), which "is not capable of being split up into natural groups."

5. Victoria.


The most useful sections are Topography, Geology, Climate, Description of Main Types of Forest Growth, and Area Covered by Existing Forests.

Howitt, A. W.—1. "Notes on the Distribution of Eucalypts," *Victorian Naturalist*, vol. v, p. 27, June, 1888. The country traversed is Gippsland, and the above is a model method of recording what was seen in a number of specified trips. It is superseded by Mr. (Dr.) Howitt’s later work on the Gippsland Eucalypts (Trans. Roy. Soc., *Vict.*, II, 83, 1890).


"Some data towards the Botanical Geography of New Holland," by Dr. John Lhotsky, late of the Civil Service in New Holland (1842).

"New Holland " really means New South Wales in this paper, which is the earliest of the kind known to me. Nos. 2 and 3 refer to the Illawarra and southern tableland respectively. He proposes the following plant regions:—

1. "First Class. The coast vegetation from Sydney south to Illawarra. Its subsoil is the almost shifting sand of the places contiguous to the sea-coast; or rocks of coal-sandstone, either naked or very slightly covered with earth; or it may be seen occurring around those small ponds of salt or brackish water, which are exceedingly common in these districts. In such localities as these the Epacris, Boronia, Dillwynia, Gonophlobium, Xanthorrhoea, Hakea, Grevillea, Persoonia, Lambertia, Astroloma, Lomatia, Comesperma, Leciepogon, and Xerotes are prevalent and characteristic tribes, while no kind of forest-tree except the Eucalypti is visible. The above-named plants grow in such dense masses that men and cattle penetrate with difficulty, presenting a striking analogy with the plains of South Africa. The stiff and dry nature of the foliage prevents their being applied to any economic purposes.

2. "Second Class. Vegetation of Rocky Gullies near the Sea-coast. In these localities, a small number of springs may be seen, which feed the few creeks on the sea-coast. This moisture, whether permanent or periodical, generates a series of plants, not met with elsewhere. In such gullies, and the small flats surrounded by them, appear the only two kinds of Palms that are indigenous to Australia. Here the Corypha (Livistona) australis rears its annulated stem to a height of 100 feet, and the Seaforthia (Archontophaniz) attains an equal stature, but with a thicker and smoother trunk. The arborescent Fern (Alsophila) likewise affects these spots; also that splendid ornament of Australian vegetation, Doryanthus excelsa, the Tasmania (Driniya), Callicoma, besides the few Australian species of Rubiaceae and Malvaceae here occur.

3. "Third Class. The Argyle Vegetation. It may be seen and is characteristic of all those park-like spots, with their stately Eucalyptus trees growing at some little distance from each other, with very little underwood; places so peculiar that they have struck all travellers, from Tasman down to the wanderers of the present day. This vegetation prevails upon every kind of rock, which, by its easy decomposition and the alumine which it contains, is capable of being converted into soil; as Greywacke, Trap, Limestone, Granite, &c. The coal-sandstone is un congenial to it, because, containing so much silica, nothing but the scanty growth described as belonging to the First Class can thrive upon it.

4. "Fourth Class. The Minero (Monaro, J.H.M.) Vegetation. This comprehends the flora of the Downs of that name surrounding the Upper Murrumbidgee and Snowy Rivers, and it is also diffused over the plains and flats at the foot of the Alps. In these downs chiefly resides the richness of New South Wales so far as grazing is concerned; they stretch on the east side of the Alps for about a hundred miles, containing many level or slightly depressed plains, which measure from three to seven miles, without break or interruption, till the traveller reaches a slight ridge of dividing hills, skirted again on the other side by similar tracts. With the exception of Hakea and Brunonia, no shrub of any size can be descried, and it appears certain that either these plains have been only lately heaved out of the sea, or else that the granitic gravel which overspreads them must be the result of some very recent geological trituration, for trees appear to have had no time to establish themselves thereon.

5. "Fifth Class. Alpine Vegetation. It begins in the valleys of the Alps and reaches their summits; amalgamating on one side with that of the meadows of Minero Downs, and terminating on the ther in a point which our present state of knowledge will not allow us to overstep. I have traced it to
the summit of Mount William the Fourth, certainly one of the loftiest among the Australian Alps, Supposing these mountains should somewhere rise to the elevation of perpetual snow, the extent of this latter Class will, of course, be considerably increased. At all events, it is certain that the numberless peaks and rocky slopes of this chain must yield a great accession to the New Holland Flora, even supposing that there should be no great novelty in the genera and species of the plants which grow there."

(Hooker's "London Journal of Botany," vol. 2, pp. 135-140, 1843.)

Mitchell, T. L.—"Three Expeditions into the Interior of Eastern Australia," London, 1838 (2nd edition, 1849). The first expedition was northerly and included Valley of the Hunter, Liverpool Plains, the Peel, Namoi, Gwydir, &c., in 1831-32. Then we have an account of the expedition to explore the course of the River Darling in 1835. In vol. ii we have the expedition to the rivers Darling and Murray in the year 1836. The Lachlan and Murrumbidgee were more or less explored, and "Australia Felix" (the modern Victoria) was traversed nearly as far as the South Australian border. The Grampians were discovered. Both volumes contain much information valuable to the botanist.

Backhouse, James.—1. "Extracts from the letters of ———, now engaged in a religious visit to Van Dieman's Land and New South Wales . . . ." (3rd edition, 1838). The letters are in five Parts, and date from 1831 to 1837.
2. "A Narrative of a Visit to the Australian Colonies" (1843). This work arises out of the series of trips referred to in the preceding work. Backhouse was a good botanist, and his notes are often valuable, e.g., the measurements in Tasmania of the gigantic Stringybark (E. obliqua) trees, the largest being 55 feet in circumference (p. 120).

Fitzgerald, R. D., 1882.—The late R. D. Fitzgerald made a slight attempt to divide New South Wales in accordance with its botanical features (Linn. Soc., Lond., 1882; Abstract in Journ. Bot., XX, 96), but he did not take cognizance of Eucalyptus. His divisions were—
1. That of the sandstone, or poor country, represented by the Proteaceae, Eupodidae, and Xanthorrhoea.
2. Eastern slopes of coast range represented by Urticeae and Palmae.
3. Cold mountain lands represented by Doryphora, Filices, and Myrtaceae.
4. Interior plains represented by Chenopodiaceae and Compositae.

Maiden, J. H.—1. "Notes on Ringbarking and Sapping; based on Foresters' Reports," collected by J.H.M., Agric. Gaz., N.S.W., Jan., 1894, pp. 14-39. In this paper I used the provisional divisions (N.S.W.) :=
1. North Coast.
2. Central Coast.
3. South Tableland and South Coast.
5. Dry plain country mainly.
6. Murrumbidgee and Murray,
and the trees referred to comprised a large number of Eucalypts.
2. In the Presidential Address before the Royal Society of New South Wales (Journ. Roy. Soc., N.S.W., XXXI, p. 64, &c., 1897) I drew attention to the importance of a botanical survey of New South Wales, with the view of advancing our knowledge of Australian trees and cognate matters.

Coghlan, T. A. (1897–1898).—“Wealth and Progress of New South Wales, 1897–1898,” has a useful coloured "Diagram Map," of which the legend is:

1. Northern Coast.
2. Northern Tableland.
5. County of Cumberland.
6. Central Tableland.
7. Central-western Slope.
8. Southern Coast.
10. South-western Slope.
11. Western Plains.

In the 1900–01 edition of the same work, the Divisions are modified as follows. The map is a generally useful one.

1. North Coast.
2. Lower Hunter.
3. County of Cumberland.
4. South Coast.
5. Northern Tableland.
6. Central Tableland.
7. Southern Tableland.
10. South-western Slope.
11. Riverina.
12. East of Darling.
13. West of Darling.

Maiden, J. H.—In the Agric. Gaz., N.S.W., for July, 1901, p. 811, is an account of a lecture on the "Forests of New South Wales," delivered before our Royal Society on 22nd May. Mr. R. D. Hay (now Chief Commissioner of Forests) kindly prepared for me a coloured "Outline Map of New South Wales, showing the location of the principal timbers." This is the first purely New South Wales forest map published, so far as I know, and it includes timbers other than Eucalypts. The scope of it may be understood when it is stated that the various colours show (Eucalypts):

1. Coastal hardwoods (south and north). These are celebrated localities for the Sydney trade.
2. Grey and Red Ironbark (Richmond and Clarence Rivers).
3. Gums, Stringybarks and Miscellaneous hardwoods.
4. Ironbark with some Box.
5. Pine and Ironbark.
6. Cypress Pine and Box.
1902.—In my Presidential Address before the Linnean Society of New South Wales (Proc. Linn. Soc., N.S.W., XXVI, 759–772, 1901, with a map), I outlined a “Botanical Survey of New South Wales.” I divided the State into Botanical Counties as follows, and which are defined with some detail. They bear the following names:

**Eastern Counties.**
- E1. Monaro.
- E2. South Coast.
- E3. Illawarra.
- E4. Cumberland.
- E5. Blue Mountains.
- E8. Upper Richmond and Clarence.
- E10. Liverpool Range.
- E11. Southern Tableland.

**Central Counties.**
- C2. Liverpool Plains.

**Western Counties.**
- W1. Murray Red Gum.
- W2. Cainozoic.
- W3. West Silurian.

After the definitions of the above, follows a list of readily accessible papers arranged under the abovenamed counties.

The map shows the eastern counties to comprise the coastal areas and tablelands. The western counties show the whole of the State west of an artificial line connecting Corowa, Narrandera, Dubbo, Coonamble, and Boggabilla. They collectively form the Western Plains. The central counties, principally the “Western Slopes,” are roughly parallel to the boundaries of the eastern and western counties.

1906.—My Linn. Soc., N.S.W., 1901, paper concerning Botanical Counties was in part amplified and brought up to date in Agric. Gaz., N.S.W., for June, 1906, p. 623, under the title “Division of New South Wales into Plant Regions.” The 1902 map was reproduced also.

In addition (p. 630) I submitted a map of fewer divisions which, for clearness’ sake, I referred to as “Maiden’s Plant-Map of 1906, or Vegetation Zones Map.”
The divisions are—

No. 1 on map, Monaro.
1a. The Snowy Mountains, as a sub-section.
2. South Coast.
3. North Coast.
3a. Northern Rivers, a sub-section of the preceding.
4. Northern and Southern Tablelands.
5. Western Slopes.
5a. Riverina, or sub-section of the preceding.
6. Western Plains.

For definitions of these zones see pp. 630-2.

Cambage, R. H., 1907.—In his paper "Climatic and Geological Influence on the Flora of New South Wales," by R. H. Cambage, *Journ. A.A.A.S.,* Adelaide), the author gives an illustrative map showing (a) the coastal area, (b) the mountain area, (c) the western slopes, and (d) the interior or rest of the State. The boundaries between (a), (b), (c), and (d) are roughly, parallel with the coast-line, and with one another, with the important exception that the boundaries of (a) and (c) run into each other, by reason of the Cassilis or Hunter River Geocol. The first three have, roughly, the same area, while (d) is larger than (a), (b), and (c) put together.

This map is repeated in "The Surveyor," Sydney, XXI (January, 1908).

"Statement on Forestry in the State of New South Wales," prepared by the Forestry Commission, N.S.W., for the Imperial Forestry Conference (London, 1920). It contains a physiographical map (stereogram), with a useful account of the geology and physiography of the State (based on Griffith Taylor). Under Climate we have a "Description of Main Forest Types."


Maiden, J. H.—"The Eucalypts of New South Wales" (N.S.W. Handbook, British Association Meeting, 1914), pp. 436-445 are exclusively devoted to that genus.

Woolls, W.—1. “Botany of Berrima and Mittagong” in “Contrib. to Flora of Australia” (1867). There are some notes on Eucalyptus at pp. 105–7, but they are chiefly of historical interest now.

2. “Lectures on the Vegetable Kingdom” (1879). “Notes on Eucalyptus,” at pp. 116–123. These are local interpretations of the species enumerated by Bentham in B.Fl., III.

Maiden, J. H.—“A Second Contribution towards a Flora of Mount Kosciusko,” Agric. Gaz., N.S.W., October, 1899. Contains some notes on the Eucalyptus on high localities.

Barnard, F. G. A.—In connection with the preceding paper for an interesting account of Dr. Neumayer’s visit to Mount Kosciusko with Twynam, &c., see Barnard, in Vict. Nat., XXXIV, 185 (April, 1918).

Cambage, R. H.—“Notes on the Native Flora of New South Wales,” Proc. Linn. Soc., N.S.W., XXIX to XLIII.

Shiress, D. W. C.—“Some Eucalypts about Mittagong,” Australian Naturalist, V, 97 (April, 1923). A valuable short paper, based on original observations, and only requiring a touch here and there to bring it up to date.


Hall. Cuthbert.—"The Eucalypts of Parramatta (N.S.W.) with description of a new species," Proc. Linn. Soc., N.S.W., XXXVII, 561-571, 1912, with a map showing local distribution. Valuable.


Both these papers should be read in conjunction with Allan Cunningham's MS. Journal in the Mitchell Library, and the paper by Maiden and Cambage (Journ Roy Soc., N.S.W., XLIII, 1909, quoted below) will be found a useful introduction to all three.


Hamilton, A. A.—"Topographical and Ecological Notes on the Flora of the Blue Mountains," Proc. Linn. Soc., N.S.W., XL, 386-413 (1915), contains a useful bibliography; omits Eucalyptus as having been dealt with in previous paper.


Part I. From the Darling River at Bourke to Cobar. (Vol. XXV, 591–604, 1900.)
II. From Cobar to the Bogan River above Nyngan. (ib., 708–720.)
III. From Mudall Station on the Bogan River to Eumabalong on the Lachlan. (Vol. XXVI, 197–212, 1901.)
IV. From Mount Hope to Parkes. (ib., 317–333.)
V. From Parkes to Marsden. (ib., 685–699.)
VI. From Marsden to Narrandera. (Vol. XXVII, 186–204, 1902.)
VII. From Forbes to Bathurst. (ib., 561–591.)


Northern Rivers.


7. Queensland.

Mitchell, T. L.—"Journal of an Expedition into the Interior of Tropical Australia," London, 1848. This work deals with the Bogan and the Macquarie and the northern half of New South Wales. The expedition traversed southern and central Queensland as far north as the Belyando, within the Tropic of Capricorn. Contains useful notes on the distribution, &c., of the Eucalypts, valuable to the student of the genus, although Mitchell did not collect many specimens of them.

Part I. pp. 76-83.


III. " pp. 305-310.


This small series contains exceptionally useful notes on the distribution of Eucalypts in several little known areas.


Domin, Dr. Karel.—"Queensland's Plant Associations (Some Problems of Queensland's Botanogeography)," *Journ. Roy. Soc., Qld.*, XXIII, 57 (1910). It is a pioneering paper and very valuable, but the references to Eucalypts are scanty. They include the following:

"The other type of forest is the very well-known open forest, with close undergrowth of grasses and scattered trees, mostly of the genus Eucalyptus, known under different names as Gums, Box, Stringybark, Ironbark, Moreton Bay Ash, Coolibah, Bloodwood," &c. (p. 65).

"There are again very different and distinct types of open forest. In the North must be specially mentioned the Eucalyptus forest with close undergrowth of high grass (as the typical form of the open forest), further with plenty of Grass-trees (*Xanthorrhoea*)," &c. (p. 67).

"From Jericho eastwards we find again a different type of Wattle (*Acacia*) scrub, very closed and dense, with prevalent *Acacia* and *Eucalyptus* . . . ." (p. 69).

"Now we understand the difference between the Malay and Australian elements, and we can imagine the struggle which certainly took place, after the best and largest localities for the tropical flora disappeared under the sea-level. In the southern part of Queensland there are some differences, as the true Australian type is represented in a few special forms in the vine scrub flora. I may mention, for instance, the gigantic Water Gums (*E. botryoides*) sic, besides some other Gums as *E. resinifera*, in the Vine-scrubs on the basaltic mountains in southern Queensland. Here the contrast is not so great . . . ." (p. 72).

White, C. T.—Abstract of Proceedings, in *Proc. Roy. Soc.*, Q., XXXIV, XV, 1922. He delivered a lecture entitled "The Eucalypts of the Brisbane District." Between seventy and eighty occur in Queensland, and twenty-one species are to be found growing within about a 10-mile radius of the city of Brisbane. The species occurring about Brisbane can be classified for practical purposes into five groups:

1. Gums proper or smooth-barked trees, six species:—*E. micrantha* (Scribbly Gum), *E. tereticornis* (Blue Gum), *E. propinqua* (Grey Gum), *E. Seesja* (narrow-leaved Blue Gum), *E. maculata* (Spotted Gum), and *E. soligna* (Flooded Gum).

The Ironbarks, four species:—E. paniculata (Grey Ironbark), E. crebra (narrow-leaved Ironbark), E. siderophloia (broad-leaved Ironbark), and E. melanophloia (Silver-leaved Ironbark).

The Boxes, one species:—E. hemiphloia (Gum-topped Box).

The Bloodwoods, three species:—E. corymbosa (Red Bloodwood), E. trachyphloia (White Bloodwood), and E. tessellaris (Moreton Bay Ash).

Northern Territory.


He included a few sub-tropical (eastern species) and also some Queensland ones, but the chief value of the paper is in regard to the Northern Territory species discovered by him on the Gregory Expedition. For the reference to Barks, see Part L, p. 312. See also Part LXVI, p. 272. (Tropical Species).

Maiden, J. H.—"Notes on a collection of Eucalypts chiefly made by G. F. Hill in the Northern Territory," forming Appendix III of Ewart and Davies' "Flora of the Northern Territory" (1917). Summarises all the species then recorded from the Territory.

Maiden, J. H.—Presidential Address before the Biology Section of the A.A.A.S. (_Rep. A.A.A.S._, XI, 158–199, 1907). At page 194 will be found Section ix, "Northern Territory," which contains a bibliography of botanical work in the Territory.

The following paper is not Australian, but it embodies a suggestion that monographers of genera and families may find useful in some cases.

Hitchcock, A. S., and Chase, Agnes, in their Monograph of "The North American Species of Panicum" (_Contrib. U.S. Nat. Herb._, vol. xv, 1910), have used small United States outline maps (showing the States), one for each species, and on each map dots are shown giving the distribution, which is made clearer by the notes on distribution alongside. I considered the adoption of this method for Eucalyptus, at least in cases in which the ascertained localities of species were not very many, but, in the present state of our knowledge, it does not appear convenient for our genus.
FACTORS WHICH INFLUENCE RANGE OR DISTRIBUTION.

The following notes and abstracts deal with subjects which are more or less inter-related:—

1. Physiography
   - Altitude
   - Aspect

2. Geology
   - Soils (including abstracts of Dr. H. I. Jensen's papers).
   - Victoria
   - South Australia
   - New South Wales
   - Queensland
   - Northern Territory

3. Climate
   - Rainfall and, conversely,
   - Drought
   - Note on species of apparently anomalous range. Meaning of Xerophily

[What follows are more or less disjointed notes on the genus, compiled, however, by one who has undertaken wide reading and botanical travel. The student will, it is expected, naturally turn to papers and more ambitious works which specially deal with various aspects of Ecology.]

INTRODUCTORY.

Mr. R. H. Cambage, in his Presidential Address (Proc. Roy. Soc., N.S.W., XLVII, 18, 1913) deals with the subject of factors in a comprehensive manner under the headings: (1) Physiography, (2) Geology, (3) Climate. Under No. 1 Altitude and Aspect are included; under No. 2, Soils; and under No. 3, Moisture, Temperature, and Wind (shelter or exposure). He also deals with the geological side.

At p. 21 he considers the effect of geological formations at some length, remarking that there are two extreme types, the siliceous and the basic, and that the effect of these soils is to some extent of a local nature, being dominated by the influence of climate. Although certain trees show a distinct preference for either a basic or a siliceous formation, it is difficult to ascertain the exact reason for this discrimination. The matter of the mechanical condition of a soil is then discussed.

At p. 22 he points out that the soils produced from similar geological formations, in separate localities, have not always the same effect upon the local flora, the diversity being caused by the differences in climate, rainfall and aspect; but in areas where these conditions remain the same, certain Eucalypts are typical of particular geological formations. Examples in the Sydney district may be seen in the distinct preference
shown for the siliceous Hawkesbury Sandstone formation by *E. corymbosa, hamastoma, capitellata, Sieberiana, piperita*, etc., and in *E. hemiphloia* and *E. tereticornis* for the Wianamatta Shale, which contains a much lower percentage of free silica. Other instances are given.

Climatic divisions (of New South Wales) are discussed at p. 27, and they are classified as (1) Coastal or semi-jungle; (2) Mountain or cold type; (3) Interior or semi-arid. He goes on to say that, owing to physiographic conditions, a fourth, referred to in his paper before the Asst. Assoc. Adv. Science in 1907 as Western Slopes, may be added. He alludes to *E. coriacea* attaining the highest altitude under No. (2), and *E. albens* being typical of zone No. (4) which, in New South Wales, has an annual rainfall of about 26–27 inches (see p. 29).

At p. 48 he goes on to say—"Species having the various types of leaf venation appear to exercise some preference for different classes of geological formations. Those having the transverse venation generally select the acid rocks which are composed of upwards of 70 per cent. silica, much of which is in a free state. Species with the oblique venation are more typical of the basic rocks and soils, although by no means confined to that formation, some even growing on highly siliceous rocks. The trees with the parallel (longitudinal) veins, such as *E. dives*, occupy chiefly the fairly siliceous formations or those containing between 60 and 70 per cent. silica, but some of them grow on basic formations, while others are on highly siliceous."

See also E. C. Andrews, "Geographical Unity of Eastern Australia in late and Post Tertiary time, with applications to biological problems," *Journ. Roy. Soc., N.S.W.*, XLIV, 420–480 (1910). I do not in this work, as a rule, take cognizance of happenings in geological times, but the chapter "Biological Significance," at p. 466, with its references to the evolution of the Eucalypts, will serve as an introduction to the botanical deductions of this brilliant writer.

**ALTITUDE.**

Altitude above sea-level (and, of course, temperature varies with sea-level) is, of course, one of the factors which determines the distribution of species.

A species of Eucalyptus (*coriacea*) forms the tree-line at nearly 7,000 feet, a few hundred feet below the summit of the highest mountain in Australia, Mount Kosciusko. The trees at the highest elevations are remarkable for their bare stems, surmounted with a dome or flattish top of leaves. The bare stems are, doubtless, the consequence of winds, the leaves being concentrated on the top as a thin "layer" and offering minimum resistance to the wind. These dwarf trees are in masses of a fairly uniform height; a different arrangement would result in the crown of leaves of the smaller plants being beaten against the bare stems of their taller brethren, and denuded of their foliage. The grotesque leaning forms of the stems, like guys or supports to resist wind-pressure, are shown in my "Forest Flora of New South Wales," Part XV, p. 114.
The term "Alpine species" is a practically convenient one, e.g., when selecting seeds for countries with low winter temperatures. Many species grow in the coastal districts, and we desire to know (a) the latitude, (b) whether the Eremean flora approaches the coast, as in certain areas of Western Australia, New South Wales, and Queensland. The question of Geocols or Gaps should be studied in this connection.

Howitt, in Trans. Roy. Soc., Vict., II, 114 (1891), dealing with the Eucalypts of Gippsland, has a table in which he shows heights in instalments of 250 feet. He catalogues every Gippsland species, and indicates the altitudes at which they ascend, thus only E. pauciflora (coriacea) and E. stellulata are found as far as 5,000 feet. If this table were accepted as a model, it could only be used for areas in which the altitude would not be greatly varied by latitude. This is based on his "Distribution of the Eucalypts" at p. 104, which gives a detailed account of and the occurrence of each species with pretty full topographical notes, including the heights of the areas referred to.

In "Climatic and Geological Influence on the Flora of New South Wales," Report, Aust. Assoc. Adv. Science, XI, 473 (1907), Cambage gives the maximum heights at which the various species occur. The Eucalypts are—E. coriamba, eximia, resinifera, paniculata, siderophloia, crebra (p. 476); E. hemiphloia (p. 478); E. coriacea, viminalis, amygdalina (radiata) (p. 479); E. coriacea, dives, piperita (p. 480); E. albans (p. 481).

GEOCOLS.

We now turn to "A Correlation of Contour, and Climate and Coal; a contribution to the Physiography of New South Wales," by T. Griffith Taylor, Proc. Linn. Soc., N.S.W., XXXI, 517 (1906).

He exhibited photographs of a stereogram he had shown a few months previously, and showed (Plate XLVI) "that the Main Dividé is constituted of three well-defined land-masses separated by cols on a gigantic scale. For these the term Geocol is suggested . . .". The word Geocol is now thoroughly established in the terminology of the physiographer, and to the botanical geographer it is valuable in that it indicates gaps in a range where vegetation may descend to lower levels, and, alternatively, spread and interchange to other levels. As regards the Eucalypts, study of the Geocols is indispensable to a knowledge of their distribution, at least in eastern Australia.

In his Bulletin No. 8 of the Commonwealth Bureau of Meteorology, which has the title "Physiography of Eastern Australia," 1911, Griffith Taylor refers, p. 12, to—

"The Cassilis Geocol" (of New South Wales), and speaks of the region as perhaps the most interesting physiographically in eastern Australia. He describes it fairly fully. At fig. 18 he shows it, and the legend is "The Cassilis Geocol, bounded on the north by the Warrumbungle trachytes, the Liverpool basalts, and the carboniferous sediments; and on the south by the hard trias sandstone . . ."
At fig. 19 we have the three main contours of south-eastern Australia (1,000 feet, 2,000 feet, and 3,000 feet). Five geocols (Cassilis, Lake George, Cooma, Omeo, and Kilmore) are marked. (See also fig. 28.) The Lake George geocol is described at p. 14, the Omeo geocol at p. 15 (fig. 25).

At p. 16 we have these five geocols of eastern Australia discussed with respect to their influences on intercommunication. See fig. 27. At p. 17 the correlation of contour and rainfall is considered. These geocols will be studied carefully by the botanist of the future, who will find them invaluable in mapping out the distribution of the Eucalypts.

Let us now turn to "The Climate and Weather of Australia," by H. A. Hunt, Griffith Taylor, and E. T. Quayle, 8vo., p. 93, with many figures and maps. Published by the Commonwealth Meteorologist, Melbourne, 1913.

Fig. 56. "The Relation of Contour to Rainfall," should be compared with the Climograph of N2. It shows the geocols admirably. Fig. 58, "Climatological Regions with Type Nations," is a clear map, showing winter rains, dry region, summer monsoon, and uniform rains. It is, of course, not so much subdivided as by Climographs.

In "The Mountains of Eastern Australia and their effect on the Native Vegetation," Journ. Roy. Soc., N.S.W., XLVIII, 267–280, with a map (1914), Mr. Cambage refers (p. 274) to the geocols, and illustrates, chiefly with Eucalypts, how the geographical distribution of plants is affected thereby. His summary at p. 279 contains the following passage:

"A study of the topography of eastern Australia and of the distribution of the native flora along and on each side of the mountain range which forms the Main Divide, serves to show that the two classes of climate, moist and dry, produced on each side of this mountain chain, are not so much the result of the position of the actual water-parting on the tableland, as that the eastern or ocean face of the plateau is fairly high and steep, and at no great distance inland. The effect of the range in the south is to create three climates, a humid and a dry one on the east and west sides respectively, and a cold one on the summit, which acts as a barrier between two floras, which would otherwise to some extent commingle at lower levels.

In Queensland, a generally lower summit of the plateau, and an increase in temperatures owing to the more northerly position of the range, permit the western or dry influence to cross the mountains in various places, and allow many interior types of plant to thrive on the eastern watershed, while the moisture-loving or coastal brush plants are largely excluded from these invaded areas. This invasion occurs in the Goulburn River Valley near Cassilis in New South Wales, and at such places in Queensland as between Toowoomba and Brisbane, between Jericho and Rockhampton, and between Hughenden and Townsville."

The same author, in his pamphlet "Eastern Australian Topography and its effect on the Native Flora," published by the New South Wales Committee for the British Association meeting in Australia (1914), goes over much the same ground.
E. C. Andrews has favoured me with a list (more detailed than that already given) of geocols in south-eastern and eastern Australia, as follows:—

1. Murray River depression—sea-level.
2. Woodend Gap, 1,000 feet above sea-level, Bendigo line.
3. The Kilmore (Victoria) gap or geocol is about 1,200 feet above sea-level, and a few miles wide. The Melbourne express passes it about 60 miles from Melbourne. Between Kilmore Gap and Hunter River there are numerous long meridional depressions in the Southern Plateau. These are not cross gaps.
4. The Cooma or Monaro geocol, New South Wales (or Australian Rift, as Taylor has it), is about 2,000–2,600–3,000 feet above sea-level, is of fair width, and stretches from Omeo through Bombala to Cooma.
5. The Lake George geocol, New South Wales, is about 2,000 feet above sea-level.
6. The Cassilis or Hunter geocol, New South Wales, is about 20-30 miles broad, and 1,700 feet above sea-level, and is responsible for the long dry loop extending from Gilgandra almost to Newcastle.
7. New England from the head of the Allyn, the Chichester and the Paterson, to Cunningham's Gap (2,000 feet) in South Queensland, presents an excessively rough and high plateau front to the coast,
8. Another broad gap occurs near Toowomba, Queensland, and is traversed by the Brisbane train from Toowomba to Warwick. Greatest height, 2,000 feet.
9. The Rockhampton-Longreach Railway, Queensland, also traverses a gap about 1,500 feet in height. Its width is not known to the writer (E.C.A.).
10. The Cairns-Chillagoe Line, Queensland, rises on to the Kuranda Gap (1,100 feet), which is in the form of a broad valley lying between plateaux on each side. Heights from 4,000–5,000 feet, 1,100 feet at Mareeba.
11. The Townsville-Charters Towers Railway, Queensland, also passes in a deep wide valley of low height between high ranges. Height about 1,000 feet.

The number of gaps or geocols has not yet been determined, but it is desirable to draw attention to their importance in regard to the distribution of plants. The writer (J.H.M.) has specially worked at the Cassilis geocol in this connection, and has a considerable list of western New South Wales plants which have used this gap for the purpose of migrating towards the coast. The migration in a contrary direction has been less worked out.

**GEOLOGICAL FORMATIONS. — SOILS.**

*With Some Incidental References to Climate.*

The mineral character of soils on which plants will thrive cannot be absolutely decided by the quantity of any substance such as silica, calcium carbonate, or sodium chloride, which may be found in their ashes. The physical nature of the soil, *i.e.*, its
degree of moisture, capacity for being heated, porosity, &c., has more influence on the
growth of plants than its chemical composition, though the latter has an indirect
influence on its physical nature.

Warming gives examples of the domintaing influence of the chemical constitution
of the soil; thus he uses the terms Halophilous, Calciphobous, Calciphilous, Silicolous,
and Nitrophilous plants. ("Ecology of Plants," English trans., p. 67.) But, p. 71,
Bonnier says that certain species, restricted to calcareous soil in one district, may
be calciphobous in another, and indifferent to soil in a third. Jensen’s observations
on Eucalypts (quoted in Part 66 under “Additions to Range”) also prove this. This
is an expression of the difficulty all observers of geological formations (soils) and the
plants that grow upon them find.

Victoria.—A. W. Howitt’s “The Eucalypts of Gippsland” (Trans. Roy. Soc.,
Vict., II, 81, 1890), is one of the earliest critical papers, containing observations in
regard to the effect of geological formations and climate in this genus.

Following are some specific notes in regard to the preference of species for certain
geological formations. The subject is, as he hints, a very difficult one. *A priori* we
are inclined to expect a very distinct relation between a plant and the geological
formation (soil) on which it grows, but in practice it is rarely that such a correlation
can be traced, and in many cases in which such a relation has been announced, additional
research shows that the relation is not as general as was at one time supposed.

He says that *E. regnans*, with *E. obliqua* and *E. globulus*, in south and west
Gippsland, are chiefly on Mesozoic Carboniferous formations (p. 87).

*E. Muelleriana* ascends hills of Upper Silurian sediment to 1,000 feet in elevation,
Toongabbie district. It appears to grow largest on the sands and sandy clays of
South Gippsland (p. 90).

*E. macrorrhyncha* grows especially upon dry ranges, on Plutonic, Metamorphic,
and Sedimentary formations of Silurian or Devonian Age. He has not observed it
anywhere on Tertiary tracts (p. 92).

*E. odorata* (*Bosistoana* is meant) grows principally on the Miocene limestones
in the littoral tracts of North Gippsland (p. 95).

*E. leucoxylon* grows upon various formations, as, for instance, at Toongabbie,
on recent Alluviums, Tertiary clays and Upper Silurian; at Bairnsdale, upon Miocene
and later Tertiary beds; at Glen Maggie, upon Upper Silurian sandstone; at Upper
Freestone Creek upon Upper Devonian conglomerates; at Noyang, upon Palæozoic
Plutonic rocks; and near Buchan, upon Tertiary sands and clays.

*E. Stuartiana* is found on all formations, but he has observed it especially on
the Tertiary clays of South Gippsland, and on the Metamorphic and Plutonic areas
of Tubbitt, Dargo, and Jingallala (p. 97).
E. tereticornis grows mainly on the recent alluviums, river flats, ancient lake basins, and on the lower terraces of the Tertiary formations, up to an elevation of 150 feet, or more rarely, 200 feet above sea-level (p. 100). In only one instance has he found it growing in the mountains, viz., at Glen Falloch, where it occupies a basin of soft shale of Upper Devonian age from 700 feet up to 1,500 feet above sea-level. The soil of this basin, which is derived from the soft shales, resembles that of the lower districts where E. tereticornis thrives best (p. 101).

He again refers to the subject—

"Geological formation, as producing variation of soil, has no doubt influenced the present distribution of the Eucalypts, but its effects cannot be made out so clearly as those produced by climate, but the broad features can be readily seen by anyone travelling through Gippsland. E. tereticornis grows almost entirely on lands which have been at one time lake or estuary beds, or in the alluvial flats of rivers.

The Stringybark Eucalypts prefer the Tertiary sands and sandy clays. E. odorata (E. Bosistoana is meant) grows mainly on the Miocene limestone, but this partiality to particular formations is not so apparent when all the Eucalypts are considered. Still, in looking over the whole of Gippsland, I observed some marked cases which it would be well to note. A good instance is afforded by E. amygdalina regnans (b), (E. regnans), which in Gippsland grows almost wholly upon the Mesozoic coal measures. E. hemiphloia appears to be confined to the Plutonic and Metamorphic areas of the Tambo and Snowy Rivers. A final instance may be taken from the Gelantipy tableland, to the west of the Snowy River, which shows how certain Eucalypts grow preferentially upon certain formations. This tableland is formed by a great thickness of Devonian and Plutonic rocks, overlaid by more or less connected sheets of Tertiary basalt. I observed that on the former grow especially E. piperita, E. globulus, E. Sieberiana, and E. amygdalina, (E. radiata), and on the latter formation E. Stuartiana, E. melliodora, E. polyanthemos, and E. macrocarpa" (p. 108).

This is followed, at p. 115, with a table of geological distribution of all the species under the headings Plutonic, Metamorphic, Silurian, Devonian, Mesozoic, Miocene, Pliocene and, later, Volcanic.

E. fastigata occurs on red coloured jungle soils, probably of volcanic origin, in north-east Gippsland. (Harry Hopkins.)

South Australia.—"Soil Survey and Forest Physiography of Kuitpo, South Australia," by E. O. Teale, D.Sc., is Bulletin No. 6 of the Department of Forestry of the University of Adelaide (1918). It is well illustrated by maps and diagrams.

Speaking of the Cambrian age, Dr. Teale says that only superficial and oxidised material is available for examination, but the rocks appear to consist largely of somewhat sandy phyllites and slates, with bands of quartzite. These areas in general are characterised by Stringybark (E. obliqua).

The relatively mature topography of the Meadows Creek valley, together with the nature of the deposits which fill its bed, make its lowest portions rather poorly drained. The stiff clays which underlie the soil of the valley render its moderately flat bottom very wet for five or six months in the year, but nevertheless provide conditions admirably adapted to the growth of the Red Gum (E. rostrata) which forms a fine timber belt of great extent along the valley.
Another striking instance where apparently drainage is a dominant factor is in the scrub areas occupied by the stunted vegetation of *E. cosmophylla*. Typically this form is found in flat, badly drained tabletops, which are very wet in winter, and baked hard and dry in the summer. The surrounding slopes are sometimes well covered with fair Stringybark (*E. obliqua*), which rapidly falls off in height, and adopts a dwarf scrub habit on approaching the edge of the *E. cosmophylla* areas, where it rapidly disappears altogether.

In general, the well-drained and gravelly slopes of the hillsides support a good Stringybark vegetation, the wet clayey bottoms of considerable extent are characterised by a Red Gum growth, and the margins of these flats, where they receive considerable hill wash, and become more sandy, favour the Manna Gum (*E. viminalis*).

The flat clayey and gravelly table-tops, with occasional ironstone pans, are typically covered with scrub, consisting of *E. cosmophylla*, &c. More limited areas of low-lying flat country, with a shallow, sandy, clay soil on a light clay, with very poor drainage, support a stunted growth of Blue Gum (*E. leucoxylon*) and Pink Gum (*E. fasciculosa*), &c. This type of country appears to be the least promising from a timber point of view. Dr. Teale acknowledges his indebtedness to Mr. S. L. Kessell in the matter of the distribution of the native vegetation.

*E. virescens* R. T. Baker.—"A stunted form, with weeping habit, and grows in low-lying country, under water in winter." (Penola, South Australia, Part X, p. 310.)


"The present study indicates that, in this district, the physical properties of the soil and accompanying conditions, play a more important part in determining the character of plant-associations and the distribution of species than the chemical composition of the soil."

Mr. Cambage divides the flora of New South Wales into four divisions—(1) the coastal area; (2) the mountain area; (3) the western slopes; and (4) the interior. He illustrates these divisions by a map.

He deals with these divisions in detail, quoting (amongst other plants) the Eucalypts, giving notes on the soils and on the height above sea-level the species reach. He also discusses geological formations. The preferences of *E. hemiphloia*, which are sometimes puzzling, are discussed. *E. coriacea, E. piperita, E. dives, E. amygdalina, E. radiata, E. albens, E. macrophylla*, and other species are most interestingly dealt with, and there is a useful bibliography.

"Botany as an Accessory to Surveying," the Presidential Address of Mr. R. H. Cambage to the Institution of Surveyors, N.S.W., in *The Surveyor*, vol. XXI, pp. 6–16 (1908), is an address which amplifies the preceding one, and has the same map, but it is by no means a duplicate of it.
"Notes on Soil Physics, with special reference to the land recently resumed for closer settlement at Tamworth, New South Wales (April, 1909)," by J. F. Campbell, L.S., is by a well-known observer, and valuable contributions to the discussion were made by F. B. Guthrie and R. H. Cambage. (See The Surveyor, Sydney, XXII, 75–85, 1909.)

For a "Note on the relation between the Geological Formation and the Vegetation which grows upon it," see Maiden's "Forest Flora of New South Wales," Part 47, p. 138 (1912). This includes valuable observations by E. C. Andrews at p. 139.

Dr. H. I. Jensen has outlined the relationship of soils to the underlying geological formations, and also the principles which govern the dependence of the forest flora on geological formations in "The Soils of New South Wales," Sydney, Department of Agriculture, 1914 (199 pp., royal 8vo., with many maps and illustrations). It is, indeed, a valuable text-book, and chapter XX on "Native flora as a guide to soil fertility" is of special use to us in the present connection. He acknowledges his indebtedness to the writings of Mr. R. H. Cambage, and also refers to a paper on a calciphile flora on the lower slopes of the Kurrajong Range near Richmond, by W. M. Came in Proc. Linn. Soc., N.S.W., XXXV, 849, 1910. He also refers to the soil types of the Cobar-Nyngan flora (F. E. Haviland, ib. XXXVI, 507, 1911). Dr. Jensen freely refers to Eucalypts in his work.

In a paper by H. G. Smith "On the essential oil of E. Smithii from various forms of growth" (Journ. Roy. Soc., N.S.W., XLIX, 158, 1915 (with photos.)), the author speaks chiefly of the natural growth of the species at Hill Top, New South Wales (altitude 2,031 feet), and also of a cultivated plant at Marrickville, near Sydney, practically at sea-level.

Mr. E. Cheel (Proc. Roy. Soc., N.S.W., L, xxiv, 1916) made comparative sowings of E. Smithii at Hill Top and Ashfield (near Sydney). The soil at Ashfield was rich and the plant flourished. After giving an account of the growth of the seedlings he concludes—

"It will be seen from the above that the rate of growth in the ordinary soil at Hill Top is very poor indeed, and although the species is a native of Hill Top and the surrounding district, it will only thrive in rich patches of soil such as is found at Mr. D. Chalker's at Box Knob, and in the deep gullies with rich soil, as well as at Mount Colo, about 6½ miles from Hill Top and near Mount Jellore, where there are patches of fairly rich soil, probably of volcanic origin."

Bulletin No. 14 of the Forestry Commission of New South Wales (1920) entitled "The Botany of the Pilliga Scrub, New South Wales," by J. H. Maiden, J. Burton Cleland and Gordon Burrow, owes its value to the subdivision of the area by the two last authors into areas based on soils and plant-associations. The distribution of the Eucalypts is given. Dr. Jensen had in the year 1912 published an important paper on the soils of the Pilliga Scrub, and he had noted the Eucalypts. Only a very small edition of it was published.
Queensland.—We now turn to an important series of pioneering papers by Dr. Jensen. I have only offered sufficient extracts and abstracts to indicate their scope, and to induce my readers to peruse the originals.


"It has been known for ages that many forest trees have a special predilection for certain kinds of soil, and as the science of geology has developed, it has been noticed by field geologists in all parts of the world, that certain trees are almost entirely confined to certain geological formations. So definite is the dependence of some plant species on a particular rock type, that these plants can be used in field mapping, as safe indications as to the formation beneath the soil on which they grow." (p. 239.)

"It was found that the character and quality of soils were dependent principally on geological formation, secondarily upon climate and topography. Topography is, however, as a rule, itself dependent on geological formation and climate, and is therefore a factor of minor importance as compared with geology and climate.

"Thus, in coastal regions and inland regions alike, soils can be divided into geological groups, which stand in the same relation to one another, as, for instance—

<table>
<thead>
<tr>
<th>Geology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granite</td>
<td>Sandy light loams relatively poor in mineral plant-food.</td>
</tr>
<tr>
<td>Sandstone</td>
<td></td>
</tr>
<tr>
<td>Quartz schist</td>
<td></td>
</tr>
<tr>
<td>Trachyte</td>
<td></td>
</tr>
<tr>
<td>Andesite</td>
<td>Loams, fair in plant-food.</td>
</tr>
<tr>
<td>Shale</td>
<td></td>
</tr>
<tr>
<td>Diorite</td>
<td></td>
</tr>
<tr>
<td>Basalt</td>
<td></td>
</tr>
<tr>
<td>Calcareous sandstone</td>
<td>Clayey soils rich in plant-food. (p. 239.)</td>
</tr>
<tr>
<td>Calcareous shale</td>
<td></td>
</tr>
<tr>
<td>Limestone</td>
<td></td>
</tr>
</tbody>
</table>

"The researches, however, did establish the fact that the bushman’s method of judging soil by the timber growing on it was thoroughly sound in principle." (p. 240.)

Then Dr. Jensen took certain areas geographically, including Roma to Injune, and subdivided it into "Box country," "Ironbark country," "Moreton Bay Ash and Sugar Gum country" (the latter is *Angophora lanceolata*), and Basaltic Box lands," all of which refer to Eucalyptus (p. 241). Box in his connection, is chiefly *E. populifolia*.

The trees on the fringe of Black Soil Plains include *E. populifolia*. See Queensland Agric. Journ., November, 1921, p. 297:—

"Associated with Sandalwood (*Eremophila Mitchellii*) we usually get some Box and Silver-leaf Ironbark (*E. melanophaea*), the latter where a stony formation gets close to the surface." (p. 298.)

"Box Country.—The soil on which the Poplar Box holds sway is usually a grey clay soil, fair in mineral plant-food, but rather too heavy for cultivation, and generally inclined to be sour. It holds water well, but has poor capillary powers, differing in that respect from the Sandalwood country. . . .

"Sometimes we get a fair amount of Poplar Box (Box) on felspathic sandstone country, where, however, it is subordinate to Pine, Moreton Bay Ash (*E. tessellaris*), Sugar Gum (*Angophora lanceolata*), and Tumbledown Gum (*E. dealbata*). This class of country is poor in lime, but a typical Box country is fair in lime. . . ."
"Silverleaf (E. melanophloia) Country.—This Ironbark, south of the Dividing Range, is usually characteristic of soils of fair quality, but not deep. The rock is near the surface. It is country which has a good mechanical composition, but, owing to the soil being shallow, it is liable to dry out very quickly in dry weather. The grass is good in good seasons, but bad in bad seasons. We get the Silverleaf mainly on felspathic and calcareous sandstone, while Pine dominates on siliceous sandstones. The commonest associate of Silverleaf is Poplar Box.

"We have notes of the Eucalypts on the driest Pine soils and on soils better supplied with moisture. The basaltic lands around Mount Hutton carry chiefly Box (this is the true Box, E. hemiphloia), Coolibah (E. microtheca) and Silverleaf Ironbark (E. melanophloia)." (p. 299.)

See the issue of December, 1921, p. 358:—

"Having treated fairly lengthily of the soils between Roma and Injune, we can now discuss the soils of the other regions more cursorily, the principles having been explained.

"Travelling up the Maranoa Valley from Mitchell, there is the Cretaceous-Tertiary Desert Sandstone. This, on the Mitchell region, is a very siliceous sandstone, and has very poor sandy soils, often coarse sand. Eucalypts, Yellow Bloodwood (E. trachyphloia), Moreton Bay Ash (E. tessellaris), Crooked Gum (E. dealbata). North of the Walloón area we get the Bundamba sandstones. The soils are typical Box (E. populifolia). (p. 359.)

"North of the Bundamba sandstone in the Main Dividing Range we get fairly large areas of fine basalt country. Coolibah, Gum-top Box (E. hemiphloia), and Silverleaf Ironbark are the main timbers.

"Along the tributaries of the Nogoa the timbers on the basalt are mostly Box (E. hemiphloia) and Silverleaf Ironbark. Below the basalt we have the 'Upper Bowen' sandstones. The soil is poor siliceous sandy loam. The timbers in this region comprise Spotted Gum (E. maculata), Crooked Gum (E. dealbata), Moreton Bay Ash, Ironbark (E. decorticans), Stringybark (E. acmenioides). The coal measure portion of the 'Midland Bowen' formations have abundant Bloodwood (E. terminalis), Silverleaf Ironbark, Box (E. populifolia). The soils are good in all mineral plant-food constituents. (p. 360.)

"The conglomerate sandstones of the 'Middle Bowen' formations in this area, and in other areas, are much better in soil and stock feed than the sandstones of the Bundamba and Upper Bowen formations. The timbers of this belt include conspicuously, Spotted Gum (E. maculata), Yellow-jacket (E. Watsoniana), River Red Gum (E. rostrata), Moreton Bay Ash, Cabbage Gum (E. papuana), and Bloodwood (E. terminalis). The alluvial soils throughout the Nogoa quadrant are splendid. The characteristic timber is Coolibah (E. microtheca). At the head of the tributaries of the Brown River we meet the Ipswich formation sandstone, a yellow sandstone, rich in felspathic detritus, hence good in potash, on which we have open forest with Box species, viz., E. populifolia, E. Cunninghamia, E. hemiphloia, also Ironbark (E. melanophloia) and E. crebra.

"The alluvials along Consuelo Creek, Carnarvon Creek, &c. are superior to anything I have seen elsewhere. They form Coolibah and Ironbark country. The Silverleaf Ironbark, which south of the Carnarvon Range favours a stony ground with shallow soil, becomes in this region a denizen particularly of deep alluvial soils. This, of course, depends absolutely on the fact that Silverleaf Ironbark must have a sufficiently calcareous soil and good drainage to live." (p. 361.)

We now turn to the issue of January, 1922, p. 13. Here he deals with the Westgrove-Glenhaughton country. The two areas consist of Bundamba sandstones in the northern parts, passing into the highly calcareous Lower Walloon rocks in the southern and south-eastern parts. On the Bundamba soils we have Ironbarks (E. decorticans, E. melanophloia (narrow-leaved variety), E. crebra, Spotted Gum, Lemon-scented Gum, Crooked or Tumbledown Gum, Moreton Bay Ash, Stringybark (E. acmenioides), Bloodwood (E. terminalis), Yellow-wood (E. Watsoniana), Yellow Bloodwood (E. trachyphloia).
He then refers to the belt of "Ipswich" formations north of the "Bundamba" sandstone. They are—

(c) Shales, limestones and calcareous sandstones with typical calciphile flora, including Moly Box (E. rariiflora, not Cambageana), Poplar Box (E. populifolia). (p. 13.)

(b) Sandstones of the same series, which are of a micaceous felspathic nature, with good and light loamy soils suited for agriculture, where the country is not too rough. Trees—Spotted Gum, Silverleaf Ironbark.

Then he deals with the Drummond Range, and the formations at Bogantungan and the tributaries of the Nogoa and Belyando are divisible into an upper calcareous shale series and a lower sandstone series. The former yields good pastoral country, timbered chiefly with Silverleaf and narrow-leaf (E. crebra) Ironbarks; the latter is poor sandy country with the usual calciphile flora Ironbark (E. siderophloia and E. crebra), Moreton Bay Ash and Yellow Bloodwood (E. trachyphloia).

On the flats where the soils mix we have Yellow-jacket (E. Watsoniana), Bloodwood (E. terminalis), and Cabbage Gum (E. papuana) (p. 14). Then we have (pp. 14–16), a tabulation of the forest flora geologically classified, and which is a useful abstract of the results of the preceding papers. At p. 17 we have a useful abstract showing the nature of the soils on which the Ironbarks occur, and at p. 18 the soils which some other Eucalypts prefer.

Dr. Jensen reverts to Queensland in the issue of October, 1922, p. 297. He says that North Queensland is, from the physiographic standpoint, referable to three divisions:—

(a) The Pacific Slopes, with high rainfall, rich soils, and rough topography.

(b) The Mountainous Mining Belt, with poor soil, medium rainfall, rough barren topography, and very rapid drainage.

(c) The Gulf Country, which is roughly divisible into the same zones as the Northern Territory, and has the same characters.

He then deals with the physiography, soils, and timbers (trees) of various subdivisions, as follows:—

The Cairns Coastal Belt.—"The usual tropical Eucalypts."

The Kangaroo Hills District.—Spotted Gum (E. maculata), Woollybutt (E. miniata), Ironbark (E. siderophloia), Bloodwood (E. terminalis), are the principal forest trees on the hills. On the granite areas the dominant trees are E. grandifolia, E. alba, and in moist places E. papuana; on the metamorphics, Ironbark (E. crebra) predominates; on the basalt around Mount Fox, Bloodwood (E. coromobo, E. terminalis), Box (E. microtha), and Blue Gum (E. tereticornis) abound, while on the desert sandstone we have abundant Yellow-jacket (E. trachyphloia), Ironbark, also E. setosa and stunted Bloodwood.

Cooktown District and Back Country.—The granite slate soils near Cooktown have the usual tropical Eucalyptus flora (E. papuana, E. grandifolia, E. terminalis, E. alba, E. tetrodonta, E. crebra). The sandstone soils have only stunted Gums. Bastard Bloodwood (E. latifolia (?) or E. dichromophloia) and E. crebra occur on a few conglomerate areas. The trees observed to be most abundant on the Little Laura sandstones are Stringybark (E. tetrodonta), Bloodwood (E. terminalis or E. Abergiana (?) ), Gum (E. grandifolia), also erroneously called Moreton Bay Ash.
Atherton-Herberton Tablelands.—On the granites, Box (E. microtheca), Poplar Gum (E. alba), and on moist flats, River Gum (E. tereticornis); on diorite, Bloodwood and Ironbark; on the greisens, Bloodwood (E. terminalis (?)), and on the metamorphic rocks, Ironbarks (E. crebra or drepanophylia) and Lemon-scented Gum (E. citriodora). In the Herberton district, Stringybark is also fairly plentiful on poor soils, both of granite and metamorphic origin.

Irvinebank—Etna Ford Area.—On the arkose-like greywackes of the district, as near Mount Albion, we have a Yellow-jacket (E. trachypMoia (?)); on loess formations a Gum-topped Bloodwood, or Dead Finish is common (E. Coccinea (?)). On the granito country between Irvinebank and Stannary Hills we have Broad-leaved Ironbark (E. melanopMoia) Scented Gum (E. citriodora). On the Featherbed porphyry rocks, Narrow-leaved Ironbark is the commonest tree, but on associated tuffs and more basic porphyries, we also get Lemon-scented Gum and Broad-leaved Ironbark Box (E. leptophleba). On the slates and schists the Scented Gum, White Gum (E. pallidifolia (?)), Narrow-leaved Ironbark (E. crebra), and Bloodwood are common. Poplar Gum (E. alba) is also a common form on the porphyry country.

Featherbed Range.—On the porphyries between Boon-Moo and Petford, Narrow-leaved Ironbark is characteristic of the slopes, and Poplar Gum (E. alba) of the flats. Where the porphyries are sylvatic, Bloodwood also comes in. Scented Gum occurs in scattered places on tuffs and metamorphics where the depth of soil is sufficient.

On the acid granites near Lappa, Silvertipped Ironbark (E. melanopMoia (?) ), Bloodwood (E. latifolia (?) ), Gum or Ash (E. grandifolia) are the commonest. On the more basic rocks, Bloodwood (E. latifolia), Narrow-leaved Ironbark (E. crebra).

Part III of this series is concluded in the issue for November, 1922, pp. 339, 440. He proceeds to discuss:—

Hodginson-Maytown Belt.—On the granite patches where a fair depth of soil obtains, Box (E. microtheca), Blue Gums (E. tereticornis) and Bloodwoods (E. terminalis) thrive. On the greywackes throughout the belt, Ironbark is in almost exclusive command, and becomes very monotonous to the eye. The narrow-leaved species (E. crebra) alone was noticed in the southern portion of the belt, but at the Maytown end a lemon-scented species (E. Slatigeriana) with a more rounded leaf, is very abundant, as well, as on the white greywackes. On the alluvial flats of greywacke origin we have also E. alba and E. grandifolia and, near permanent water, E. papuana.

Chillagoe-O.K.—Palmer Belt.—On the limestone country we get an abundance of calciphile trees. Bankia, &c., interspersed with the more widespread species of Eucalyptus such as E. grandifolia, E. alba, and in damp places, E. papuana and E. terminalis. On the granite country we have E. grandifolia, Box (E. microtheca), Bloodwood (E. terminalis), while on the poorest granite soils we have E. setosa, with some E. grandifolia interspersed.

Etheridge-Croydon District.—The forest flora of the granite country is more inclined to the calciphile than to the calciphe type; this on account of the lime-felspar content of the granite, and the comparatively slight leaching of soils under the climatic and topographic conditions of these granite areas.

Thus, on the “older” granites of the Etheridge, we get Box (E. bicolor and E. microtheca), Ironbark (E. prunioura), Gum or Moreton Bay Ash (E. grandifolia), while on the “new” granites of Chillagoe age and acid character, Gum (E. grandifolia chiefly), with Box and Ironbark on the flats. On the Desert Sandstone of the Newcastle Range we have Yellow Bloodwood or Yellow Jacket (E. trachypMoia) on the red loams, but with these occur E. grandifolia, E. melanopMoia, E. leptophleba, E. setosa, E. gregilis (?), E. dichromopMoia, E. pallidifolia (?), E. ferruginea (?), E. tetrodonta, E. terminalis, E. mivista, E. Normantonensis.

In the porphyries about May Lagoon (Croydon Road) the following trees were abundant:—E. terminalis, E. mivista, E. prunioura, E. melanopMoia. The Etheridge basalts were typically clothed with Box (E. microtheca and E. prunioura). In moist places on all formations E. papuana and E. alba.

In vegetation, physiography and climate, this district is very similar to the Northern Territory. There is no scrub country at all in this region, and agriculture would only be possible with irrigation, in spite of the good soils, since the climate is markedly semi-arid.
Northern Territory.—We leave Queensland for the present, and turn to the Northern Territory, studying the paper, “The Physiography of Northern Australia,” I, by Dr. H. I. Jensen, *Queensland Agric. Journ.*, September, 1922, p. 140.

He gives his own observations on Soils and Physiography in Queensland, and supplements information made by Messrs. Gray and Winters and himself in the Northern Territory, beginning with a short bibliography of Territory physiography. He goes on to say (p. 141) that climatically and in vegetation, the Territory can be divided into three zones:—

A. Coastal Plain.—Sedimentary rocks and metamorphics alike on this zone capped with laterite, which is disintegrating owing to increasing moisture of climate. Country lightly timbered with *E. grandis*, *E. papuana*, *E. miniata*, *E. tetrodonta* and non-Eucalypts.

B. Hill country, usually from 100 to 200 miles from the coast, but hugging the coast closer in the north-west and west. The metamorphic rocks and granites are dissected into rough hills, on many of which occur cappings (mesas) of table sandstone. These mesas are often capped with laterite, which was once co-extensive with the coastal laterites. The vegetation consists of stunted forest, of which *E. alba* is a prominent member. We also have *E. Foelscheana*, *E. Spenceriana*, *E. latifolia*, *E. grandis*, *E. phoenicea*, *E. tetrodonta*, *E. miniata*, *E. setosa*, *E. clavigera*, *E. dichromophloia*, *E. Houseana*, *E. microtheca*, *E. ptychocarpa* and *E. melanophloia*. This belt is, however, typically the Poplar Gum (*E. alba*) belt, since on all alluvial flats *E. alba* is dominant. Stringybark (*E. tetrodonta*) is typical principally of the most sandy, poor soils.

C. Inland Areas.—These areas are roughly divisible into:—

(a) Plains, with rich, black soils of limestone derivation, covered with Mitchell (Astrebla) and other grasses. No forest trees are seen at all over large areas. There are patches of *E. pruinosa*.

(b) Desert Country.—This is the local name for wooded poor country, such as occurs on sandstone, metamorphic, and granite areas. The Eucalypts met with are solely of the desert type:— *E. aspera*, *E. eudesmioides*, *E. pyriformis*, *E. oleosa* (?), *E. ganophylla*, *E. salmonophloia*, *E. macrocarpa*, *E. pedata*, *E. tetrapona*, *E. salubris*, *E. odontocarpa*, *E. ptychocarpa*, “and so on.” Setose leaves characterise many of the Eucalypts.

A few of the above species should be checked, as regards Queensland and the Northern Territory.

**EFFECT OF DROUGHT CONDITIONS.**

Mr. W. A. W. de Beuzenville, District Forester in charge of the Tumut Forest District, New South Wales, reported in July, 1923:—

“You are aware the summer of 1922-23 was remarkable for the long spell with little rain (six months, November to April, a little more than 2 inches). About April several species began to show signs of distress, and before the rain came in May, large patches of timber had died out. Nearly always situated on well-drained hillsides, these killed areas stood out as though fire-killed. Some areas of 40 to 50 acres in extent.

The most generally killed species in *E. macrocarpica*, growing on both slate and granite formations. *E. elaeophora* on slate and granite came next. *E. hemiphloia* on volcanic soils suffered to a considerable extent, though the fatalities occurred mainly in well-grown coppice. I have also been reliably informed that areas of *E. coriacea* at the Four Mile, Kiandra, on basalt formation, succumbed also. Another species noted as affected, though not to any great extent, was *E. caesia*. The parishes chiefly affected were Talbingo, Tumut, Adelong, Goldspink, Courabyra, and Tumbarumba, in the counties of Buceleuch, Selwyn, and Wyndar.”
There are articles on the susceptibility of Eucalypts to drought in The Australian Forestry Journal for May and July, 1923, in which the subject of the concentration of salts in ground-water is dealt with. Although it is so very important, it is one which has not been dealt with, at all events, quantitatively, except to a very limited extent, but, simultaneously with the better management of Australian forests, it will be admitted into the category of pressing matters.

If the Forestry Departments of the various Australian States have records as to the effect of drought on the various species, it would be desirable to publish them.

NOTE ON SPECIES OF APPARENTLY ANOMALOUS RANGE.

This is one of the many phases of the subject that I have only time to barely touch upon.

Take, for example, E. Bakeri, E. hybrida, E. squamosa. These are three eastern Bisectae (a group vastly predominant in Western Australia). They are fundamentally allied.

E. Bakeri may be Eremean. E. hybrida grows in saline surroundings, and hence is retarded in development. The same conditions may perhaps affect E. squamosa. The student of distribution in Eucalyptus will study that aspect presented in Dr. Delf's paper.


The author points out the confusion which has arisen in regard to the meaning of xerophily, and in the "Summary and Conclusions" says: "From examination of all the evidence, it is clear that xerophily cannot be adequately defined in terms of habitat, of anatomy, or of physiology alone . . . Edaphic drought may be met with in at least three different ways—(1) by the development of a deep root-system, penetrating to a constant water-supply in the subsoil; (2) by the production of a generalised root-system with tissues which can develop very high osmotic pressures, so that absorption is possible, even in air-dry soil; (3) by a superficial root-system with capacity to form adventitious collecting rootlets rapidly after rainfall (characteristic especially of Cactaceae) . . . . On the whole, the result of ecological work of all kinds tends to show that the plant and its environment vary together, and that neither is wholly without effect upon the other . . . ."

There are other contrivances to resist drought, e.g., the physiological properties of bog-water, which contains humus acids and is often cold in addition. Then water may contain a certain percentage of salt, and so we may have a physiological drought, with water everywhere. We have to ascertain in what way and to what extent this may influence the welfare and, therefore, the distribution of Eucalypts.
AGE AND AREA.

By way of introduction, I offer brief extracts from "Is the Theory of Natural Selection Adequate?" by Dr. John C. Willis, F.R.S. ("Nineteenth Century," October, 1922).

The general principle of Age and Area has, as a necessary consequence, that the minimum area goes with the minimum age. But as this minimum area may easily be only a few square yards, inhabited by a very few individuals, it is evident that a species probably arises as very few, and will have a very strenuous struggle for existence to become established. If in any way ill-suited to the conditions that occurred at its place of birth, it will be at once killed out by natural selection.

The bearings of Age and Area may be easily understood by taking a simple case in geographical distribution. Dr. Willis takes the Ceylon genus Coleus (he was for many years in Ceylon). The four Ceylon species (A, B, C, D) are found—

<table>
<thead>
<tr>
<th>In Ceylon</th>
<th>Outside Ceylon</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. In all the mountains.</td>
<td>Nowhere.</td>
</tr>
<tr>
<td>C. Mountains and wet plains.</td>
<td>South India.</td>
</tr>
<tr>
<td>D. Mountains, wet and dry plains.</td>
<td>Tropical Asia and Africa.</td>
</tr>
</tbody>
</table>

The only reasonable explanation of these striking and widespread facts, according to Dr. Willis, seemed to be that distribution depended upon the time that had elapsed since the arrival of the plant in the country under consideration. The species that occurred beyond the Indian peninsula being on the whole the oldest (each in its own group of relationship), would be the first to arrive in Ceylon, and so would have time to spread there in the maximum degree. Somewhere in the south they would give rise to the species now confined to Ceylon and South India, which, being younger, would spread to a less degree in Ceylon; and finally they would give rise to the species now local in Ceylon, which, being the youngest of all, would have spread least in the island (each, of course, being considered only with respect to its immediate relatives). The Ceylon local species are thus to be looked upon, not as failures, or as special local adaptations to local conditions, but as species occupying small areas because they have not had time to occupy larger. (See note on *Eucalyptus pulcherrima*, &c., below, J.H.M.). Age does nothing in itself, but it allows time for the various active factors in distribution to produce their effect. Age and Area, as a principle, goes to show, however, that differences between species, generally expressed in differences in structure, count for little, as far as distribution is concerned.

Upon this view, to return to the Colei of Ceylon, D is a very old species, and reached Ceylon first of all, while C followed soon after. B is younger again, and has only been able to spread over the Ceylon mountains, while A is youngest of all, and has...
not yet been able to spread further than one mountain peak, where it was first evolved. *Coleus elongatus* must have evolved on the summit of Ritigala, where it exists as about a dozen individuals, and cannot ever have been much more numerous. The most numerous group of the Ceylon endemics are these "very rares"—"very rares" meaning the minimum area; and the numbers decrease steadily up to the "very common"—"very common" meaning the maximum area (for the endemics under consideration).

But there is no need, says Dr. Willis, to confine the hypothesis to one country. Holding good, as it does, for all, it must be general, and we may say that widely spread species are in general the oldest and first evolved, very local species the youngest and last evolved.

Take a slightly earlier paper by Dr. Willis, "Endemic Genera of Plants in their Relation to Others," *Ann. Bot.*, XXXV (October, 1921), p. 503, in which he says:—

"So firmly has the old view, that endemics are relics of old floras held sway, that it never seems to have occurred to any botanist to try the simple test whose results I am about to set forth, and yet this test may have been made at any time in the last thirty years."

He has published his views at length in an admirable work, "Age and Area" (Cambridge University Press, 1922), to which I refer my readers for a full statement of his arguments.

At the same time, it is proper to state that his remarks do not command universal acceptance amongst students, a prominent criticism being that of Bateson's review of the work in *Nature*, of 13th January, 1923, pp. 39-43. See also the discussion before the Linnean Society, reported in *Nature*, of 2nd December, 1922. In the course of that discussion, Prof. A. C. Seward pointed out that as regards Conifers and Ferns, study showed that the forms existing now in restricted areas were the oldest and not the youngest. Willis refutes this in quoting distribution of Australian *Callitris*.

In "Natural Selection and the Dispersal of Species" by Edwin Bingham Copeland, *Philippine Journal of Science*, C, Botany, XI, 147 (July, 1916), the author presents himself "as a confirmed adherent of the doctrine of natural selection," and adopts a different position to that of Dr. Willis.

Dr. Willis candidly meets some of his objectors in a chapter of his work specially devoted to Objections to the Hypothesis. See also his paper in *Ann. Bot.* for April, 1923, p. 193.


"J. C. Willis has tried to show that the dispersal of plants is governed by general laws and independent of so-called adaptations, or of any kind of advantageous response to local conditions. The main factor of distribution is age, a cause which works in the same manner on all plants . . . The same analogy that connects Jordanian with Linnean species is thus connecting species and genera also. The new law, that age goes parallel to area, and that the method of evolution and distribution have been, in the main, the same in all branches of the animal and vegetable kingdom, seems to be the principle which must direct further researches in the geography as well as the genealogy of the living world."
Dr. Willis emphasises the statement that by the use of the hypothesis of Age and Area, one is able to discover new facts which may lead to advances in our knowledge of geographical distribution. Natural selection cannot do this.

De Vries' review is charmingly written, and one of the most lucid and convincing presentations of Dr. Willis' thesis of "Age and Area" I have seen.

Considering some of the species of most circumscribed range (so far as we know them), let me remind my readers (and we all constantly require this reminder) that, as regards distribution of species, Australia is a very imperfectly explored area and, as the days roll on, most important data, modifying our present knowledge of distribution will inevitably become available. Further, those few "species" that we only know in the juvenile leaf stage, or as having scarcely progressed beyond it, may be traced as evolutionary forms of other full grown "species." In such cases (when proved) the areas of the "complete" species will be that of the combined areas of juvenile and full-grown species. But this is an interesting by-path, not influencing the range of species in general in an important manner.

I consider this an important path of research. If, say, twenty species (Willis's minimum) in juvenile leaf stage can be found to have restricted areas, it would go a long way towards proving, on the hypothesis of Age and Area, that this was the earliest form of Eucalyptus.

Turning to Australian species of limited area (sometimes (?) erroneously called "disappearing" species), we must differentiate between those in botanically well-explored areas and those in areas which, when better explored, may tell a different tale. Let us consider the following:—

1. E. pulverulenta.
2. E. Staigeriana.
3. E. Cliftoniana.
4. E. argillacea.
5. E. Abergiana.
6. E. Pimpiniana.
7. E. Kruseana.

In this short list, Nos. 1, 4 and 7 have predominantly juvenile foliage, and the fact that they have not attained the falcate or mature-leaved stage is an argument in favour of the hypothesis that they are recent arrivals.

It may be mentioned that the localities of all these species are more or less difficult of access, at least to workers in the capital cities.

In contrast with these we may take, as examples, our two most widely diffused species, viz.,

E. rostrata. E. microtheca.

Some years ago I inclined to the view that a species like E. pulverulenta, only sparsely known from a few hill-tops and a few specimens, was a depauperate and disappearing species, related to or descended from a species we are still uncertain about.
When we pronounce a species a "disappearing" one, we do so because it seems to be so; it is a small species consisting usually of few individuals, and found on the top or tops of hills, as if all the rest had been blown away, or had decayed away. This, so far, is pure surmise, but facts in support we have none, so far as I know—we do but interpret a vision, in the empirical way in which visions are usually interpreted.

Dr. Willis's "Age and Area" conception is, at least, constructive.

Mr. R. H. Cambage, in Journ. Roy. Soc., N.S.W., XLVII, p. 39, 1913, refers to E. pulverulenta as follows:

"Judging by results, it would seem to have been a necessity at some particular stage of Eucalyptus development that some adjustment of leaf arrangement should have been made to conform to some altered climatic condition, and ensure the further progress of the genus. The simplest method for those species to adopt which had already developed petiolate leaves, was to gradually twist the leafstalk and so change the position of the blade from horizontal to vertical. It is instructive to enquire into the condition of one or two species which appear to have been unable to do this.

One of the most interesting Eucalypts in this connection is E. pulverulenta (E. pulverulenta), which is growing in the mountain region at Cox's River, at Bathurst, and near Cooma. This tree appears to have been unable to develop any lanceolate leaves at all, or to substitute the alternate for the juvenile opposite arrangement, the whole of its foliage being either orbicular or broadly ovate, and, being sessile, the cordate leaves remain clasping the stem at right angles, and therefore present their full surface to the sun. It is now that we see the potentialities of the Eucalypt to adapt itself to its surroundings, and the method selected in this instance has been to cover the leaves with a glaucous powder or vegetable wax, which reduces the effect of the sun's rays and therefore lessens the evaporation, while it also serves to keep out the cold in winter. It would seem, however, that this provision has not been so successful as the twisting of the leafstalk, for this species is a weakling and rarely seems able to grow more than 20 feet high, and although in the past it appears to have had an extensive range at least from Bathurst to Cooma, a distance of about 200 miles, it is not known in the intervening area, and is looked upon as rare in both localities. The available evidence regarding this tree points to the conclusion that it is probably a vanishing species.

E. cordata, of Tasmania, is a very similar little tree, and has adopted the vegetable wax instead of the vertical leaf. The species is confined to Tasmania, and even there is not regarded as plentiful. It seems not unlikely that in the near geological future both these species will have disappeared.

In studying such problems of Age and Area, it is desirable that we should have the curving boundaries of as many as possible of the species, and of this I have already spoken. But this will take some time to carry out, and could hardly be complete (of course, nothing is ever completed) until such time as the "Range" (or records of distribution) given in this work have been well advanced. In spite of the fact that these figures would be so economically and academically valuable, I cannot press the matter at this time, in view of the fact that the New South Wales Government has been so good to me in the matter of illustrations.

Owing to the present state of my health, and bearing in mind that "time and tide wait for no man," I have been compelled to add this to the many other phases of Eucalyptus study that I must leave to younger and more active men.
THE LEAF.

(Continued from Part LXVI, p. 313.)

MATURE LEAVES.

Descriptions of the following mature leaves have in some cases through inadvertence on my part, been omitted from the species descriptions. I have taken the opportunity of offering some supplementary notes:—

46. *E. acacioides* A. Cunn.

"Erect, narrow lanceolate to almost linear, under 6 inches long, mostly 2-4, obtuse or acute; petiole short; colour rich green, but lustreless on both sides; venation obscured, lateral veins spreading; intramarginal vein not far removed from the edge."

(R. T. Baker in *Proc. Linn. Soc., N.S.W.*, XXV, 316, 1900, as *E. viridis.*)


Leaves glaucous. (W. V. Fitzgerald.)

257. *E. Blaxlandi* Maiden and Cambage.

Resemble those of typical *E. capitellata*. See Part VIII, p. 216.

120. *E. caesia* Benth.

The foliage sub-glaucous, the inflorescence and fruits very glaucous. Veins very conspicuous.


"The leaves have always numerous diverging veinlets, and the juvenile foliage appears constant. The leaves are broadly oblong, alternate, stalked, equal-sided, or nearly so; the veinlets are very numerous and netted." (L. Rodway, *Proc. Roy. Soc., Tas.*, 14, 1917.)


Leaves shining. (W.V.F.)

205. *E. corymbosa* Sm.

"We observed that, in the Upper Clarence district, they were slightly more glaucous than those observed in the Sydney district." (W. F. Blakely and D. W. C. Shiress, October, 1922.)
51. *E. crebra* F.v.M.

"Scattered, on rather short stalks, elongate or falcate lanceolar, sometimes very narrow, of somewhat thin consistence, of equal and dull green on both sides; lateral veins subtle, rather numerous, almost parallel and moderately spreading, the circumferential vein very near to the edge." ("Eucalyptographia.")

217. *E. dichromophloia* F.v.M.

Leaves dull glaucous green. (Kimberleys, C. A. Gardner).

5. *E. facunda* Schauer.

"Lanceolate, acuminate, rarely exceeding 3 inches, thick, with fine veins scarcely conspicuous and much more numerous and less oblique than in *E. loxophleba*, the intramarginal one very near the edge." (B. Fl., III, 252.) The differences between *E. facunda* and *E. loxophleba* require careful investigation.

224. *E. Foelscheana* F.v.M.

Leaves pale yellowish-green, coriaceous and shining. (C. A. Gardner, Kimberleys.)


Mature leaves are described, but sucker (juvenile) leaves quoted by a slip of the pen, in Part XXXIX, p. 298.

74. *E. Gillii* Maiden.

"It seems to me that besides the typical form (from Umbcratana, Flinders Range, South Australia), with sessile leaves, usually nearly orbicular, but occasionally lanceolate, (Mount Lyndhurst, South Australia, fig. 6, Plate 67), we have a petiolate form, with broadly lanceolate leaves, which it would be a convenience to constitute a variety, and which I accordingly do, under the name of *petiolaris*. At the same time, it is quite possible that we may find, on further investigation, that both forms may occur on the same plant. The varietal name will then become unnecessary, but it is a useful provisional name until we know more of *E. Gillii*.

Var. *petiolaris* var. nov. A shrub or small tree apparently in all characters similar to that of typical *E. Gillii* except that the leaves are petiolate (with petioles of about 1 cm.), and broadly lanceolate in shape. The type from Wirrabarra, South Australia (Walter Gill); see figs. 4a, 4b, Plate 67, C.R." (Maiden in Journ. Roy. Soc., N.S.W., LIII, 68, 69, 1919.)

209. *E. gracilis* F.v.M.

"The foliage of this species is, as a rule, dense, the leaves are small, and of a dark shining green. It somewhat resembles the true Black Morrell (*E. melanoxylon*, No. 1,753) in habit, but may be distinguished in the field by its greenish upper bark and bright shining foliage." (C. A. Gardner, Coolgardie, W.A.)

"Very variable in shape and size, lanceolate to broadly lanceolate, glaucous, both surfaces similar, the veins conspicuous, the midrib prominent, the intramarginal vein at a distance from the edge." (C. A. Gardner, Kimberleys.)

95. *E. macrocarpa* Hook.

"Mr. W. F. Blakely has collected from the Botanic Gardens, Sydney, suckers in which the alternate leaves are 1 ½ inches apart on the shoots. In other words, the broadly lanceolate leaves, which are very shortly petiolate to stem-clasping, have the petioles 1 ½ inches apart." (Maiden in *Journ. Roy. Soc., N.S.W.*, LIII, 70 (1919).


"This species has pale grey-green leaves with a whitish bloom upon them. These leaves are nearly round, opposite, without leaf-stalks and stem-clasping, a peculiarity which all observers will have noticed belongs to the young state of many gum trees. But, however old the tree, the leaves always have this form. . . . I used to think that this was a stunted variety of *E. crebra*, and I am still not very clear on the subject, as the trees are in many respects so very much alike. But they grow side by side, and the opposite-leaved character of the present species is always maintained. Still the appearance is that of a Eucalypt not fully developed, especially in that whitish bloom on the leaves, and it never is seen of the size or appearance of a fully-grown tree." (J. E. Tenison Woods in *Proc. Linn. Soc., N.S.W.*, VII, 335, 1882–3.)

Father Tenison Woods did well to draw attention to this species as one "not fully developed"; it was not until some years afterwards that it was realised that it also produced "mature leaves,” lanceolate in shape.

72. *E. oligantha* Schauer.
Foliage very scanty. (W. V. Fitzgerald, MSS.)

Leaves glaucous. (C. A. Gardner, Kimberleys.)

138. *E. Perriniana* F.v.M.

"The leaves, till a year or two ago, were all opposite, connate and orbicular; upon the trees attaining a height of 10–15 feet the leaves become alternate, petiolate and lanceolate, with exactly the form and venation of some forms of *E. viminalis.*" (Rodway, in *Proc. Roy. Soc., Tas.*, 181, 1895.)

31. *E. Planchoiana* F.v.M.

"Scattered, sickle-shaped lanceolar, prolonged into a narrow apex, slightly less shining beneath, not pellucid dotted, with subtle, much spreading, not crowded veins, the circumferential vein somewhat removed from the edge." ("Eucalyptographia.")
"The general appearance of the foliage is similar to that of *E. eximia*, being glaucous and drooping, and sometimes with a dull yellow tint. The leaves are fairly large, acuminate lanceolate-falcate, even the young sucker leaves are so. The very young tips are at times various shades of purple-brown."  (W. F. Blakely and D. W. C. Shiress, Copmanhurst district, New South Wales.)

40. *E. populifolia* Hook.

Following is a translation of Hooker's original words, quoted at Part X, p. 339:—

"Branchlets slender, terete, leaves with long petioles, subrhomboid orbicular, very obtuse subcuneate at the base, finely penniveined, venation oblique, close to the margin, somewhat thickened . . ."

"Scattered, on rather long stalks, orbicular-ovate or rounded, very shining and intensely green on both sides, occasionally verging into an oval-lanceolar form; veins very spreading, but not crowded, the circumferential vein distinctly removed from the edge." ("Eucalyptographia.")

218. *E. pyrophora* Benth.

"Leaves lanceolate, rigid and coriaceous, shining, the midrib prominent, the margin nerve-like, the veins pinnately arranged at an angle of about 60 degrees to the midrib. (C. A. Gardner, Kimberleys.)

132. *E. quadrangulata* Deane and Maiden.

"The leaves of the Nundle tree also display small tubercles irregularly distributed along the margins of the leaves, and notable if only because they have so rarely been seen in the genus. Their occurrence in *E. nitens* has already been referred to." (Part XIX, p. 416.)

50. *E. Raveretiana* F.v.M.

"Scattered, of thin consistence, oval or oftener elongate-lanceolar, almost equal-sided, or but slightly sickle-shaped, opaque, copiously dotted by pellucid oil glands, paler underneath; veins very fine, slightly distant, the marginal vein very near the edge." ("Eucalyptographia.")

At Part XII, p. 61, is the following note:—"The figure in the 'Eucalyptographia' is not a very good one. While the tree has many leaves of the shape depicted, yet there are also numerous long lanceolar leaves, as figured at fig. 3a, Plate 53, of the present work."

155. *E. resinifera* Sm.

"Ovate-lanceolate to lanceolate, acuminate, straight or falcate, mostly 4–6 inches long, rather thick, with numerous fine close parallel and almost transverse veins, sometimes scarcely conspicuous, the intramarginal one close to the edge." (B. Fl., III, p. 245.)
89. *E. salmonophloia* F.v.M.

"Scattered, of rather thin consistence, sickle-shaped or narrow-lanceolar, shining and of equal colour on both sides; their lateral veins spreading at an acute angle, very much concealed, the circumferential vein but slightly removed from the edge of the leaf." ("Eucalyptographia.")


"Mature leaves narrow, lanceolate, acuminate, of an equal colour on both sides, not shining, venation not very distinct, lateral veins fine, numerous, intramarginal vein close to the edge; petiole about an inch long." (Proc. Linn. Soc., N.S.W., XXIV, 292, 1899.)

216. *E. terminalis* F.v.M.

"Leaves alternate, lanceolate to narrow-lanceolate, coriaceous and shining above, paler underneath, with a prominent midrib and veins arranged pinnately at an angle of about 70 degrees to the midrib, the intramarginal vein close to the edge." (C. A. Gardner, Kimberleys.)

254. *E. tetrodonta* F.v.M.

"Leaves dull green, thick, the veins very prominent." (C. A. Gardner, Kimberleys.)

121. *E. tetraptera* Turcz.

A specimen of adult foliage from Desmond, near Ravensthorpe (L. Reid), measured 20 by 5½ cm., very thick, venation very transverse, sometimes making an angle of 70–75 degrees with the midrib.

47. *E. Thozetiana* F.v.M.

"Leaves mostly alternate, from linear or narrow-lanceolate in the adventitious shoots, and from lanceolate to oblong lanceolate in the normal form; under 6 inches long and ½ inch wide, occasionally shining; venation rather obscured in the thick epidermis; lateral veins sparse, oblique, distant, intramarginal vein removed from the edge." (R. T. Baker in Proc. Linn. Soc., N.S.W., XXXI, 305, 1906).


"Mature leaves lanceolate, falcate, large, up to 9 inches long and 1½ inches broad, pale coloured on both sides, coriaceous, venation very distinct, lateral veins distant, spreading, oblique, marginal vein removed from the edge." (Proc. Linn. Soc., N.S.W., XXV, 687, 1900, Plate XLIV, figs. 2, 3.)
EXPLANATION OF PLATES (272-275).

PLATE 272.

(Juvenile Leaves, continued from Part 66. More Juvenile than previously Figured.)

E. longicornis F.v.M.

1a, 1b, 1c, 1d, 1e. Pairs of leaves, opposite and alternate, of twigs from the same tree. Southern Cross, Western Australia (C. A. Gardner, No. 1,751). These figures show that the juvenile leaves may be broader than those shown on Plate 241.

E. longifolia Link and Otto.


E. pachyphylla, F.v.M.

3. As juvenile a leaf as I have yet seen of this species. 60 miles west of Camp IV, Lander Creek, Northern Territory. (G. F. Hill, No. 371, 22nd June, 1911.) See also Plate 171.

E. obtusiflora DC.


E. Preissiana Schauer.

5. The broadest and most juvenile leaf I have seen. Thakalarup Road to Porongorups, Albany district, Western Australia (J.H.M., October, 1909).

E. saigna Sm.

6a, 6b. Juvenile leaves, in different stages. Ourimbah and another locality, also in the Brisbane Water district, New South Wales (J. L. Boorman).

PLATE 273.

(Mature Leaves. More Mature than previously Figured. See also Plate 274.)

E. aggregata Deane and Maiden.


E. albems Miq.


E. amplifolia Naud.


E. Baueriana Schauer.

5. Mature leaf. Bago Forest Reserve, Monaro, New South Wales. (Forest Assessor W. A. W. de Beuzeville, January, 1917.) This is also illustrative of the comparatively large sizes that leaves of very many species attain on the branches of vigorous young trees.


12. Mature leaf. Given to me by the late W. R. Guilfoyle, from the Melbourne Botanic Garden, but the history not available.


**PLATE 274.**

(Continuation of Leaves more Mature than those previously Figured.)


E. *notabilis* Maiden.

E. *tetramerata* Turcz.

E. *radiata* Sieb.
9a, 9b. Mature leaves, the latter especially showing marked longitudinal venation. Clarence Siding, Blue Mountains, New South Wales (J. L. Boorman, February, 1918).

E. *Preissiana* Schauer.
10. Mature leaf. Conical Hill, Stirling Range, Western Australia (Dr. A. Morrison, September, 1902).

E. *Woodwardii* Maiden.
11. Mature leaf. 120 miles east of Kalgoorlie, Western Australia. Transcontinental Railway Survey (Henry Deane, May, 1909).

**PLATE 275.**

*E. Bloxsomei* Maiden, n.sp.
1a. Twig with hairy juvenile leaves, in the earliest stage available; 1b, juvenile leaf, in the next earliest stage seen; 1c and 1d, leaves in the intermediate stage; 1e, mature leaf; 1f, mature fruits, with some corky excrescences; 1g, end-on view of the mouth of a fruit. All from Hippong, Queensland (H. S. Bloxsome and Dr. T. L. Bancroft). The type.

2a. Buds; and 2b, front and back view of an anther. Parish of Boondooma, 70 miles north-west of Wandai, Queensland (Forest Guard Higgins).

*E. Campaspe* S. le M. Moore.
3a. Fruits larger than those figured at Plate 3b, a fruit in elevation showing the valves and the very short pedicel. Montana Hill, Coolgardie, Western Australia (C. A. Gardner, No. 1,749).
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:—

acacioides A. Cunn. (xlviii).
acmenioides Schauer (xxxii).
affinis Deane and Maiden (lvi).
amygdalina Labill. (xvi).
Andrewsii Maiden (xxi).
Baileyana F.V.M. (xxxv).
Bakeri Maiden (lxx).
Baueriana Schauer (lvii).
Baueriana Schauer var. conica Maiden (lvi).
Behriana F.V.M. (xlvi).
bicolor A. Cunn. (xlv).
Boormani Deane and Maiden (xlv).
Bosistoaniana F.V.M. (xlili);
Calygi Maiden (lv).
capitellata Sm. (xxviii).
conica Deane and Maiden (lvi).
Considerniana Maiden (xxxvi).
coriacea A. Cunn. (xv).
corymbosa Sm. (xiii).
crebra F.V.M. (liii).
Dalrympleana Maiden (lxiv).
dives Schauer (xxi).
dunosa A. Cunn. (lxv).
eugenoides Sieber (xxix).
fruticetorum F.V.M. (xlii).
gigantea Hook. f. (li).
globulus Labill. (lxvii).
gonioalyx F.V.M. (vi).
hæmastoma Sm. (xxviii).
hemiphloia F.V.M. (vi).
longifolia Link and Otto (ii).
Luehmanniana F.V.M. (xxvi).
macrophylla F.V.M. (xxviii).
maculata Hook. (vii).
Maideni F.V.M. (lxix).
melanoploia F.V.M. (liv).
melliodora A. Cunn. (ix).
microthea F.V.M. (lii).
Muelleriana Howitt (xxx).
umerosa Maiden (xvii).
obligua L'Hérit. (xxii).
ochrophylia F.V.M. (i).
odorata Behr and Schlectendal (xii).
oleosa F.V.M. (lx).
paniculata Sm. (viii).
pudibaris Sm. (xxi).
piperita Sm. (xxxiii).
Planchnioniana F.V.M. (xxiv).
polyanthemos Schauer (lix).
populifolia Hook. (xlvii).
propinqua Deane and Maiden (lxii).
punctata DC. (x).
radiata Sieb. as amygdalina (xvi).
regnans F.V.M. (xvii).
resinifera Sm. (iii).
robusta Sm. (lxviii).
rostrata Schlecht. (lxii).
rubida Deane and Maiden (xlxi).
saligna Sm. (iv).
siderophloia Bentham. (xxxix).
sideroxylon A. Cunn. (xiii).
Sieberiana F.V.M. (xxxiv).
Smithii R. T. Baker (lxx).
stellulata Sieb. (xiv).
tereticornis Sm. (xi).
tessellaris F.V.M. (lxvi).
Thozetiana F.V.M. (lxix).
viminalis Labill. (lxiv)
virgata Sieb. (xxv).
vitrea R. T. Baker (xxiii).

*Government Printer, Sydney. 4to. Each part contains 4 plates and other Illustrations.

Note by Government Printer.

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

JUVENILE LEAVES.

(More juvenile than previously figured).

EUCALYPTUS LONGICORNIS F.v.M. (7).
E. LONGIFOLIA Link and Otto. (2).
E. PACHYPHYLLA F.v.M. (3).
E. OBTUSIFLORA DC. (4).
E. PREISSIANA Schauer (5).
E. SALIGNA Sm. (6).
MATURE LEAVES.
(More mature than previously figured. Continued on Plate 274).

EUCALYPTUS AGGREGATA Deane and Maiden. (1).
E. BAUERIANA Schauer. (4).
E. CALEYI Maiden. (7).
E. FOECUNDA Schauer. (10).
E. CAESIA Benth. (13).
E. ALBENS Miq. (2).
E. DALRYMPLEANA Maiden. (5).
E. DIVES Schauer. (8).
E. COCCIFERA Hook. f. (14).
E. AMPLIFOLIA NAUD. (3).
E. EXIMIA Schauer. (9).
MATURE LEAVES.
(More mature than previously figured).

EUCALYPTUS HEMIPHLOIA F.v.M. (1).
E. RADIATA Sieb. (9a and 9b).

E. MICRO Corys F.v.M. (2 and 3).
E. NOTABILIS Maiden. (7).
E. PREISSIANA Schauer. (10).

E. STOWARDI Maiden. (4 and 5).
E. TETRAPTERA Turcz. (8).
E. WOODWARDI Maiden. (11).
EUCALYPTUS BLOXOMEI Maiden, n. sp. (1 and 2).
E. CAMPASPE S. le M. Moore, fruits. (3).
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 8.

PART LXVIII

OF THE COMPLETE WORK.

(WITH FOUR PLATES.)

PRICE THREE SHILLINGS AND SIXPENCE.

Published by Authority of

THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER.

1927.
A Critical Revision of the genus Eucalyptus

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

The author of this standard work, Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., died on 16th November, 1925, at the age of 66 years.

It is most regrettable that he did not live to see the completion of his great work, of which 65 Parts have already appeared, and the final Parts were prepared by him for publication prior to his death.

With the kind permission of Dr. Darnell-Smith, Director, Botanic Gardens, Sydney, this and the subsequent Parts will be edited by Messrs. R. H. Cambage, C.B.E., F.L.S., and W. F. Blakely, Assistant Botanist, Botanic Gardens, both of whom have been in constant touch with the late Mr. Maiden during the progress of the work.

VOL. VII. PART 8.
Part LXVIII of the Complete Work.
(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

PRICE THREE SHILLINGS AND SIXPENCE.

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

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1927.
### CCCLXIII. *Eucalyptus Dwyeri* Maiden and Blakely.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAGE 363

### CCCLXIV. *E. Burracoppinensis* Maiden and Blakely.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAGE 367

### CCCLXV. *E. Whitei* Maiden and Blakely.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAGE 369

### CCCLXVI. *E. Dongarraensis* Maiden and Blakely.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAGE 371

### CXLI. *E. maculosa* R. T. Baker.

<table>
<thead>
<tr>
<th>Synonyms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAGE 373

### CCCLXVII. *E. Staerii* Maiden.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAGE 374
<table>
<thead>
<tr>
<th>CCCLXVIII. E. Badjensis de Beuzeville and Welch.</th>
<th>PAGE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>376</td>
</tr>
<tr>
<td>Range</td>
<td>376</td>
</tr>
<tr>
<td>Affinity</td>
<td>376</td>
</tr>
<tr>
<td>Additional Affinities</td>
<td>377</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CCCLXIX. × E. Kalangadooensis Maiden and Blakely.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Affinities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CCCLXX. E. albida Maiden and Blakely.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Affinities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CCCLXXI. E. biangularis Simmonds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Affinities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Natural Hybrids</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Affinis; E. Hybrida; E. Peacockeana</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Artificial Production of Vigorous Trees by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hybridisation</td>
</tr>
</tbody>
</table>

| Effect of Rapidity of Growth on Timber         | 385   |

<table>
<thead>
<tr>
<th>Diel's Law</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>List of Collectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
The desirability of studying eucalyptus in the bush  . 394
Preparation for botanical travel  . . . 394
Aid in the study of geography  . . . 395
Necessity for quoting the name of a collector  . 396
Ecology  . . . . . . . . . . . 396
Examination of organs and general appearance
in the bush  . . . . . . . . . 397
The aesthetic aspect of the genus  . . . 397
The value of the study of Eucalyptus in a scheme of
education  . . . . . . . . . 399
Scientific and humanistic studies  . . . 399
The industries parasitic on science  . . . 400
How to further the study of botany  . . . 400
Explanation of Plates 276-279  . . . 401
DESCRIPTION.

CCCLXIII. E. Dwyeri, Maiden and Blakely.


Mallee ramosa, folis obscuris, folis maturis crassiusculis, lanceolatis, petiolatis, venus aliquantum conspicuis, venis secundariis e costa media circiter 45° orientibus inflorescentia in umbellis ad 7 in capitulo, in pedunculis paulum planatis, pedicellis brevibus vel absentibus: alabastris nitentibus, operculis attenuato-conicis, calycis longitudine cum tubo aequantibus: antheris versatilibus, atque ex Macrantheris; fructibus paulum urceolatis vel campanulatis, hemisphericis vel sub-cylindraceis, brevioribus, margine latiore et fere horizontali, valvis exsertis.

Usually a small, branching Mallee, but, like some of the Mallees, it may exceptionally attain the dimensions of a small tree. The foliage dull-coloured, drying olive-green.

Juvenile Leaves narrow-lanceolate, but not seen in the earliest state. Intermediate leaves (not seen from type locality) broadly-lanceolate.

Mature Leaves moderately thick, lanceolate, petiolate, the venation not very conspicuous, slightly spreading, but the secondary veins on the whole parallel, and make an angle of about 45 degrees to the midrib; the intramarginal vein distinctly removed from the edge.

Inflorescence in umbels up to seven in the head, on slightly flattened peduncles up to 1.5 cm. long, the pedicels short or absent. The buds shining and brown in colour, opercula attenuate-conical, of the same length as the calyx-tube, which is scarcely ribbed, and which tapers gradually into the very short pedicel. Anthers versatile, opening in parallel slits, gland at the back; belonging to the Macrantherae.

Fruits slightly urceolate or campanulate, hemispherical or sub-cylindrical, rather small, up to about 9 mm. in greatest diameter, rim broadish and nearly horizontal, the valves whitish (through a thin discal membrane) and distinctly exsert.

Type, from Gungal, near Merriwa, New South Wales, preferring ridges (J. L. Boorman, September, 1904.

In honor of the Right Reverend Joseph Wilfred Dwyer, Roman Catholic Bishop of Wagga, New South Wales, who, when parish priest of Temora, collected this species on several occasions, and who has been an acute observer of native plants for many years.
RANGE.

So far it has only been recorded from New South Wales, and in moderately dry, but not very dry, areas. In view of the fact that it is a Mallee, and that it is superficially similar to at least two other species, I confidently predict that its range will be considerably added to in the near future.

At present we know the species from three main areas—(1) Between the Murrumbidgee and the Lachlan Rivers, which may be briefly described as the Temora-Wyalong country; (2) the Merriwa-Denman area, where the type came from; and (3) the Pilliga Scrub. Outliers from (1) are the Nymagee district, and from (3) the Warrumbungle Mountains.

Definite localities are:—

On quartzite ridge, Ardlethan (R. H. Cambage, No. 4,192). Small or medium-sized trees of 12–40 feet high, growing on the ridges around the township and at the mines (J. L. Boorman). Small to medium-sized trees, having much the habit of a Red Gum, bark dark-grey, ribbony towards the base of the stem, Wyalong (J. L. Boorman); Wyalong (W. S. Campbell, 1901); Red or Cabbage Gum, Barmedman, on ridge (R. H. Cambage, 16th September, 1900).


A Mallee, Blow Clear State Forest, 8 miles north of Bogan Gate (K. Walker, Nos. 5 and 6, 1918). Growing in Mallee form, 8 or 10 stems from one root, and about 20 feet high, Wirlong, Nymagee (R. H. Cambage, No. 1011). Referred to as *E. tereticornis* var. *dealbata* (*E. dealbata*) by Mr. Cambage in *Proc. Linn. Soc., N.S.W.* xxvi, 204, 1901, and by me, as resembling the Gungal specimens, *ib.*, xxix, 773, 1904).

Sent in as “A.” “A small tree of branching habit, no stem; specimens were obtained from the small shoots; was not able to form any idea as to size. Top of hill, in one locality only.” Gungal, near Merriwa (J. L. Boorman, September, 1904), Another specimen, also labelled “A,” and labelled “Mallee.” Piece of timber with this.

Sent in as “B.” “Mallee-like trees or shrubs, tops of the hills; on the flats not plentiful. Timber of this.” Gungal, near Merriwa (J. L. Boorman, September, 1904). “In the vicinity *Grevillea longistyla* and *Philaethea australis* var. *Reichenbachiana* grow. . . . The Eucalypts are very interesting, and, so far as my knowledge
goes, they are new, with affinity to E. tereticornis var. brevifolia. . . . There is a large quantity of E. trachypholia growing on the sides of the hills all over the district.” (J. L. Boorman, September, 1904.)

Growing like Mallee on sandstone, top of mount near shale mine, Baerami, west of Denman (R. H. Cambage, No. 2,687).

About 14 miles west of Dunedoo, near Merrygoen railway station. A Mallee about 10 feet high, with thin, straight stems, 2–3 inches in diameter. Bark smooth, blotched. Leaves somewhat glaucous; young branches reddish. Buds somewhat stellate, yellowish very numerous. (Andrew Murphy, January, 1924.) Mr. Murphy also states that it grows all over the Warrumbungle, and it is the common Mallee of that part.

Now we come to the Pilliga district. A Mallee-like plant of 8–12 feet, stems 3–6 inches in diameter, tips of twigs claret-coloured. On stony ridges at a high altitude, Forked Mountain, Coonabarabran. On the road Gunnedah to Coonabarabran, about 4–5 miles from the latter township. Found (by me) in one spot only of the eastern fork, in the vicinity of the Mission Station (J. L. Boorman, September, 1908). (This is Burra Bee Dee, the Aboriginal Station, 6 or 7 miles from Coonabarabran.)


2. "Clean-stemmed Mallee with galls. Labelled No. 2. Fruit larger than No. 1." Both Pilliga Scrub, near middle (Dr. J. B. Cleland, 7th October, 1918).


"Resembles a young E. tereticornis. Collected from saplings about 4 inches butt diameter. [Mature gums growing among them. It was taken for granted they were of the same species as the saplings, but from superficial observation there appeared to be no buds or fruits on the mature trees. The mature trees grow 4–5 feet girth, and about 40–50 feet high, branching, and as a rule crooked]. Improvement lease 1,777, parish Brigalow, county Pottinger, in company with E. trachypholia, &c. (Forest Guard M. H. Simon, No. 110, August, 1913.) That the species attains a height of 40–50 feet seems doubtful, or at all events unproved (J.H.M.) Gum, 40 feet high and 12 inches in diameter. Timber and bark available. Forest Reserve 35,919, parish Brigalow, county Pottinger, Gunnedah district—June, 1915 (Forest Guard M. H. Simon, No. 8).
AFFINITIES.

Although on the probationary list for nearly twenty years, its specific rank was confirmed when seeds from a large number of specimens attributed to *E. dealbata* were sown, and a very fine series of seedling plants compared. Two series of seedlings resulted, the true *E. dealbata* with broad leaves, and *E. Dwyeri* with narrow ones. We have here an illustration of the desirability of raising seedlings as a check on determinations otherwise obtained. It may be mentioned that the leaves of the seedlings of *E. pumila* are, like those of *E. dealbata*, broad. Further details will be given when the seedlings of a large number of species are described, when it will be found that in the Bilobæ, *E. Dwyeri* comes in Series No. 21, “Narrow lanceolate,” while *E. dealbata* and *E. pumila* are in No. 23 “Semi-terete to quadrangular; petiolate (elliptical to orbicular).

1. With *E. dealbata* A. Cunn.

Compare Plates 134 and 135, Part XXXII. An outstanding difference between the two species lies in the broad juvenile foliage of *E. dealbata;* the pedicels of the same species are more defined, the calyx-tubes and fruits more hemispherical, never sub-cylindrical, while the opercula are more conoid, and, when elongated, never as much as in *E. Dwyeri.* *E. dealbata* is a small or moderately large tree, probably never a Mallee; its bark is rougher and the timber red.

2. With *E. pumila* Cambage.

See Plate 206, Part L. Both species are Mallees, but the juvenile leaves of *E. pumila* are broad, and those of *E. Dwyeri* narrowish. The peduncles and pedicels of the former are shorter and thicker, and the pedicels are more sharply defined from the hemispherical fruits, while the rims are more domed. The buds of *E. pumila* are more attenuate, both as regards opercula and calyx-tubes.

3. With *E. siderophloia* Benth.

A suggestion, as regards fruits, is the above, and *E. siderophloia* is not closely related to *E. dealbata*.

Specimens from Arrarowine, Borah Creek, Pilliga Scrub, a small white gum with smooth bark, labelled *E. siderophloia* by Dr. H. I. Jensen, No. 151, have fruits very similar in shape to those of some forms of *E. siderophloia*. 
DESCRIPTION.

CCCLXIV. E. Burracoppinensis, Maiden and Blakely.


Arbor parva vel frutex 8-15 feet altus, cortice basi rugoso, ramis levibus, folia juniora non vidimus: foliis maturis alternatis. crassiusculis, dilute viridibus, petiolatis, angustis ad lato-lanceolatis, 8-12 cm. longis, 1-3 cm. latis, venis centissimis leniter obscurs; venis lateralis numerosis 30-40° e costa orientibus, vena peripherica marginis approximata; inflorescentia axillaris, pedunculo cum 3 floribus grandis fusis pedicellatis alabastris, pyriformibus 3 cm. longis, 1-5-2 cm. diametro; opercula crasso rostrato, 1-5-2 cm. longo, basin versus leniter vel distincte costato; calycis tubo hypocrateriformi, levi vel obscure costato; antheris magnis latis parallelliter aperientibus; fructu depresso-turbinato, levi vel leniter costato, parte calycem versus levi, parte discali crassa annulus staminale multo excedente, valvis crassis deltoides acutis leniter exsertis.

A small tree or shrub, 8-15 feet high, with smooth grey bark on the branches, and the lower part of the trunk covered with ragged bark (Max Koch).

Juvenile leaves not seen.

Mature leaves alternate, moderately thick, light green, petiolate, narrow to broad lanceolate, the apex acuminate-incisate, 8-12-5 cm. long, 1-3 cm. broad, petiole compressed, expanded upwards, 1-5-2 c.m. long; venation very fine and somewhat obscure on both surfaces, the midrib channelled above, and scarcely raised beneath; lateral veins numerous, making an angle of 30-40 degrees with the midrib, intra-marginal vein close to the edge.

Inflorescence axillary, the common peduncle bearing three moderately large pedicellate flowers. Buds somewhat pyriform, 3 cm. long, 1-5-2 cm. in diameter. Operculum very thick, rostrate, 1-5-2 cm. long, faintly or distinctly many ribbed at the base and more inflated than the calyx: calyx-tube funnel-shaped, gradually diminishing into the terete pedicel, smooth, or with a few faint ridges, 8-10 mm. long; anthers large and broad, opening in parallel slits. Floral disc pale-coloured, conspicuously raised above the top of the ovary, as in E. pyriformis, and forming a deep nectary around the ovary.

Fruit depressed-turbinate, the thick calycine portion smooth and glossy, slightly ribbed, the discal portion also thick, much paler than the former, and considerably raised above the staminal ring; valves four, thick, deltoid, acute, slightly exsert. Capsular disc pale-coloured, rather broad and thick, and much raised above the sharp rim of the calyx, the sides sloping upwards to a broadish truncate rim, the inner surface of the rim slightly oblique, the entire disc free from the valves of the capsule. The morphosis of the disc is similar to that of E. pyriformis and the variety Kingsmilli depicted in Part LXI, Plate 250, figs. 1a to 2e of this work.
RANGE.

It is known only from Western Australia. Localities are:—Burracoppin (F. M. C. Schock, No. 205, 2nd July, 1917; the type Dr. J. B. Cleland, 1908, figured in Part XVII, Plate 75, figs. 7a, 7b (mature leaf and fruit), as E. pyriformis Turcz. var. minor; see also Part XL, p. 17). The type. Halfway between Booran Siding and Burracoppin (F. M. C. Schock, 2nd July, 1917). Small tree, upper branches with a smooth grey bark, the lower part of trunk covered with ragged bark, Merredin (Max Koch, No. 3,020, January, 1924. In fruit and very young buds; the latter, although immature, show the corrugation.

"A shrub with the habit of typical E. Oldfieldi, with the stems densely branched from near the base, erect and spreading, 8-15 feet high. Flowers yellowish-white; bark silver-brown, with a rough dark grey persistent bark at the base." Carrabin, Westonia road, in yellow sandy soil on plains, or in thickets of Hakea multilineata and Casuarina aequivalvis. Flowers October-November (C. A. Gardner, No. 1,825, 7th October, 1922, co-type).

AFFINITIES.


This is an imperfectly known variety, and it seems to have the same funnel-shaped calyx-tube as E. Burracoppinensis, but the operculum is quite smooth, not corrugated, as in the new species.


Both species appear to be much alike in habit; they are Mallee-like or occasionally developing as individual trees. There is also a great deal of similarity between them in the shape of the fruits, but generally the fruits of E. Oldfieldi are smaller and invariably sessile. But the large rostrate, corrugated operculum, and the large parallel anthers of E. Burracoppinensis readily separate it from E. Oldfieldi.


The fruits appear to be the only character which bring these species together. They are both members of the E. pyriformis series with the typical pyriformis fruit, which show the large raised disc perhaps better than any other species. The fruits of E. pachyphylla are, however, more strongly ribbed than the fruit of E. Burracoppinensis.
DESCRIPTION.

CCCLXV. E. Whitei, Maiden and Blakely.


Ironbark parva. cortice alte sulcato atro-cinereo; ligno pallide-rubro duro; foliis junioribus lato-oblongis crassiusculis glaucis; foliis maturis petiolatis oblongo-lanceolatis vel falcato lanceolatis, 7-13 cm. longis, 1-5-2 cm. latis, venis indistinctis, venis secundariis et costa 30-40° orientibus; inflorescentia axillari umbellis 5-7 floribus, pedunculo communi 7-10 mm. longo, pedicellibus gracilibus 4-5 mm. longis; alabastris plerumque operculo brevi acuto calycis tubo ca equilongo; antheris latovatis per fissuras laterales aperientibus; loculamentis magnis; fructibus glaucis semi-ovatis vel leniter campanulatis truncatis aliquando apice leniter contracto 5-7 mm. longis ca 5 mm. diameтро; valvis leniter exsertis vel inclusis.

A small ironbark of glaucous appearance, with a rather deeply-furrowed dark-grey bark, deepening to lead coloured. Timber (only one small specimen seen) inclined to pale red, close-grained and very hard.

Juvenile leaves.—Those available are not very satisfactory. They are inclined to broadish oblong, are obtuse, shortly petiolate, moderately thick and glaucous, more or less undulate, 7-8 cm. long, 2 cm. broad. Intramarginal vein close to the edge. venation somewhat obscure, the secondary veins making an angle of 35-45 degrees with the midrib.

Mature leaves petiolate, thickish, moderately glaucous, dull, the same colour on both sides, oblong-lanceolate to falcate-lanceolate, 7 to 13 cm. long, 1-5 to 2 cm. broad, intramarginal vein very close to the edge, venation indistinct, the secondary veins making an angle of 30-40 degrees with the midrib.

Inflorescence axillary, or occasionally somewhat racemose, 5 to 7 in the umbel, the common peduncle slender, slightly compressed to almost terete, 7-10 mm. long, the pedicels slender, 4-5 mm. long. Buds usually elongated, with a short acute operculum about the same length as the calyx-tube; in some forms it is shorter. Anthers broadly ovate with lateral slits, the cells large, also the dorsal gland. Floral disc represented by a very thin membrane lining the calyx-tube.

Fruit glaucous, semi-ovate to somewhat campanulate, truncate, usually 4-celled, sometimes slightly contracted at the top, and gradually tapering into the slender pedicel; valves short and broad, slightly exerted or enclosed, 5-7 mm. long, about 5 mm. in diameter. Capsular disc somewhat obscure, usually represented by a slight thickening of the discal lining at its junction with the somewhat persistent staminal ring. In common with the ironbarks and boxes, the capsular disc of this species is not very well developed.

The name proposed is in honour of Cyril Tenison White, Government Botanist of Queensland, whose distinguished services to the botany of his State are well known.
RANGE.

It is confined to northern and central Queensland, so far as we know at present. Following are localities:—Burdekin River, an old specimen from F. Mueller, mixed with *E. crebra*; at 1,400 feet, Prairie, 30 miles east of Hughenden. An ironbark looked upon as a large-fruited form of *E. crebra*. Mature leaves (which are more or less glaucous) and fruits alone available, but it appears to be fairly typical of the species (R. H. Cambage, No. 3,955, 1913); Berricania, central Queensland, on the road between Muttaburra and Prairie. A small ironbark (C. T. White, April, 1919); Tower Hill, small ironbark, very common (No. 16, same collector and date); common about Berricania, J. S. Swanson, September, 1920 (C. T. White, No. 17); "Ironbark," with slightly smaller fruits, The Plains, Prairie (J. R. Chisholm, August, 1920).

AFFINITIES.


Both species have glaucous foliage, but the leaves of *E. Staalgeriana* are usually broader and shorter, and strongly lemon-scented, while the fruits are also smaller and slightly different in shape.


The leaves of both species are thickish, but the glaucousness of *E. Whitei* readily distinguishes it from *E. drepanophylla*. It also differs from the latter species in the inflorescence, which is usually axillary, or when terminal, consisting of 2–4 umbels, and in the shape of the fruit.


Both species are typical ironbarks, but *E. crebra*, even in districts where both species are found, appears to be a much larger tree with thinner and greener leaves and smaller buds and fruits.


This is also a medium-sized ironbark, and is probably a slightly larger tree than *E. Whitei*, with thin, green leaves, and somewhat globose fruits, with the valves well exserted, and with a more strongly developed capsular disc than that of *E. Whitei*. 
DESCRIPTION.

CCCLXVI. E. Dongarraensis, Maiden and Blakely.


White Gum parva Mallee similis, 20-25 feet alta; foliis junioribus leniter glaucis late-ellipticis ad ovatis, petiolatis 3-5-8-5 cm. longis, 3-5-6-5 cm. latis; venis mediocriter distinctis, vena peripherica a margine remota, venis lateralibus remotis e costa 45° orientibus; foliis maturis crassis pallide viridis obscuriusculis angusto vel late-lanceolatis 7-5 cm.-12 cm. longis 1-5-3 cm. latis; venis obscuris e costa 45° orientibus; inflorescentia axillari, pedunculis compressis floribus breviter pedicellatis 5-9 capitulo; alabastris glaucis clavatis; operculo hemispherico calycis tubo turbinato breviore; fructibus pyriformi-cylindraceis truncatis 10 mm. longis, 6 mm. latis 4-locularibus, valvis insertis.

A slender white gum, ribbony at the butt, 20-25 feet high, with a trunk 4 inches in diameter. Wood very tough, a little brown at heart. (Only one clump was seen, and a fuller note will be found at p. 372.)

**Juvenile leaves** broadly ovate to ovate-elliptical, with a rather long, semi-terete peduncle, 3-5 to 8-5 cm. long, 3-5 to 6-5 cm. broad, slightly glaucous (the somewhat compressed internodes very glaucous), rather thick and rough, with numerous slightly raised oil-glands, and the minute reticulate veins. Venation moderately distinct, intramarginal vein distant from the edge, lateral veins rather distant, approximately forming an angle of about 45 degrees with the midrib; midrib prominent beneath, indistinct above.

**Intermediate leaves** slightly glaucous, broadly cordate-lanceolate to obliquely lanceolate, a few rounded-deltoid, 5-9 cm. long, 5-7-5 cm. broad, the petiole terete, sometimes exceeding 2 cm. long. Venation moderately distinct, intramarginal vein somewhat wavy, and here and there 3-4 mm. from the edge, lateral veins making an angle of about 45-50 degrees with the midrib.

**Mature leaves** thick, pale green, dull, narrow to broad-lanceolate, 7-5 to 12 cm. long, 1-5 to 3 cm. broad, venation obscure, the intramarginal vein usually confluent with the edge, lateral veins obscure, making an angle of about 35-40 degrees with the midrib.

**Inflorescence** axillary, the common peduncle compressed, gradually expanding upwards, 10-15 mm. long, supporting a head of 5-9 flowers on short, thick pedicels. Buds glaucous, clavate, including the pedicel 11 mm. long; operculum hemispherical, often with a small umbo, many times shorter than the calyx-tube, wrinkled and more
or less ribbed, about 4 mm. in diameter. Anthers ovate-emarginate, opening in longitudinal slits, with a prominent dorsal gland. Flora disc forming a thin, dark carnosus lining around the calyx-tube, and extending for a short distance over the top of the ovary, which is much paler in colour.

**Fruit** pyriform to cylindrical, truncate, gradually diminishing into the short, thick pedicel; 10 mm. long, 6 mm. broad, the rim sharp and sloping inwards, 4-celled, the valves rather short, all enclosed. Capsular disc forming with the staminal ring a slightly thickened oblique band around the inner rim of the calyx-tube; staminal ring present. Seeds not seen.

---

**RANGE.**

It has only been seen at Dongarra, in Western Australia, up to the present. Dongarra is a railway station on the coast, 275 miles north of Fremantle, and 43 miles south of Geraldton.

In Part XXXVIII, p. 222, under *E. dumosa*, I made the following statement from my notebook, made in 1909, when standing in front of the trees:—"At Dongarra, not far from the beach, is a dense growth of slender white gums, ribbony at butt, which reminds one of dense Mallee, but not true Mallee, 20-25 feet high, trunk 4 inches diameter. Wood very tough, a little brown at heart. Operculum a little ribbed. Broad, coarse suckers; glaucous buds. It is very close to the typical *incrassata*, certainly a connecting link."

---

**AFFINITIES.**


It seems to be more of a white gum than *E. dumosa*, and perhaps a somewhat larger type of mallee, but this is not certain. It is also more glaucous, especially in the juvenile leaves and buds. The operculum is also shorter and the fruit larger and more pyriform.

2. With *E. conglobata* (R.Br.) Maiden. See Part IV, p. 100, also Part LVI, p. 274.

It seems to resemble *E. conglobata* in its mallee-like habit, but the stems are straighter and whiter. The juvenile leaves of both species are glaucous, but those of *E. Dongarraensis* are considerably coarser. In buds and fruits both species are easily separated.


The juvenile leaves and the anthers of *E. incrassata* and *E. Dongarraensis* are somewhat similar, and they appear to be the only botanical characters upon which an affinity can be based. The juvenile leaves are, however, much broader and more glaucous than those of *E. incrassata*. 
CXLI. *E. maculosa* R. T. Baker.

Synonyms.

See those enumerated at Part XXVII, p. 126, together with *E. Gullicki* Baker and Smith, "Research on Eucalypts," ed. ii, p. 128, with figures of two partial umbels of three and two fruits respectively, and an English description, but without the Latin description, as required by botanical law.

I have received specimens of the type from Mr. Baker, from which I have caused to be prepared the drawing (the first made) to be found in Plate 278. If any of my readers can indicate in what way *E. Gullicki* differs from the exhaustive series of figures of *E. maculosa* depicted at Plate 112, and described at pp. 125–129 of Part XXVII, they will further the interests of science. *E. Gullicki* "is fairly well distributed over the Blue Mountains, N.S.W.," no other locality being given.

Mr. Baker says it differs from *E. maculosa* in the shape of the abnormal (juvenile) leaves and fruits, as well as chemical properties of the oil. He also says—"Abnormal (juvenile) leaves lanceolate, rarely ovate, usually under 3 inches long, almost sessile, mucronulate or acute, seldom obtuse, venation netted, oil glands prominent." I have not seen strictly juvenile leaves; those supplied are intermediate forms.
DESCRIPTION.

CCCLXVII. E. Staerii Maiden.


E. Staerii Maiden MSS. is described (except the Latin) in Kessell and Gardner's "Key to the Eucalypts of Western Australia," p. 110 (1924), with my concurrence, and it will be sufficient to transcribe it with some alterations and additions.

 Arbor erecta 40–50' alta, trunco robusta ca 2' diametro, ramulis patentiusculis; cortice cinereo brunneo crasso longitudinaliter sulcato, parte exterio in stratis latis secedente, ligno pallido-flavo; foliis junioribus tenuibus sessilibus ovatis pallidoviridibus, costa conspicua; foliis maturis crassis ovato-lanceolatis vel lanceolatis, 11 cm. longis, 4 cm. latis, vena peripherica a margine crassato remota; pedunculis axillaribus ca 2½–3 cm. longis planis parte superiore dilatata umbellam 4–8 floram in pedicellis ca 5 mm. longis, funentibus; calycis tubo obconico vel angusto-turbinato, operculo obconico, antheris reniformibus, fructibus globosis ca 2-5 cm. diametro, margine prominenti capsula leniter depressa, valvis obtusis inclusis.

"Albany Blackbutt." An erect tree of 40–50 feet with a stout trunk and rather spreading branches. Trunk to 30 feet and 24 inches diameter. Bark dark greyish-brown, thick and longitudinally fissured, the fissures more or less whitened or yellowish-grey, the outer bark shedding in broad flakes not as stringy as those of the Jarrah (marginata), but not friable as the Blackbutt (patens) bark. It is intermediate between the two in character and appearance. Timber pale, yellowish. Branches crooked. The inner flakes of bark reddish.

Juvenile leaves not seen in quite the youngest state, ovate, thin, sessile, pale green, with conspicuous midrib and purple-red nerves, the secondary veins spreading and irregular, the intramarginal vein distant from the edge. Obtuse and roughly 2 inches (5 cm.) long by 1¾ inch (3 cm.) wide. Mature leaves ovate-lanceolate to lanceolate, thick and rigid, on very angular branchlets and with flattened twisted petioles, acuminate, pale green, with a thick yellowish midrib and fine roughly parallel spreading veins; the intramarginal one at a distance from the thickened margin. Peduncles axillary, about 1 inch (2-5 cm.) long, stout and flattened, widened near the top, supporting an umbel of 4–8 rather large flowers on fairly long angular pedicels. Calyx-tube obconical or narrowly turbinate, tapering into the pedicel. Operculum
conical, slightly spreading at the base and forming a prominent angle with the calyx-tube. Filaments whitish; anthers kidney-shaped, opening in upwardly confluent slits. Fruits globose, about 1 inch (2-5 cm.) in diameter, with a prominent rim and slightly sunk capsule with obtuse included valves.

The name commemorates John Staer, seed-collector, from whom I originally received specimens.

RANGE.

Confined to south Western Australia (at no great distance from King George’s Sound), so far as we know at present. Occurs on sandy, usually sub-swampy flats near Albany, extending over the sandy places to Denmark and near the Kent River; flowers yellowish-white, flowering in November.

AFFINITIES.

1. With *E. marginata* Sm.

Compare the figure of *E. Staerii* (as *E. marginata* var. *Staerii*) on Plate 210, with that of *E. marginata* on Plate 230. The leaves are much the same, but the fruits are different, in the former being larger, globose, and, when ripe, with exsert valves and a wider rim, those of the latter being pyriform, and with slenderer peduncles and pedicels. Mr. Gardner’s opercula of *E. Staerii* are conical, while those of *E. marginata* are very much more elongated. The differences in the two barks have already been described, while the two species are sharply separated by the pale-coloured wood of *E. Staerii* and the well-known deep red, heavy wood of the latter.


The timbers of the two species are pale-coloured, and but of little economic value; the fruits are of about the same size and shape, but those of *E. Todtiana* have smaller apertures and thinner rims. The latter species is scarcely found south of Perth, while the home of *E. Staerii* is the King George’s Sound district. The anthers of both species, are, however, quite different. The affinities of the two species require to be further worked out.
DESCRIPTION

CCCLXVIII. E. Badjensis, de Beuzeville and Welch.

In Journ. Roy. Soc., N.S.W., lix, 177, with Plates VIII, IX (1924).

Without a Latin description, as decreed by the International Congress of Botanists (Vienna Meeting, 1905), and binding on all loyal botanists. I have always endeavoured to obey the decisions, and because we are so far from Europe and some of us are ignorant of them, I have done my best to make them known. As I am but an indifferent Latinist, I sympathise with those who may shirk the rule referring to Latin descriptions, and I would welcome the arrival of Latin students who are also familiar with botanical terminology, and who would relieve the botanist of his Latin descriptions on payment of a reasonable fee per species. Perhaps a guinea a species, for those of average length, might be considered fair.

A large forest tree, locally known as "Gully Ash," attaining a height of 100 feet or more. Bark persistent about half-way up the trunk, smooth above. Abnormal leaves opposite, lanceolate, at first sessile, cordate, later shortly petiolate, up to 6 inches long and 1 inch wide. Normal leaves narrowly-lanceolate, 4-8 inches long, 5-9 lines wide, tapering to a point, not shining, of equal colour on either side; lateral veins not usually prominent, inclined at an angle of 30-45 deg. to the midrib, intramarginal vein somewhat looped and removed from the edge. Peduncles axillary, 1-2 lines long, flowers sessile, in threes. Calyx tube under 2 lines long, 1½ lines wide; operculum conical, acute or slightly acuminate, about 1 line in length. Fruit conical or slightly conico-turbinate, rim rounded; valves strongly exserted; under 3 lines long and 2 lines in diameter.

Range.—Type specimen is from the eastern fall of the Main Dividing Range, at an elevation of about 4,000 feet, 3 miles south of the Big Badja Mountain, north-easterly from Cooma (N.S.W.) It has been observed also from Mount Darragh, near Cathcart in the south, as far north as the Tallaganda State Forest, at high elevations.

Affinity.—This species is closest in external morphology to E. viminalis, which occurs in the same district. The fruits are, however, consistently smaller and not pedicellate, as usually obtains in that species, nor are they hemispherical. The operculum is short and broad, conical, acute or slightly acuminate, not obtuse, egg-shaped, as in E. viminalis. Other differences will be noted under field and anatomical characters.

Field Characters.—It differs from E. viminalis in several very important field characters, and cannot readily be confused with that species, with which it is often in association. E. viminalis, whether smooth-barked from the ground up, or rough-barked at the butt, is white above, whereas the rough bark of the proposed species more closely resembles that of E. goniocalyx; the upper smooth portion is greenish in colour, approaching that of E. stellulata. Moreover, E. viminalis in the same locality possesses a typical "candle bark," the decorticated portion hanging in long ribbons, which does not occur, as far as our observation has gone, in this species. The bark possesses a very marked "piney" odour when cut, due to the very large development of oil glands.

The leaves are always narrow (Mallee-like), enabling this species to be picked out readily from E. viminalis, which, growing in association, possesses broader leaves which are a much brighter green in colour. This character alone is sufficient to separate the trees when seen together in the field. These bark and leaf characters are constant throughout the entire range. Another interesting point is that, to our knowledge, manna has never been found beneath this tree in marked contrast to E. viminalis, the Manna Gum of the Monaro.
Anatomical Details.—The timber is pale reddish in colour (heart-wood), sap-wood wide, light coloured, with distinct growth rings, and is characterised by small black stains, which are usually under 1/4-inch in vertical height, and 1/2-inch in tangential width, but extending radially for several inches (Similar stains have been found in the woods of *E. Sieberiana* and *E. nitens*, but are not usual.) Branched septate fungal hyphae have been found in the discoloured areas, and the wood parenchyma, medullary rays and also some of the parenchymatous cells possessed darkened contents. The fungus has not been identified. Largely owing to the presence of this black stain, the timber has so far found little use, especially since large supplies of the Brown Barrel, *E. fastigata*, are usually available in the same district. The wood is of moderate weight for a hardwood, and should be suitable for all building purposes, though its durability has yet to be proved. From the specimens seen it is probable that careful seasoning will be necessary, since there was evidence of “wash-boarding,” probably due to cell collapse. This defect is, however, common in many of the lighter weight Eucalypt woods.

AFFINITIES.

Besides the affinities quoted by the authors, *E. Bauerleni* F.v.M., described in Part XXIX. p. 184, and Part LXV, Plate 267, fig. 3, seems to be more closely related to *E. Badjensis* than *E. viminalis*. Both species are Gums with more or less smooth bark extending to the topmost branches, and both have pale pink or pale reddish timber. I have not seen very good juvenile leaves of either species, but, judging from what I have seen, there is not much difference between them. The juvenile leaves of *E. Badjensis* appear to be somewhat shorter and more acute than those of *E. Bauerleni*, but as the juvenile leaves of *E. Badjensis* are not fully developed, one must reserve judgment until perfect specimens are available. The buds and fruits of both species are in threes, and the buds are angular in both, but the buds of *E. Badjensis* are smaller and less acute than those of *E. Bauerleni*. The fruits of both species are very much alike, in fact, the fruits of *E. Badjensis* appear to be a small edition of the fruits of *E. Bauerleni*, both in shape and sculpture. Up to the present we know but very little about the habit of *E. Bauerleni*; it is an imperfectly known species.
DESCRIPTION.

CCCLXIX. \times E. Kalangadooensis, Maiden and Blakely.


(It is suggested that this may be a hybrid, of which *E. rubida* may be a parent.)

*Arbor* alta cortice laevi; foliis maturis alternatis petiolatis angustis vel latiusculo-lanceolatis, leniter undulatis, supra subtusque nitentibus, 8-14 cm. longis, 1.5-3 cm. latis; venatione distincta, venis lateralibus e costa 30-40° orientibus: inflorescentia in umbellis simplicibus et axillaribus, pedunculo 10-15 mm. longo, 4-10 flores subsessiles ferentes; calyce turbinato operculo rostrato æquilongo; antheris versatilibus parallelibus dehiscentibus; disco florale interiorem atro-carnosam calycis tubi formante et ad ovarii basin extendente; fructibus turbinatis vel semi-ovatis disco distinctoro coronato et 3-5 valvis acutis valde exsertis.

A tall tree, with a smooth bark (Prof. J. B. Cleland, M.D., and Dr. J. A. Rolland).

**Juvenile leaves** not seen in the earliest stages, but two in the opposite stage on a fruiting branch are shortly petiolate, broadly lanceolate, obtuse, coriaceous, glossy on both sides, 8 cm. long, 4-5 cm. broad, the margin slightly thickened. Venation prominent, the lateral veins few and distant, making an angle of 35-45 degrees with the midrib; intramarginal vein distinct and distant from the edge.

**Mature leaves** alternate, petiolate, narrow to broadish-lanceolate, shortly acute to acuminate, somewhat undulate, glossy on both sides, 8-14 cm. long, 1.5-3 cm. broad. Venation distinct, intramarginal vein distant from the edge, lateral veins making an angle of 30-40 degrees with the midrib.

**Inflorescence** in simple axillary umbels, the 10-15 mm. peduncle bearing 4-10 shortly pedicellate flowers. Buds 10-12 mm. long, 5-7 mm. in diameter; calyx turbinate, about the same length as the rostrate operculum. Anthers versatile, opening in long parallel slits, the broad dorsal gland about half the length of the anther. Floral disc forming a dark carnose lining around the inner portion of the calyx-tube and extending to the base of the ovary, the ovary itself conical and slightly exceeding the rim of the calyx-tube in the newly spent flowers.

**Fruit** turbinato to semi-ovate, crowned by a well defined disc, and 3-5 acute white valves protruding well beyond it, 10 mm. long, 7-8 mm. in diameter. Capsular disc thick, convex, extending about half way over the valves, but quite free from them, the rim of the calyx-tube and the staminal ring usually well defined at the base of the disc.
RANGE.

This species has been found only in South Australia, near the township of Kalangadoo, which is situated between Grey Town and Kongart, and close to Mount Burr.

AFFINITIES.


   From which it appears to differ mainly in the apparently broader juvenile leaves, larger and more rostrate buds, and in the considerably larger and more turbinate fruit, with its thicker and more uniform disc. In typical *E. viminalis* the buds are in threes, but there are sometimes as many as six in the multiflowered form. In the present species ten seems to be the greatest number, and they are much larger than any of the buds of the multi-flowered form of *E. viminalis* that we have seen so far.

2. With *E. rubida* Deane and Maiden, figured in Part XLIX, p. 268.

   The affinity with this species appears to be in the broad juvenile leaves and in the nature of the bark and timber. But as we have not seen a good set of juvenile leaves of *E. Kalangadooensis*, a proper comparison in this direction is not possible at present.


   Both species no doubt have much in common in general appearance, also in the nature of the bark and in the adult leaves, and possibly in the juvenile leaves, and also to some extent in the buds and fruits. The buds are, however, much smaller in *X E. McIntyrensis*, also the fruits, which are more hemispherical.
Mallee parva 2–6' alta, caulis tenuibus e basi lignea orientibus, cortice tenui rubro-brunneo; foliis junioribus tenuibus glaucis sessilibus cordatis vel ellipticis mucronatis 12–27 mm. longis, 12–22 mm. latis, plurimis paribus oppositis; venatione mediocriter distinctis, venis secundariis e costa 45–60° orientibus, vena peripherica margini approximata; foliis maturis tenuibus pallido-viridibus utrimque nitentibus, petiolatis, oblongis vel angusto-lanceolatis, 4–7 cm. longis, 18–28 mm. latis; venatione distincta, venis secundariis e costa 40–45° orientibus, vena peripherica margini approximata; inflorescentia axillari, pedunculo communi flores 5–7 distincte pedicellatos ferentes; alabastris clavatis 4 mm. longis, operculo obtuso calycis tubo æquilongo; antheris adnatis per poros semi-terminales dehiscentibus; style gracili persistente apice torta; fructibus semi-ovatis, truncatis 3–4 mm. longis, valvarum trium apicibus acutissimis e margine capsular exsertis.

A dwarf Mallee of 2 to 6 feet in height, stems thin, straggling, from a woody stock, the bark thin, warm red or reddish-brown, with small purple patches of bark when collected.

Juvenile leaves thin, conspicuously glaucous, sessile to slightly stem-clasping, opposite for an indefinite number of pairs, the lowest pairs orbicular, emarginate, oblong, cordate to elliptical, the upper ones mucronate or acuminate at the apex, 12–27 mm. long, 12–22 mm. broad. Venation moderately distinct, the secondary veins making an angle of 45–60 degrees with the midrib; intramarginal vein almost obscure and usually very close to the edge.

Intermediate leaves glaucous, alternate, sessile to very shortly petiolate, oblong to broadly lanceolate, with a short acuminate point, 27–60 mm. long, 18–28 mm. broad. Venation distinct, the secondary veins making an angle of 45–60 degrees with the midrib; intramarginal vein somewhat distant from the edge.

Mature leaves thin, light green and shining on both sides, petiolate, oblong to narrow-lanceolate, often with a long acuminate point, 4–7 cm. long, 5–10 mm. broad. Venation distinct, the secondary veins making an angle of 40–45 degrees with the midrib; intramarginal vein confluent with the nerve-like margin.

Inflorescence axillary, the common peduncle slender, slightly compressed, supporting 5–7 distinctly pedicellate flowers. Buds, including the pedicels, 8–10 mm. long, clavate or nearly so, operculum obtuse, conical, about the same length as the calyx-tube. Anthers (immature) adnate, opening in semi-terminal pores or on the
shoulders with a small terminal gland between them. Style somewhat persistent, slender, spirally twisted at the top, developing with the capsule and eventually splitting at the base into three needle-like divisions when the capsule ripens. Floral disc forming a dark lining around the inside of the calyx-tube and apparently free from the top of the ovary.

**Fruit** shortly campanulate to semi-ovate, truncate, 3-4 mm. long, 4 mm. in diameter at the top, valves three with very fine points protruding well beyond the rim of the fruit. Seeds not seen. Capsular disc slightly thickened, usually exceeding the rim of the calycine ring.

---

**RANGE.**

Only known at present from Western Australia, at Harrismith, on rises, in sandy or sandy-gravelly soil (C. A. Gardner, No. 2,113, 6th March, 1924).

---

**AFFINITIES.**


This proposed new species appears to be its closest affinity, especially in the shape of the juvenile leaves, but those of *E. uncinata* are much thicker and greener. The adult leaves are also thicker and more rigid (often very rigid), while the buds and fruits are sessile, and more numerous in the umbel, and also quite different in shape. The white juvenile leaves appear to be a distinctive feature of *E. albida*. They are as white as those of *E. globulus* and *E. rubida*.


It seems to have the general appearance of this species, but the mature leaves are broader and less rigid, while the juvenile leaves are very glaucous and twice as broad as those of *E. leptophylla*. The buds and fruits are also somewhat similar in both species; they are pedicellate, but the operculum of *E. leptophylla* is nearly always more or less rostrate, and the fruit is thick, with scarcely exserted valves.


The mature leaves of both species are very much alike, but those of *E. angusta* are thicker and more rigid. Both species are also closely allied in the anthers, but the buds and fruits of *E. angusta* are coarser and different in shape to those of *E. albida*. D
DESCRIPTION.

**CCCLXXI. E. biangularis, Simmonds, n.sp.**

Arbor altitudinem 70' vel raro 100' attinens; cortice arido decidente, trunco inde albo maculatove. Foliis juvenilibus cordatis sessilibus; foliis adultis petiolatis; punctis oleariis plurimis et insigniter pellucidis. Umbellis axillaribus; pedunculo $\frac{1}{2}$ ad $\frac{3}{4}$ longo tres sessiles flores ferente. Operculis depressis; antheris cuneatis paralleleter fere aperientibus. Cupulis immaturis valde compresset et angulatis. Cupulis maturis $\frac{3}{4}$ longis $\frac{5}{8}$ latis, plerumque biangularibus; orificio externus anulato intus in formam crateris depresso, valvis parvis et omnino inclusis.

Species or hybrid growing in five widely separated localities in New Zealand, as follows:—Teddington, Banks Peninsula, tree 100 feet high with widely spreading branches and thick bole; Botanic Gardens, Christchurch, near river, tree 80 feet high with bole 2 feet in diameter; Invercargill, vigorous young tree; Auckland Isthmus, three trees now about 40 feet high; Bulls, two or three young trees.

Dead bark non-fibrous, deciduous from stem and branches.

Leaves of seedlings and stump sprouts cordate and sessile; from Christchurch tree glaucous, from other trees clear green.

Leaves of adult trees petiolate, about 6 inches long, with numerous remarkably pellucid oil dots.

Peduncles axillary, about $\frac{1}{2}$ inch to $\frac{3}{4}$ inch long, compressed and angular, each carrying normally three flowers. Buds with low cap, sessile, compressed so that the two outer ones become strongly biangular. Stamens inflexed in bud; anthers cuneate and versatile, cells opening with nearly parallel slits.

Ripe seed-cups goblet-shaped, two outer ones strongly biangular, $\frac{1}{4}$ inch to $\frac{8}{8}$ inch wide by $\frac{3}{4}$ inch deep, double rimmed with outer rim sharp and prominent; orifice crater-like; valves 3 to 5, small and deeply sunk. Buds and seed-cups from Christchurch tree glaucous, from all other trees brown; seeds without appendage, many not fertile.

The Teddington tree and the Christchurch tree both produce seedlings showing transit to *E. globulus*; but both are growing in close proximity to fruiting specimens of *E. globulus*, so that the state of the seedlings may be due to hybridism. The Auckland trees were grown from seed imported from Tasmania under the name of *E. urnigera*, and so far there is nothing about them to suggest that they are hybrids. The wide distribution of these several trees and their great difference in age forbid
any theory of a common origin in New Zealand. The most feasible theory is that there are or were in Tasmania parent trees from which the New Zealand specimens have all been separately derived. Whether these parent trees belonged to a distinct species or were themselves hybrids between *E. umigera* and *E. globulus* is a question the solution of which should be sought in Tasmania.

The above are Mr. Simmonds' own words. Following are our own, for which Mr. Simmonds is, of course, in no way responsible.

We forwarded a specimen of *E. biangularis* to Mr. L. G. Irby, Conservator of Forests, Hobart, who stated that he had not encountered this particular form in Tasmania. Mr. Irby also asked Mr. L. Rodway, Government Botanist, Tasmania, for an expression of opinion, and the reply, addressed to Mr. Simmonds, was as follows:

"Mr. Irby desires me to reply to your letter of the 22nd instant. Your specimen appeals to me as an extreme form of the very variable *E. umigera*. I have never found its exact counterpart in Tasmania, but I have a specimen taken from a tree growing at Combe Royal, Scotland, which is identical with it. This was a tree about eighty years old and grown from seed gathered on Mount Wellington, Tasmania. I have a specimen also which is from a tree growing at Lord Balfour’s seat, Wethemstone, whose history is the same, but whose form is about the reverse. Little bits of flowers and fruits. I have another specimen from a tree on the slopes of Mount Wellington, with almost spherical fruits and long (9 inches) linear leaves. My experience with some of our Eucalypts is that they vary considerably according to edaphic and climatic conditions."

**AFFINITIES.**

It may be desirable to refer to *E. globulus*, Part XVIII, p. 249, Plate 79, figs. 1-12.


   The buds and fruits of both species are in threes, and they are also pedicellate, but the pedicels are more strongly angular in *E. biangularis* than in *E. umigera*.

2. With *X E. pseudo-globulus* (Hort) Naudin, described in Part LII, p. 78.

   This hybrid species, like *E. biangularis*, is one in which the buds and fruits are in threes. The buds, however, differ from those of *E. biangularis* in the quadrangular pedicel and in the verrucose operculum, and the morphology of the fruits, like the operculum, is of the *E. globulus* type.

3. With *X E. Insizwaensis* Maiden, described in Part LII, p. 82.

   This species is also a hybrid with the floral characters of *E. biangularis*, but the buds are sessile, and the fruits are more cylindrical.
NATURAL HYBRIDS:

(See Part LIII, p. 107.)

E. affinis, E. hybrida, E. Peacockeana:

The Artificial Production of Vigorous Trees by Hybridisation. Effect of Rapidity of Growth on Timber.)

At Part XII, p. 97, I refer to a tree collected by the late Mr. J. E. Carne at Copeton, parish of Dingo, not far from Tingha, county of Murchison, New South Wales, in 1909.

In 1912 Mr. Forest Guard Lance B. Peacocke found the same plant, and furnished additional specimens and particulars. It is a tree with a Box-bark, known locally as "White Ironbark" or "Peppermint." It has a long, straight, sound barrel; timber rather pale in colour, is a free splitter and an excellent milling timber. It is scarce; he has not seen it growing abundantly anywhere; in fact, he has not seen much of it except in the locality mentioned.

Having given further attention to the specimens, I attribute them to E. affinis, a species which partakes of the characters of E. Caleyi and E. albens. It is not quite typical, but its paler timber of good quality removes it further from E. Caleyi.

When referring to E. hybrida under "Seedlings" (not yet published), I draw attention to the fact that on the evidence of the seedlings, it does not appear possible that the species can have E. paniculata and E. hemiphtoia for its parents. As there seemed to be a good deal of evidence as to the origin suggested, the incident will make a botanist careful in regard to such surmises.

CCCIII. x E. Peacockeana, Maiden.

(See Part LIII, p. 113.)

Following are additional particulars concerning this reputed natural hybrid, from Mr. Lance B. Peacocke:—

I forward you further specimens of E. Peacockeana, collected about 3 miles east of Nullamanna (a township 11 miles north of Inverell) in the parish of Nullamanna, county of Arrawatta. All the above are from one and the same tree, which apparently does not differ from the Elsmore specimen previously forwarded. This species appears to flourish in rich alluvial black soil flats, as well as in the hard trappean formations, a most unusual feature in Ironbarks. The tree from which the specimens now forwarded were gathered was growing in black basaltic alluvial on the fringe of a trap ridge, upon which stands a forest of E. crebra; the species immediately surrounding it was E. melliodora, with E. albens in the near vicinity.
The Artificial Production of Vigorous Trees by Hybridisation.

Although written without Eucalypts in view, a paper bearing the above title by Dr. Augustine Henry, Lecturer in Forestry in The University of Edinburgh, in the London “Quarterly Journal of Forestry” for 1921, is worthy of attention by Australian foresters, if only because of the fact that most of the Algerian and New South Wales hybrids are reputed to be especially vigorous, and to possess specially durable properties in their timbers. The following extract, showing the scope of the paper, may be sufficient for my present purpose:—

For several years the author has been making experiments in the production of new trees by hybridisation in the hope of obtaining fast-growing kinds that would produce timber rapidly. A considerable number of such trees has occurred accidentally, and among them may be mentioned the Lucombe Oak, the Huntingdon Elm, the Black Italian Poplar, the Cricket Bat Willow, and the London Plane. All these show the striking feature of first crosses in the difference of the rate of their growth from that of the parent species. These hybrids of the first generation, in trees as in other plants, are remarkable for their size, rapid growth, early and free flowering, the ease with which they can be multiplied, and, in all probability, their comparative immunity from disease. Impressed with these facts, the author urged in 1910 that the artificial production of trees by crossing was a new and important field of research.

Effect of Rapidity of Growth on Timber.—It is a popular belief that fast grown timber is necessarily soft and comparatively worthless. This is a fact in most conifers; but in one class of broad-leaved trees, the wood of which is characterised by large pores, in the inner part of the annual ring, the contrary is true, as the faster the timber of these trees is grown, the stronger and denser it becomes. This class includes Oak, Ash, Chestnut, Hickory, and Walnut, the species, in fact, that, par excellence, produce the most valuable timber.”

Oak grown in the Sydney district is inferior in quality, speaking generally, but the rapidity of growth requires investigation. As regards the quality of Eucalyptus timbers grown with various degrees of rapidity, we have practically no data at present.
DIELS'S LAW.

(See Part LVI, p. 303.)

"With regard to 'Diels's Law' (p. 305, Part LVI), Definition of Diels's Law—I have seen very striking examples of this in the typical E. cinerea in this district, perfectly juvenile form of foliage, as well as perfectly developed mature forms are usually found on one and the same tree—on young to very aged trees, sometimes both forms on one branch, and on both forms perfectly developed buds, flowers and fruits, which mature and ripen. I think the same may be said of E. neglecta.

"Regarding adventitious shoots, I once observed a remarkable thing on a Red Gum tree at Boisdale (near Maffra). A medium-sized E. tereticornis, in the full vigour of growth, and from a medium-sized branch, there came forth a sturdy stem, 2 or 3 inches in diameter, and about 3 or 4 feet long, which carried a rather dense head of large, quite ovate-shaped leaves, on short stiff petioles. These stiff green leaves were quite glabrous, and of the usual dark green colour of E. tereticornis, about 3 to 4 inches long and 2 to 2½ inches broad (so far as I could judge), but it was too high up for me to obtain a specimen. They stood out very conspicuously from the rest of the foliage, which was quite normal. It looked just like the branch of an entirely different species grafted into the tree. So far as I could see, this strange branch had neither buds nor fruits. The leaves bore no resemblance to the juvenile or sucker leaves usually associated with E. tereticornis." (Harry Hopkins, Bairnsdale, Victoria.)

E. aggregata, E. Dalrympleana, E. rubida, E. stellulata.—Examples from all these species were found at Marrangaroo, New South Wales, October, 1921, by Dr. E. C. Chisholm and W. F. Blakely.

I have seen specimens of E. albens from the Dubbo district, New South Wales (December, 1922), affording excellent illustrations of Diels's Law.

E. dives.—The coloured plate (LXXV) in Baker and Smith's "Research, &c.," 2nd edn., shows a young twig in flower, and may be a precocious seedling, or, more probably, an illustration of Diels's Law.


E. macrorhyncha. See also "Flowers and fruit on a 4-feet high stool-shoot. The fruit is nearly sessile on the preceding year's wood." Mount Evelyn, near Lilydale, Victoria, 1st January, 1922. (A. D. Hardy.)

E. urnigera Hook f.—"One specimen from Alma Tier, Tasmania, has the flowers upon a shoot while still in juvenile foliage." (L. Rodway.)
LIST OF COLLECTORS.


The botanical names are chiefly of those specimens examined by Bentham for the "Flora Australiensis." I have not altered these names, or the sequence of them.

Concerning Robert Brown's specimens, the numbers given before certain species, and the localities given after, are those found on the labels issued by J. J. Bennett on the occasion of the British Museum distribution in 1876. Additions have also been made under the names of Drummond, Sieber, Gunn, and a few others, from original labels seen by me.

Adamson—
E. macrorrhyncha, E. melliodora.

Armstrong—
E. tetrodonta.

Miss Atkinson—
E. eximia.

Babbage—
E. rostrata.

Backhouse—

Banks and Solander—
E. tereticornis, E. terminalis.

Baudin's Expedition—
E. ecorifolia, E. alba.

Baxter—
E. goniantha, E. doratoxylon, E. tetragona.

Beckler—

Bowman—
Behr—

E. leucoxylon var. minor, E. paniculata, E. uncinata, E. dumosa, E. rostrata.

Bidwill—

E. polyanthemos.

Brown (Robert)—

E. amygdalina, E. amygdalina var. (?) hypericifolia, E. Risdoni; 4,727, E. capitellata, Port Jackson; 4,725, E. piperita, Port Jackson; E. pilularis; E. marginata; 4,736, E. paniculata, Port Jackson; 4,754, E. hastatoma var. micrantha; E. pruinosa; 4,734, E. polyanthemos (E. subrotunda), George’s River; 4,731, E. bicolor (Bosistoana), “Port Jackson”; E. hemiphloia; 4,735, E. hemiphloia var. (E. purpurascens), Memory Cove; E. cneorijolia; E. siderophloia; E. siderophloia var. rostrata; E. drepanophylla, “North Coast”; E. longijolia; E. urnigera; E. microita; 4,746, E. robusta, Port Jackson; 4,751, E. botryoides, Port Jackson;

No number, E. dumosa var. (E. conglobata), Bays 9 and 10, South Coast, also Island VIII; E. incrassata; 4,748, E. dumosa or E. incrassata (E. aniceps), Kangaroo Island; E. megacarpa; E. Lehmanni; E. cornuta; 4,744, E. viminalis, South Coast, also without numbers, Bays 9 and 10, &c., South Coast; 4,737, E. tereticornis, Northumberland Islands; 4,738, E. tereticornis var. latijolia, Shoalwater Bay passage; E. platyphylla, E. resinijera; 4,792, E. doratorylon, South Coast; 4,788, E. grandijolia, “Islands A. and C., Carpentaria”; E. clavigera; E. tessellaris; 4,769, E. diversicolor, King George’s Sound; E. facunda; 4,782, E. setosa (E. hispida), North Coast, Carpentaria; 4,779, E. latijolia (E. compacta), North Coast, E. calophylla; 4,777, E. corymbosa, Port Jackson; E. dichromophloia; 4,776, E. eximia (E. nitida), Banks of the Grose; E. tetragona.

Not in B.Fl. (!)—


Bynoe—

E. perfoliata, E. pyrophora.

Caley—

E. piperita var. eugenioides, E. leucoxylon, E. polyanthemos, E. bicolor, E. siderophloia var. rostrata, E. longijolia, E. viminalis, E. resinifera var. grandiflora, E. macroita.

Collie—

E. goniantha, E. loxophleba.
Cunningham (Allan)—


Dallachy—


Drummond (James)—

These are Western Australian plants arranged in the sequence of Drummond’s own numbers. The numbers in brackets refer to the number of the collection, of which he made six. Some of the duplications of numbers are undoubtedly owing to bad copying of the original labels.


70 (3rd), E. falcata Turcz.; 70 (6th), E. erythrorygos F.v.M.; 70 (4th), E. pyriformis; 71 (3rd), E. goniathina Turcz.; 71 (4th), E. tetrapeta Turcz.; 72 (4th, 1848), E. patens Benth.; 73 (4th), E. brachypoda Turcz.; 74 (4th), E. occidentalis Endl.; 75 (4th), E. incrassata var. angulosa, according to B.Fl. iii, 231 (E. cuspidata Turcz. in some); No. 75 (1848) in some herbaria is E. tetragonon F.v.M.; 76 (4th), E. uncinata var. latifolia; 77 (4th), E. concord Schau.; 78 (4th), E. tetragonon F.v.M.; 81 (2nd), E. redunca Schauer; 82 (2nd), E. loxophleba Benth.; 83 (2nd and 4th),
E. cornuta Labill.; 84 (2nd), E. redunca; 85, E. marginata Sm.; 86 (2nd, also 5th Coll.), E. Drummondii Benth.; 87 (2nd), E. facunda Schau.; 97 (4th), E. donatoxylon; 150, E. calophylla R. Br.; 151 (of some sets), E. leptopoda, salmonophloia; 152 (4th), E. occidentalis; 183 (5th), E. platypus Hook.; 184 (5th), E. gracilis F.v.M.; 185 (5th), E. marginata; 186 (5th), E. uncina var. rostrata; 187 (5th), E. decurrea; 187 (5th), E. redunca var. angustifolia; 189 (5th), E. tetraptera; 188 (of some sets), E. leptopoda, salmonophloia; 230, E. incrassata var. angulosa.

Fitzalan—
E. pilularis var. aemencioides; E. hemiphloia var. ? parvi flora; E. Bowmani; E. drepanophylla; E. tereticornis; E. tessellaris; E. setosa; E. corymbosa.

Fitzroy—
E. platyphylla.

Fraser—

Gilbert—
256, E. pyriformis; 257, E. megacarpa; 270, E. cornuta; E. patens; 266, E. decurrea; 263, E. facunda; 271, E. redunca; E. ptychocarpa.

Gregory—
E. gomphocephala, E. pyrophora.

Gunn—
E. Risdomi var. clata; E. coccijera var. parvi flora.

The following numbers are Gunn’s own:

1,071, E. cordata; 1,072, E. Risdomi; 1,070, E. globulus; 411 and 1,076, E. coccijera; 1,109, 1,964, E. Risdomi var. clata; 1,074, E. urvigeria; 685, 1,083, 1,085, 1,086, 1,087, 1,090, 1,092, 1,097, E. viminialis; 1,080, 1,082, 1,084, 1,963, E. Gunnii; 1,297, 1,081, 1,088, 1,089, 1,093, 1,096, 1,097; 1,098, E. acervula Sieb.: 1,113, E. vernicosa; 25, 1,079, E. amygdalina; 684, 1,107, 1,108, 52, E. coriacea (684 is “Weeping Gum” of Norfolk Plains, Formosa, V.D.L.), (1,107, Grass Tree Hill, 1842); 1,095, 1,104, 1,106, 1,965, 1,966, E. gigantea; 1,099, 1,103, E. obliqua; 1,073, E. radiata (1 of Hooker); 1,077, 1,102, E. radiata; 1,112, E. radiata (2 of Hooker); 1,100, 1,110, E. radiata (4 of Hooker); (1,077, 1,102, 1,100 and 1,110 all appear to be E. Risdomi var. clata); 808 (aff. 1,073), E. nitida; 1,288 “Risdomi var.” “Grass-tree Hill, among grass-trees, October 12, 1840. I think this is hardly to be dist. from 1,112.”

Harper (C.)—
E. orbifolia.
Harvey—
  *E. uncinata*, *E. decipiens*, *E. tetraptera*, *E. gomphocephala*, *E. occidentalis*,
  *E. spathulata*, *E. decurrea*.

Henne—
  *E. pruinosa*, *E. clavigera*, *E. sotosa*, *E. terminalis*.

Herrgolt—
  *E. dumosa*.

Hill (W.)—
  *E. platyphylla*, *E. Stuartiana*, *E. corymbosa*, *E. terminalis*.

Hooker—
  *E. coriacea*, *E. amygdalina*, *E. Risdoni*, *E. coccifera*, *E. obliqua*, *E. cordata*,
  *E. globulus*, *E. urnigera*, *E. viminalis*, *E. Stuartiana*, *E. Gunnii*.

Howitt's Expedition—
  *E. brachypoda*.

Labillardiere—
  *E. macrocarpa*, *E. cordata*, *E. incrassata*, *E. cornuta*.

Leichhardt—
  *E. stellulata*, *E. coriacea*, *E. capitellata*, *E. melliodora*, *E. microrys*, *E. poly-
  anthemos*, *E. albens*, *E. Bowman*, *E. siderophloia*, *E. melanophloia*,
  *E. crebra*, *E. miniata*, *E. decalbata*, *E. saligna*.

Leschenault—
  *E. gomphocephala*.

Macarthur—
  *E. harmastoma*, *E. botryoides*, No. 91 of Paris Exhibition woods; *E. viminalis*.

Maxwell—
  *E. buprestium*, *E. gracilis*, *E. uncinata* and var. rostrata, *E. micranthera*,
  *E. decipiens*, *E. tetraptera*, *E. dumosa* and var. puncticulata and var. *E. rhodophloia*,
  *E. incrassata*, *E. grossa*, *E. megacarpa*, *E. Lehmanni*,
  *E. annulata*, *E. platypus* and var. nutans, *E. macranda*, *E. occidentalis*,
  *E. spathulata* var. grandiflora, *E. pachyloma*, *E. angustissima*, *E. rudis*,
  *E. patens*, *E. concolor* var., *E. goniantha*, *E. fulcata*, *E. olcosa*, *E. decurrea*,
  *E. doratoxylon*, *E. loxophleba* var. fruticosa, *E. redunca* var. angustifolia,
  *E. ficifolia*, *E. tetragona*.

McDouall Stuart’s Expedition—
  *E. brachypoda*.

Menzies—
  *E. marginata*. 
Milligan—
E. vernicosa.

Milne—
E. facunda.

Mitchell—

Moore—

Morton—
E. gracilis.

Oldfield—

Oldham—
E. vernicosa.

Preiss—
229, 242, 244, 251, E. marginata; 241, E. decipiens; 235, E. macrocarpa; 239, E. Preissiana; 227, E. Lehmannii; 238, E. cornuta; 228, 240, E. occidentalis; 252, E. radiis; 225, E. concolor; E. patens; 246 (and 248?), E. laxophleba; 231, E. facunda; 232, 234, 245, 247, E. redunda; 250, E. calophylla; 253, E. tetragona.

Robertson (J. G.)—
E. obliqua, E. capitellata var. latifolia, E. capitellata, E. dumosa, E. viminalis.
I have also seen No. 501, E. rostrata, and his 497, 498, 500, 503, all E. capitellata (Portland Bay).

Roe (J. S.)—
E. patens.

Sieber—
467, E. virgata Sieb.; 468, E. paniculata Sm.; 469, E. acervula Sieb., E. piperita (Bentham); 470, E. piperita var. paniciflora DC = E. coriacea A. Cunn. (Benth.), (also 377); 472, E. stricta Sieb., the type; 473, E. obtusiflora DC (Benth.), (E. rigid Sieb.); 470 and 473 (E. piperita
Labill. (?), are E. virgata; 474, E. pilularis DC non Sm. = E. viminalis (Bent.) is E. Macarthuri; 475, E. amygdalina var. radiata Sieb.; 475, E. paniciflora Sieb. ? according to Herb. Berol = E. amygdalina (radiata) = 604 Fl. mixta.; 476, E. crebra F.v.M.; 477, E. terminalis Sieb.; 477, E. persicifolia DC. is E. pilularis Sm.; 478, E. virgata Sieb. (in his handwriting), but really E. stellulata (label probably misplaced); 478, E. stellulata Sieb.; 479, E. eugenioides Sieb. scabra Dum. Cours. DC.; 480, E. robusta var. rostrata (DC), robusta (Benth.); 497, E. hamastoma var. micrantha DC. (DC.); 583, E. oblonga DC. (DC.) = E. piperita, E. hamastoma, etc., (Benth.); 593, E. persicifolia Lodd. var. β (DC.); 594, E. persicifolia Lodd. var. γ (DC.), E. multiflora Poir; 604, Fl. mixta, E. viminalis (? = E. radiata Sieb.); 606, E. pallens DC., E. albens or E. dealbata (Benth.), is E. obliqua L’Herit.; 617, E. ligustrina DC. = E. amygdalina? (Benth.) ; 623, E. punctata DC., see B. Fl. III., 242.

Thozet—
E. pilularis var. ? acmenioides.

Tozer—
E. pilularis var. acmenioides.

Stuart (1.)—
E. macrorrhyncha and var. brachycorys, E. leucorylon and var. pallens, E. melliodora, E. albens, E. crbra, E. dealbata, E. viminalis, E. rostrata, E. tereticornis var. brevifolia.

Victorian Expedition—

Walters—
E. virgata.

Waterhouse—

Whan—
E. coriacea and E. amygdalina.

White—
E. capitellata, E. piperita, E. saligna, E. resinifera.

Whittaker—
E. cosmophylla.

Wilcox—
E. tereticornis.

Wilhelmi—
E. virgata, E. capitellata, E. Behriana var. purpurascens, E. hemipholia, E. corynocalyx, E. dumosa var conglobata; E. oleosa.
A.—THE DESIRABILITY OF STUDYING EUCALYPTUS IN THE BUSH.

Preparation for Botanical Travel.
Aid in the Study of Geography.
Necessity for quoting the Name of a Collector.
Ecology.
Examination of Organs and General Appearance in the Bush.
The Aesthetic Aspect of the Genus.

PREPARATION FOR BOTANICAL TRAVEL.

As I have travelled a good deal in all the States, I am in a position to give my younger friends some practical advice (if they want it). I use the old-fashioned pocket-books, with an elastic band, and keep a separate pocket-book for each locality or district. Thus, for the Blue Mountains, New South Wales, I have several books, one for each collecting ground, e.g., Glenbrook, Blackheath. Every trip is dated, and sign-posts, mile-posts, and other indications of locality carefully recorded, as helping to indicate where specimens were found. I write only on one side of a page, so that there is always a blank one for a supplementary note. When I go on a trip to the same locality, the old note-book of that locality accompanies me, for one may supplement the material formerly obtained, and on a subsequent trip one always reads one's note-book with a wider knowledge. It is well to date the later observations. If one has published notes from a note-book, a vertical line through the passage thus used does not interfere with its legibility. If the note-book is carefully posted up as regards localities, it is often useful to inquiring friends who desire detail particulars from one who has actually trodden the ground. In our vast country, it is not surprising that details of this kind are often valuable. I have sometimes been to the Tourist Bureau of a State for details of a locality, and have failed to get the information I desired. This has seldom occurred, and, on my return, I have had the pleasure of furnishing information to the Bureau for the use of future travellers. In my early days I used to destroy my note-books by cutting them up for publication. I have long since abandoned this plan, as I find my notes, just as I wrote them down, always have a special value to me.

In 1909 I spent four months travelling widely in Western Australia, mainly to make the present work more complete. I provided myself with a large number of stiff cartridge papers, carefully cut to the size of 6½ by 5 inches. These fitted in my coat pocket, and the rigidity of the paper prevented creasing. Inter alia, I had a sheet for every species of Eucalyptus recorded for the State, including dubious records. Every locality was written out, together with a note of each matter to be inquired into under the species. It might be that the juvenile foliage, the fruit, the size of the tree, its habit, were uncertain or unknown. Another set of cards was used for localities
arranged in alphabetical order, with cross-references to the species concerned. Through the help of friends in Perth or in the country I cleared up many doubtful points, some of which dated from Drummond’s time. I made free use of red ink for underlining and cross-references. I had an excellent map of Western Australia, mounted on linen for folding in the pocket, and the Surveyor-General kindly furnished me with such detailed maps as I required for the botanical exploration of a particular district. I did not take many printed books, but only such extracts as I thought would be useful, for I often had to travel light. Every detail I worked out before my tour commenced was of help, and I would say to my readers, that time spent in examining specimens and maps and working up the literature of a district before the journey is actually entered upon, may readily give a botanical explorer better results, even if the time so absorbed means some curtailment of that available in the field.

AID IN THE STUDY OF GEOGRAPHY.

We have only to mention the scanty writings of the famous collector of Western Australia, James Drummond, and the later writings of Mueller, to note how valuable a place-name may subsequently become. The species may not have been collected except by the original finder, but if we have a place-name, we can search old maps, or consult the Surveyor-General of the State concerned, or, failing these, write to the newspapers, and thus draw upon the marvellous, frequently untapped, resources of the average newspaper reader, who does not lay bare his knowledge without a stimulus. As an example, the place-name Quangan used by Drummond is discussed under *E. macrocarpa* in Part XVIII, p. 240. The locality is still involved in some obscurity, as it probably represents a vague district.

I open vol. ii of the *Fragmenta* quite casually, and at p. 34, under *E. tetraptera*, I find the type locality for it given as “Fitzgerald River.” Western Australia, of course, the State concerned, and a little hunting up shows that it is in the south-west, east of the Stirling Range. This is quite easy, but some localities cited are difficult because they were not taken up on the official maps, or for other reasons. I repeat that search of them is sometimes interesting, and often profitable. Much of the knowledge of Australian geography that I possess I obtained plant-hunting. When I could get no definite information as to a reputed locality, I have sometimes copied out the context, journeyed to the district believed to be referred to, studied the local trees and topography, have consulted the “oldest inhabitant,” and in one way or another have thrown light on the problem.

Now that the map of Australia is so much better filled in than it used to be, there is no excuse for an inquirer to send a Eucalypt with the information that it came from such a vague locality as the Lithgow district or the Adelaide district. If the species is a rare one, we may require the information for the records, every detail of the locality being necessary, in order that we may trace its range. Even if the species be a common one, it may still be necessary to record it; indeed, it is remarkable how careless we have been in regard to the range of common species in the past.
Necessity for Quoting the Name of a Collector.

The necessity for quoting the name of a collector with his specimen is often misunderstood. It is not to glorify the collector, although if there is any slight kudos thus to be gained he deserves his share. But the use of the name may help us to trace further particulars concerning the plant in question. The collector is named John Smith, let us say, and if we turn up his name in, say, my "Records of Australian Botanists," the only series of papers dealing exclusively with the biographies of such worthies, we may find a reference to a journey or a place of residence, or a work written by John Smith which may help us to learn more about the specimen in question. For example, in Mueller's Fragmenta, I have often come across the name of a man, scarcely more than incidentally mentioned, which gave me the clue to trace valuable information.

Although not a very good example, take (Fragm. ii, 38, under E. Preissiana), Mueller's absurd contraction "Mx.,” which is at p. 34 "Maxw.,” and which is a shortening of Maxwell. These two references show that he collected at the Salt and Fitzgerald Rivers. My "Records of Australian Botanists” give some idea of the journeys these worthies made, and the fact that one of them was at this and that locality may be of distinct value in showing that he may have collected a certain plant there. At all events, it helps us in compiling his itinerary.

It has been my duty for many years to name plants collected by officers of various Government Departments. Not only have I had to battle against the vague localities sometimes furnished, but also against omissions in supplying the names of collectors. Some heads of Departments do not seem to understand that, as regards scientific specimens, it is a standing rule that the name of the collector should be quoted wherever it is available. This gives credit to the finder (whether he wants it or not), it contributes to precision, and it eliminates circumlocution, to the extent of rendering a man's official designation unnecessary. It may be sufficient to say John Jones. Croajingalong (and this may give a clue, in after years, to the travels of a definite human being), but to say collected by the Protector of Aborigines or the Officer authorised to certify to Marriages of Minors, with or without his town, is exasperating. Some persons seem to me distinctly averse to disclosing a subordinate’s name, except on my application. In speaking thus plainly, on behalf of official recipients of scientific specimens for the public collections, I do not think that the heads have any feeling in the matter: they are unaware that they are doing any harm—their unscientific action is simply the botanically uninformed official way. It is also most important to give the date, or approximate date, when the specimen was collected. I need not go into the reasons here.

Ecology.

One's information in regard to a plant is one-sided, unless one has met it in the bush. In that way alone can we see the nature of the soil, the drainage, the aspect it prefers, and its associates; in other words, what is its status in the republic of plants in a smaller or larger district, in a State, in the very continent itself. This can only be done by travel.
The caution of the immortal Hooker, as stated in his "Flora of Tasmania," p. 132 (vol. i, Part III, 1860) has never been long absent from my thoughts—

"To study the 'Gum-trees' well it is further necessary to study the other plants of the Colony, for the results of an observer's experience in such a genus will be entitled to more or less weight very much according to the amount of knowledge he possesses of the limits of variation, etc., in other plants; in short, it requires an experienced and very cautious observer to monograph the Australian Gum-trees, for it is no doubt one of the most difficult tasks in all systematic botany, and at the same time one of the most important in an economic as well as a scientific point of view."

Examination of Organs and General Appearance in the Bush.

Some of them promptly fade, or are readily deciduous. (The leaves, flowers, fruits of some species become discoloured and detached, although this does not specially apply to Eucalyptus.) Some organs, e.g., bracts and bracteoles and outer opercula are usually only seen on the early umbel or operculum; they are deciduous and prone to shrivel. The most certain way to see them is on a visit to the tree. The colours of filaments soon fade, even amongst those classed as "white," which often should be recorded as cream-coloured, or even pale-yellow. The anthers should, if possible, be studied from the fresh flowers. The shape of the bud, of the fruit, is best noted on the living plant, as the herbarium specimen always shows shrinkage, and sometimes different shapes. I have already (Part LVI, p. 331) drawn attention to the fact that the colours of young leaves, which fade almost as soon as gathered, can only be satisfactorily examined in the bush.

A proper knowledge of the foliage of seedlings, of shoots, and of their correlation, shapes and general morphological characters, can be studied adequately only in the bush, and by many consecutive visits to the bush. In the days to come the refinements of the cinematograph will be applied, with the view to securing a permanent record of the growth changes of foliage and other organs.

Then, obviously, the best place to describe the general appearance of a tree is standing near it, a photograph being an inferior substitute. The appearance of the bark should be described while standing in front of the tree, especially as there are so many textures and colours. An axe-cut of the bark is valuable, but it should be borne in mind that the rough bark varies in the height to which it ascends up the trunk and branches, and this height of rough bark, the appearance of the smooth bark, and the diameter of the tree are all necessary data best recorded in the forest. An axe-cut of the timber may be taken at the same time, and the appearance of the fresh (and subsequently well seasoned) wood noted. The botanist never does any harm to the forest, and it is remarkable with what little sacrifice of plant-life he secures valuable data.

The Aesthetic Aspect of the Genus.

When the vastness of the genus and the infinite variety of the species is better understood by the average botanist, and he communicates his knowledge, obtained in the field, to the literary man, I am confident that the beauty and interest of
Eucalypts will form the theme of many a poem, many an essay, many a descriptive account of an area more or less extensive. Eucalyptus is an intensely Australian theme, but no one not imbued with the Australian spirit will ever be able to properly handle it. I have casually referred (Part LII, p. 85) to the perennial interest of the Australian bush so far as the Eucalypts are concerned, and it is a matter of great satisfaction to observe that artists are endeavouring to understand Eucalyptus, a sine qua non if they desire to pictorially interpret it to others. Painters will arise who will be able to depict the characters of scores (and additional ones eventually) of trees, which possess their own individualities, not at present understood by the man, botanist or other, who is unable to devote the time necessary for a knowledge of those individualities, which must, obviously, precede their interpretation. Lister-Lister, Hans Heysen, and Grauer (to select but three) are artists who depict Eucalypts as they see them, and who do not attempt to produce results which the botanical student knows to be impossible.
B.—THE VALUE OF THE STUDY OF EUCALYPTUS IN A
SCHEME OF EDUCATION.

Scientific and Humanistic Studies.
The Industries Parasitic on Science.
How to Further the Study of Botany.

SCIENTIFIC AND HUMANISTIC STUDIES.

I would suggest to my readers that in the many aspects of Eucalyptus, the
opportunity presents itself to teachers to offer to the student an intellectual discipline
comparable in its value as a stimulus to thought with that of the Greek and Latin
classics. I am aware that the claim has been made for science in a wider sense, to
example—

The gospel of Spencer and Huxley is that the study of science is not merely useful, but may be
made the basis of a culture alternative and even superior to the older linguistic culture (p. 157). . .
Scientific culture, made universal and exclusive, would become, it was seen, as oppressive a tyrant as the
culture it sought to dethrone, and would not fail to develop an equally narrowing pedantry (p. 158). . .

The "gospel" of Spencer and Huxley, as Dr. Nunn puts it, refers only to the
"basis" of a culture "alternative" to linguistic culture. He then proceeds to refer

The gospel of Spencer and Huxley, as Dr. Nunn puts it, refers only to the
"basis" of a culture "alternative" to linguistic culture. He then proceeds to refer
to scientific culture, "made universal and exclusive," and I think that most scientific
men (who really know most about science) would repudiate such a suggestion. They
are, as a class, widely read and broad-minded, and to suggest that they desire to impose
a narrowing system of education appears to be unfair. If the study of science, which
is another name for truth, does not make its votaries tolerant and well informed, it
fails to accomplish one of its primary functions.

We naturally turn to the journal Nature (our safe guide in regard to the
philosophy of science) in a discussion of this sort, and are not disappointed. For
example, take vol. 109, 1922—

(a) It was claimed that instruction in classical languages was particularly valuable in developing
accuracy, training reasoning powers, improving the memory, and cultivating all the faculties necessary
to make the best use of life in any field. Psychologists have, however, destroyed the educational concept
upon which this claim is based, and it is no longer believed that the exercise of the mind on one kind of
material, improves the faculty to deal with other kinds. No subject can therefore be put forward as
affording unique general training in mental faculties or powers. (p. 33, 12th January).

(b) "The value of acquaintance with Greek learning is not in the material knowledge itself, but in
the spirit which created it. The Greeks possessed to a high degree the spirit of scientific curiosity, and
the desire to find a natural explanation for the origin and existence of things which is the ground motive
of progress in science. The aim of Greek thought was the unification of disconnected knowledge. This
laid the foundation of synthetic science, but carried with it the tendency to reduce natural phenomena
to a rigid geometrical or logical system. It is possible that the modern science student would be all
the better if given a trend in the same direction, as experimental inquiry alone is apt to be narrow
and must be specialised. Even neglecting this philosophical aspect of science, the early Greeks
manifested supremely the characteristics of true apostles of science. Passionate regard for truth, dis-
interested research, imagination, acute reasoning, and creative intelligence were the essence of the
Greek spirit, and they are elements of the unalterable germ-plasm which transmits the scientific temper
throughout the ages (p. 34).

This, of course, carries one away somewhat from linguistic culture as such.
(e) Science as such has nothing to do with the conquests of nations or peoples, or the upholding of dynasties, or industrial exploration. The end of all scientific investigation is the discovery of truth in the realm of animate and inanimate Nature, including man, his instincts and impulses, and his social organisation. As expressed in the motto of the Royal Society ("Nullius in Verba"), science is not bound by the words of any master, and it therefore holds itself free to examine critically any principle or doctrine in which natural facts or phenomena are involved. It represents knowledge as opposed to ignorance, light as against darkness, the beauty of truth and the truth of beauty. It seeks justification not through faith but by works, and its allegiance is to truth alone so far as human intelligence can comprehend it at any epoch (p. 801, 24th June).

Aristotle is quoted as saying "To be for ever hunting after the useful, behits not those of free and lofty soul." (Politics, viii, 3). In spite of the fact that the study of "pure botany," delightful in itself, may lead to economic applications to-morrow I hope that students will be attracted to Eucalyptus because of the simple desire to know more about it for its own dear sake.

The Industries Parasitic on Science.

"The industries have been parasitic on Science. They draw out from our laboratories, with their large salaries, the very best men they can get, and they are causing educational institutions to face a very serious problem. . . . It is going to be necessary to protect ourselves against the inroads of the industries. We must come to an understanding with them." And so on. (Dr. C. E. McClung, "The National Research Council," Journ. Amer. Pharm. Assoc., July, 1920, p. 690.)

This is a plea for the claims of "pure" science put in a suggestive form. To the scientific student remains the pure bliss of making scientific discoveries, which may be potential money-makers, to be exploited by the "captains of industry." The said captains rarely search out the real originators of their wealth, or they may not possess the necessary technical knowledge to ascertain them, and so Dr. McClung feels himself compelled to appeal to equity (perhaps not technical equity) for a fair share of the rewards which the present law is unable to give.

In the progress of this research, one has become acquainted with the general indifference to Eucalyptus of people whom one would expect to be interested, economically in the subject. I allude more particularly to foresters and gardeners, and one may be permitted to remind them that no retailer or wholesaler can be successful if he is ignorant of the contents of his shop or of his warehouse.

How to Further the Study of Botany.

I hope that the morphological (minute and other) characters that I have brought under notice, will be found to include subjects of investigation for students in Universities, Technical Colleges, Schools, &c., and other workers for a long time to come. I have given frequent references, not only to elucidate or confirm statements, but also because I think they will be useful to teachers and students for the purpose just stated.

Of one thing I am certain, that a proper study of Eucalyptus must begin with the rising generation. I believe that, in the near future, children will be taught more of the wonders of the bush than hitherto, and to accomplish that end, photographs of typical trees and reproductions of selections from the beautiful drawings of Miss M. Flockton will be found in every school throughout the Commonwealth. These should be coloured wherever possible, for colour is a great help to the minds of children and, indeed, of older people.
EXPLANATION OF PLATES 276-279.

PLATE 276.

E. Dwyeri Maiden and Blakely.

1a. Juvenile leaf; 1b, mature leaf, buds and flowers; 1c, anthers, front and back view; 1d, fruits; 1e, fruit, in elevation. Gungal, near Merriwa, New South Wales (J. L. Boorman, September, 1904). The type.

2. Mature leaf and buds. From the same locality, and collected on the same date, but not from the same plant as No. 1.

3a. Juvenile leaf; 3b, 3c, mature leaves; 3d, panicle of buds; 3e, fruits (picked up under the tree). Forest Reserve 35,919, parish of Brigaloo, county Pottinger, Gunnedah district, New South Wales. (Forest Guard M. H. Simon, June, 1915.)

4a. Young buds; 4b, fruits. Forked Mountain, Coonabarabran, New South Wales. (J. L. Boorman, September, 1908.)


7a. Pendulous twig, with buds; 7b, fruits. Ardlethan, on quartzite ridge (R. H. Cambage, 30th September, 1916, No. 4192.)

PLATE 277.

E. Burracoppinensis Maiden and Blakely.

1a. Twig with not fully ripe buds, in threes; 1b, vertical section of not perfectly ripe operculum. Note the thickness and also the protection for the style and stigma; 1c, not perfectly ripe anthers, front and back; 1d, immature fruit, showing rim and persistent style. Carrabin-Westonia road; Western Australia (C. A. Gardner, 7th October, 1922, No. 1882.)

2. Immature buds. Merredin, Western Australia (Max Koch, January, 1924, No. 3020.)

3a. Twig with narrower mature leaves and immature buds; 3b, fruits. Between Booran Siding and Burracoppin, New South Wales (Forester F. M. C. Schock, 2nd July, 1924 No. 205). The type. (Compare Plate 75 (figs. 7a, 7b) where the fruits were figured as E. pyriformis Turcz. var. minor Maiden. See also Part XLI, p. 17.)

E. Whitei Maiden and Blakely.

4a. Juvenile leaves; 4b, mature leaf. Small Ironbark common about Berricania, Queensland (J. S. Swanson, September, 1920, through C. T. White.) The type.

5a. Intermediate leaf; 5b, mature leaf with fruits; 5c, anthers; 5d, panicle (t) of fruits; 5e, single fruit. Prairie, 1,400 feet, 30 miles east of Hughenden, Northern Queensland (R. H. Cambage, 1st September, 1913, No. 3555).

6a. Immature pointed buds, axillary, not racemose; 6b, fruit, with a slight rim. Small Ironbark, very common at Tower Hill, Central Queensland (C. T. White, April, 1919, No. 16).
PLATE 278.

*E. Dongarraensis* Maiden and Blakely.

1a, 1b, Juvenile leaves; 1c, mature leaf; 1d, buds; 1e, anthers (not quite mature); 1f, fruits. Dongarra, Western Australia (J. H. Maiden, October, 1909). The type.

*E. maculosa* R. T. Baker.

(See also Plate 112, Part XXVII).

2a. Mature leaf; 2b, twig with buds; 2c, fruits; 2d, front and back views of anther. Lawson, Blue Mountains, New South Wales (C. F. Laseron, August, 1919). Type of *E. Gellieki* R. T. Baker.

*E. Staerii* Maiden.

(See also Part LI, Plate 260, as *E. marginata* Sm. var. *Staerii* Maiden.)

3a, 3b, Juvenile leaves: 3c, 3d, juvenile leaves, a stage further; 3e, intermediate leaf; 3f, mature leaf; 3g, umbel of flower-buds; 3h, fruit. Near Albany, Western Australia (T. N. Stoate, through C. A. Gardner, except 3f, which is C. E. Lane-Poole, same locality, April, 1919).

PLATE 279.

*E. Badjensis* de Beuzeville and Welch.

1a. Seedling or twig of juvenile leaves; 1b, twig with mature leaf, buds and fruits; 1c, anthers (not quite ripe). Head of Big Badja (Mountain), New South Wales, at an elevation of 4,000 feet. (W. A. W. de Beuzeville, January, 1924.) Co-type.

*E. albida* Maiden and Blakely.

2a, 2b, 2c, 2d, 2e, Juvenile leaves in various stages; 2f, twig with mature leaves and buds; 2g, immature anther; 2h, fruits. Harrismith, Western Australia (C. A. Gardner, 6th March, 1924, No. 2113). The type.

*E. Kalaugadooensis* Maiden and Blakely.

3a. Juvenile leaf; 3b, intermediate leaves: 3c, mature leaf; 3d, umbel of buds (10); 3e, two views of anther; 3f, fruits. Kalangadoo, South Australia (Prof. J. B. Cleland, M.D., December, 1922, No. 89; the juvenile leaf is No. 90). The type.

*E. triangularis* J. H. Simmonds.

4a. Intermediate leaf; 4b, mature leaf; 4c, umbel of buds. (Anthers are very immature; they appear to open in parallel slits with gland at the back.) 4d, fruits (in threes). Invercargill, New Zealand, and therefore from a cultivated plant. (Rev. J. H. Simmonds, No. 561.) The type. May be a hybrid.
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also described wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:

- acacioides A. Cunn. (xlviii).
- acmenioides Schauer (xxxii).
- affinis Deane and Maiden (lvi).
- amygdalina Labill. (xvi).
- Andreusi Maiden (xxi).
- Bakeri Maiden (lxx).
- Baueriana Schauer (lvi).
- Baueriana Schauer var. conica Maiden (lviii).
- bicolor A. Cunn. (xlv).
- Boorman Deane and Maiden (xliv).
- Caley Maiden (lv).
- capitellata Sm. (xxxviii).
- corymbosa Sm. (xii).
- Dalrympleana Maiden (lxiv).
- dives Schauer (xix).
- dumosa A. Cunn. (lxv).
- eugenioides Sieber (xxix).
- gigantea Hook. f. (lii).
- globulus Labill. (lxvii).
- haeastoma Sm. (xxvii).
- longifolia Link and Otto (ii).
- maculata Hook. (vii).
- melliodora A. Cunn. (ix).
- Muelleriana Howitt (xxx).
- numerosa Maiden (xvii).
- obliqua L'Hérit. (xxii).
- odorata Behr and Schlectendal (xli).
- paniculata Sm. (viii).
- pilularis Sm. (xxxi).
- piperita Sm. (xxxiii).
- polyanthemos Schauer (lix).
- populifolia Hook. (xlvii).
- propinqua Deane and Maiden (lxi).
- punctata DC. (x).
- radiata Sieb. as amygdalina (xvi).
- resinifera Sm. (iii).
- robusta Sm. (lxviii).
- rostrata Schlecht. (lxii).
- rubida Deane and Maiden (xliv).
- saligna Sm. (iv).
- siderophloia Benth. (xxxvii).
- sideroxylon A. Cunn. (xliii).
- Sieberiana F.v.M. (xxxv).
- Smithii R. T. Baker (lxx).
- stellulata Sieb. (xiv).
- tereticornis Sm. (xi).
- viminalis Labill. (lxiv).
- virgata Sieb. (xxvi).

* Government Printer, Sydney. 4to. Each part contains 4 plates and other illustrations.

BY GOVERNMENT PRINTER.

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

EUCALYPTUS DWYERI Maiden and Blakely.
EUCALYPTUS BURRACOPPINENSIS Maiden and Blakely. (1-3).

E. WHITEI Maiden and Blakely. (4-6).
EUCALYPTUS DONGARRAENSIS MAIDEN and BLAKELY (1).
E. MACULOSA (Gullicki) R. T. BAKER. (2). [See also Plate 112.]
E. STAERII MAIDEN. (3). [See also Plate 260]
EUCALYPTUS BADJENSIS de Beuzeville and Welch. (1).
E. ALBIDA Maiden and Blakely. (2).
E. KALANGADOOENSIS Maiden and Blakely. (3).
XE. BIANGULARIS J. H. Simmonds. (4).
INDEX OF PARTS PUBLISHED—continued.

PART XXXVI.
263. E. erythrocyrus F.v.M.
264. E. tetragonus F.v.M.
265. E. odontophora Baker and Maiden.
266. E. caput-calcarea Smith.
267. E. Cambageana Maiden.
268. E. Novanuntonensis Maiden and Cambage.
Plates, 184-187. (Issued April, 1921.)

PART XLVI.
269. E. tetragonii F.v.M.
270. E. eucalyptodes F.v.M.
271. E. Eosunauntonensis Maiden n.sp.
19. E. Andrewsii Maiden.
273. E. Apisunauntonensis Maiden and Cambage.
274. (dip. at 292) E. eremophila Maiden.
70. E. decipiens Endl.
Plates, 188-191. (Issued May, 1921.)

II. The Bark (and Habit)—continued.
1. Leptopokophyllum (Smooch-Barks or Gums).
2. Hemiphilium (Hail-barks).
3. Agathophyllum (Rough-barks).
4. Pathophyllum (Stringing-barks).
6. Lepidopokophyllum (Barks frisble and lamellar). Plates, 206-211. (Issued February, 1922.)

PART XIII.
300. x E. amygdalina Naudin.
299. x E. desigillata Sm., var. glandulosa Sm.
298. x E. compacta Sm., var.compacta Sm.
297. x E. patellaris Sm., var. patellaris Sm., n.sp.
296. x E. pseudoglobulosa Sm.
295. x E. papatua Naudin.
294. x E. angustatima Sm., var. angustatima Sm., n.sp.
293. x E. pseudo-globulosa (Bort.) Naudin.
292. x E. Trautvetteri Vil.corn.
291. x E. Sturtiana x globulosa Trubut.
300. x E. stricklandiana Maiden n.sp.

II. The Bark—continued.
3. Classification of Trees in General by Means of Bark. Plates, 212-215. (Issued April, 1922.)

PART XLVII.
301. x E. Burmanianæa Maiden n.sp.
302. x E. Tenduanæa Maiden n.sp.
303. x E. Piteriænæa Maiden n.sp.
304. x E. Stopfærdi Maiden n.sp.
305. x E. Forschiæi Maiden n.sp.
306. x E. Babuænæa Maiden n.sp.
307. x E. Zygophyllum Maiden n.sp.
308. x E. Blackburnianæa Maiden.
309. x E. Stiægænæa Maiden n.sp.

III. Timber.
Historical—Early Attempts at Classification. Plates, 216-219. (Issued May, 1922.)

PART IV.
310. E. Mcleayanaeana n.sp.
311. E. Pitti McOey.
313. E. Milliganæa R. M. Johnston.
314. E. Delftæi Ettinghausen.
315. E. Dillenæi Ettinghausen.
316. E. Hoyæi Ettinghausen.
317. E. Houæmannæa Ettinghausen.
318. E. Mitchellæi Ettinghausen.
319. E. cretanæa Ettinghausen.
320. E. Davidsonæa Ettinghausen.
321. E. Oseanaæa Ettinghausen.
322. E. scolopæide Ettinghausen.
323. E. Warræmannæa Ettinghausen.
324. E. praecocæa Deane.
325. E. Hermalæa Deane.
326. E. Rossæi Deane.
327. E. Kitiæi Deane.
328. E. Suttonæ formerly E. Muelleræ Deane.
329. E. Chapmanæi formerly E. Woolæi Deane.

III. Timber—continued.
Microscopic structure. Crystals (Calcium Oxalate).
Specific Gravity. Hardness.
PART LXV.
VI. The Leaf.
(Continued from Parts LXIV and LXVII, and the Plates of Part LX.)
1. Introduction.
3. Angles of secondary veins with midrib.
4. Juvenile leaves (not only).
5. Mature leaves (not only).
6. Correlation of Seedlings and Juvenile Leaves (adventitious shoots)—
   (a) Terminology of Juvenile Leaves.
   (b) Coloured Plates.

Juvenile Leaves.
7. Additional descriptions.
   Plates 264-267. (Issued March, 1926.)

PART LXVI.
Range.
1. Definitions of Climographs.
2. Species arranged according to Climographs.
3. Species arranged according to Stutes.
4. Tropical Species.
   North-Western Australia.
   The term "Pindan."
   Northern Territory.
   Use of the term "North Australia."
   Northern Queensland.
5. Extra Australian Species.
   E. Nodiflora and some synonyms, doubtful and otherwise.
   Phillipines and New Britain, Papua, Timor, &c.
6. Australian Species cultivated abroad.
7. Addition to Range of Individual Species (as already given under each Species).

The Leaf.
(Continued from Part LXV, page 230.)
The Intermediate Leaf.
1. Preliminary.
2. The "Saplings" of Howitt.
   Plates 268-271. (Issued June, 1926.)

PART LXVII.
362. E. Bloasomii Maiden, n.sp.

Papers on Range or Distribution.
1. Australia in General.
2. Western Australia.
3. South Australia.
4. Tasmania.
5. Victoria.
7. Queensland.
8. Northern Territory.

Factors which Influence Range or Distribution.
Introductory.
Altitude.
Crocodiles.
Geological Formations, Soils—Victoria, South Australia, New South Wales, Queensland, Northern Territory.
Effect of Drought Conditions.
Note on Species of apparently anomalous Range.

Age and Area.
The Leaf.
(Continued from Part LXVI, page 313.)
Mature Leaves.
   Plates 272-275. (Issued December, 1926.)
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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


PART LXIX OF THE COMPLETE WORK.

(WITH FOUR PLATES.)

PRICE THREE SHILLINGS AND SIXPENCE.

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

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER.

1928.
INDEX OF PARTS PUBLISHED.

PART I.
1. E. gigulias Sm., and var. Muelleriana Maiden. Plates, 1-4. (Issued March, 1903.)

PART II.
2. E. obliqua L. Héritier. Plates, 5-8. (Issued May, 1903.)

PART III.

PART IV.

PART V.
7. E. coracea A. Cunn. Plates, 29-32. (Issued April, 1905.)

PART VI.
10. E. linearis Dehnardti. Plates, 41-44. (Issued November, 1907.)

PART XI.
41. E. bosistoena F.v.M. Plates, 49-52. (Issued February, 1910.)

PART XII.
60. E. rovecructina F.v.M. Plates, 53-56. (Issued November, 1910.)

PART XIII.
60. E. affinis Deane and Maiden. Plates, 57-60. (Issued July, 1911.)
61. E. panulicata Sm. Plates, 61-64. (Issued March, 1912.)
64. E. gigantha Sieber. Plates, 73-76. (Issued September, 1912.)

PART XVI.
68. E. Le Souefi Maiden. Plates, 81-84. (Issued December, 1913.)
70. E. decorumi Sieber. Plates, 89-92. (Issued April, 1915.)
71. E. doratexylon F.v.M. Plates, 93-96. (Issued May, 1915.)
72. E. gigantha Sieber. Plates, 97-100. (Issued July, 1915.)
73. E. melanthera F.v.M. Plates, 101-104. (Issued September, 1915.)
75. E. lycosticta F.v.M. Plates, 109-111. (Issued April, 1916.)
78. E. morii Hook. f. Plates, 120-123. (Issued May, 1917.)
82. E. morii Hook. f. Plates, 136-139. (Issued April, 1918.)
83. E. schimperi Hook. f. Plates, 140-143. (Issued July, 1918.)
84. E. morii Hook. f. Plates, 144-147. (Issued October, 1918.)
86. E. morii Hook. f. Plates, 152-155. (Issued April, 1919.)
87. E. schimperi Hook. f. Plates, 156-159. (Issued July, 1919.)
94. E. morii Hook. f. Plates, 184-187. (Issued April, 1921.)
96. E. morii Hook. f. Plates, 192-195. (Issued October, 1921.)
98. E. morii Hook. f. Plates, 200-203. (Issued April, 1922.)
100. E. morii Hook. f. Plates, 208-211. (Issued October, 1922.)
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

The author of this standard work, Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., died on 16th November, 1925, at the age of 66 years.

It is most regrettable that he did not live to see the completion of his great work, of which 65 Parts have already appeared, and the final Parts were prepared by him for publication prior to his death.

With the kind permission of Dr. Darnell-Smith, Director, Botanic Gardens, Sydney, this and the subsequent Parts will be edited by Messrs. R. H. Cambage, C.B.E., F.L.S., and W. F. Blakely, Assistant Botanist, Botanic Gardens, both of whom have been in constant touch with the late Mr. Maiden during the progress of the work.

Part LXIX of the Complete Work.

(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

PRICE THREE SHILLINGS AND SIXPENCE.

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

Sydney:
ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1928.
CCCLII. E. crucis Maiden.

CCCXXXIII. E. rigidula, n.sp.
Synonym

CCCLXXII. E. Kondininensis Maiden and Blakely.
Description
Range
Affinities

CCXV. E. terminalis F.v.M. var. nov. longipedata Maiden and Blakely.

CCVII. E. patellaris F.v.M.
Additions to description
Range
Affinities

LXXXVII. E. Pimpiniana Maiden.
Additions to description
Affinity

CCCLXXIII. E. cylindriflora Maiden and Blakely.
Description
Range
Affinities
CCCLXXIV. *E. Westoni* Maiden and Blakely.

Description ............................................ 413
Range .................................................... 414
Affinities .............................................. 414

CCCLXXV. *E. mieroneura* Maiden and Blakely.

Description ............................................ 415
Range .................................................... 415
Affinities .............................................. 416

CLXX. *E. Dundasi* Maiden.

Additions to description .............................. 417

LXXXIV. *E. diptera* Andrews.

Additions to description .............................. 419

CCCLXXVI. *E. ovularis* Maiden and Blakely.

Description ............................................ 421
Range .................................................... 422
Affinities .............................................. 422

CCCLXXVII. *E. Kesselli* Maiden and Blakely.

Description ............................................ 423
Range .................................................... 424
Affinities .............................................. 424

CCCLXXVIII. *E. Desmondensis* Maiden and Blakely.

Description ............................................ 425
Range .................................................... 425
Affinities .............................................. 426
LXXXIV. *E. aggregata* Deane and Maiden.

Synonym .................................................. 427

LXXII. *E. Forrestiana* Diels.
Additions to description ................................. 429

CCCLXXIX. *E. Merrickae* Maiden and Blakely.

Description ............................................. 430
Range ...................................................... 431
Affinities ................................................ 431

CLXXXIX. *E. clavigera* A. Cunn. var. *Gilbertensis*
Maiden and Blakely n. var.

Description ............................................. 432
Affinities ................................................ 432

THE SPECIES QUESTION.

1. What is a species? .................................. 433
2. Variety or species? .................................. 433
3. Inequality of species-values .................... 434
4. No fixed line of demarcation between Species .. 434
5. Jordan's species. ................................... 436
6. A classical case of "splitting" ................... 437
7. Application of zoological tests to botanical species .... 437
8. Variation in the genus ............................. 438

THE STRUGGLE FOR TAXONOMIC DEFINITENESS.

1. The ideal of the type ............................... 439
2. How to designate the type ....................... 440
3. Model descriptions. ............................... 442
4. Labels and schedules ............................. 443

Some aphorisms ......................................... 445

Explanation of plates (280-288) ....................... 448
CCCLI. *E. crucis* Maiden.

Additional juvenile leaves and buds. See Explanation of Plates, Plate 280, for particulars.

DESCRIPTION.

CCCXXXIII. *E. rigidula*, n.sp.

SYNONYM.

*E. angusta* Maiden.

(This work, Part LVI, p. 265.)

*E. angusta* is pre-occupied by *E. angusta* Velenovsky, a fossil species (see Part LV, p. 226, of the present work). I, therefore, propose the name *E. rigidula* on account of its narrow, somewhat rigid, leaves.
DESCRIPTION.

CCCLXXII. E. Kondininensis Maiden and Blakely.

ARBOR mediocris, corte 3-7 feet basin versus rugoso ramulis laevibus; folis junioribus leniter glauca
tenuibus petiolatis undulatis ovatis vel oblongis obtusis 2-3·5 cm. longis, 1-1·5 cm. latis, venis obscurs; folis maturis dilute viridibus utroque latere nitentibus crassiusculis angusto-lanceolatis acuminatis ad falcato-lanceolatis, 6-11 cm. longis, 8-15 mm. latis, venis obscurs, venis lateralis et costa 30-40° orientibus; inflorescentia axillaris, umbellis in pedunculis brevibus subangularibus alabastra ad 7 breviter pedicellata
ferentes; alabastris anustis cylindraceis, operculo conico loco costato, calyx tubo vix longiori; antheris paralleliiter aperientibus; stigma clavata; fructibus campanulatis 5-7 mm. longis spicis 5-6 mm.
latis, valvis leniter exsertis.

A "Blackbutt," locally known under the name of "Stocking Tree," or "Black
Yate." Attains a height of 40-60 feet, with erect or slightly spreading branches. Trunk
to 30 feet in height and 30 inches diameter. The bark reminds one very much of Eucalyptus Clelandii; thick and flaky and black at the base to a height of 3-7 feet above
the ground, and persistent. This bark ends abruptly. Above, the bark is smooth,
yellowish, shining, with a few blotches of purple-grey decorticate bark. Timber
light to dark brown, dense and strong. Branchlets angular, assuming a reddish colour.

Juvenile leaves slightly glaucous, rather thin, petiolate, only two or three of
the lowest pairs opposite, ovate to oblong, obtuse, slightly undulate, 2 to 3·5 cm. long,
1 to 1·5 cm. broad, venation obscure, intramarginal vein moderately close to the edge,
secondary veins spreading, making an angle of about 40-50 degrees with the mid-rib.

Mature leaves light yellowish-green, glossy on both surfaces, moderately thick,
narrow-lanceolate acuminate to falcate lanceolate, tapering at the base into a semi-
terete peduncle, 1·5-2 cm. long, the blade 6-11 cm. long, 8-15 mm. broad.

Venation indistinct, intramarginal vein fairly close to the edge, lateral veins
spreading at a rather high angle or at an angle of about 30-40 degrees with the mid-rib;
midrib channelled above and slightly raised and obscurely channelled beneath.

Inflorescence axillary, the umbels on shortish, compressed and slightly angular
peduncles, which support up to seven very short pedicellate buds. Buds narrow,
cylindrical, not seen fully ripe; calyx-tube about 4 mm. long, moderately smooth,
slightly campanulate, tapering into a very short, rather thick, angular pedicel.
Operculum conoid, somewhat corrugated-striate in a dry state, scarcely longer than
the calyx-tube. Anthers opening in parallel slits, with a large dorsal gland; filaments
short, of a creamy-white colour. Stigma slightly thickened, more or less clavate.
Floral disc represented by a thin membrane extending over the top of the ovary, and
lining the calyx-tube.
Fruit campanulate, 5–7 mm. long, 5–6 mm. broad at the top, 3–4 celled, the short, broad valves slightly protruding. Capsular disc rudimentary, represented by a white membrane over the valves, and a slight thickening of the inner wall of the calyx-tube and staminal ring.

RANGE.

It is confined to Western Australia, so far as we know at present.

Collected at Kondinin, on loam flats forming open forest with *E. salmonophloia* and *E. Flocktoniae*. (C. A. Gardner, Nos. 1843 and 1966.)

AFFINITIES.


In general appearance both trees appear to be much alike, both in habit, shape and colour of the leaves, nature of the bark and colour of the timber. Although perhaps the bark of *E. melanoxylon* is rather more deeply furrowed and not discoloured with kino, and the timber is much darker, the timber of *E. Kondininensis* is a deep walnut-brown. In other characters both species differ from each other very considerably.


In dealing with herbarium specimens one would naturally compare *E. dumosa* with *E. Kondininensis*, as it is noted for its faintly striated or ribbed operculum, and its short, somewhat cylindrical fruits, but when other characters of *E. dumosa* are taken into consideration they are found to be totally different from those of *E. Kondininensis*. The real affinity of the two species appears to be in the ribbed operculum, in the anthers, and to some extent in the shape of the fruits. In habit *E. dumosa* is a dwarf Mallee, with broadish, somewhat dull, bluish leaves, which retain their dullness and colour even when dry. *E. Kondininensis* is a tree up to 60 feet high.
3. With *E. Clelandi* Maiden. This is also called "Blackbutt," and is illustrated in Part XVI, p. 189.

There is a slight resemblance between the buds and fruits of both species, but the buds of *E. Clelandi* are broader, with a more prominently ribbed operculum, besides being glaucous, and so also are the juvenile and adult leaves.


The affinity with *E. longicornis* is mainly in the juvenile and adult leaves, which is so marked that young trees may be mistaken for either species. On the other hand, both species are very dissimilar in buds and fruits. *E. longicornis* is also a much larger tree.
CCXV. *E. terminalis* F.v.M. var. nov. *longipedata* Maiden and Blakely.

"Large tree, spreading habit, Darwin, March, 1917." (C. E. F. Allen, No. 181.)

With leaves, buds, flowers and early fruit.

Port Darwin (Schultz, collector for Mueller, about 1880). With leaves and buds only.

The mature leaves are narrow-lanceolate and not very dissimilar to those of *E. terminalis*, shown at fig. 10a, Plate 164. Juvenile leaves of the new form are not available.

The buds can be compared with those of *E. terminalis*, figs. 2 and 3a, Plate 164, in which the comparative shortness of the pedicels is seen. The pedicels are longer in Schultz's than in Allen's. From *E. terminalis* it differs in the long pedicels, and the smooth, red buds, not more or less scurvy, as in the normal form. It is certainly striking in appearance.

Allen's specimen has yellowish filaments, and some of the outer ones are much broader than the inner ones.

Until fruits of the new form are available, its position cannot be stated with certainty. It may be a new species, but in order to settle its affinities, juvenile leaves, timber and bark are also necessary.
CCVII. *E. patellaris* F.v.M.

Tree of 30–40 feet high, branching at 20 feet from the ground, with a trunk 18 inches in diameter at 3 feet from the ground. (C. E. F. Allen, 683A.)

“Bark dirty grey, wrinkled and cracked, persistent on the trunk and branches” (see Part XXXIX, p. 257, translation of original). “Grey, rough, cracked perpendicularly, an old tree.” (Allen, 683A.)

Specimens sent by Mr. C. E. F. Allen show bark which is twisted or curly, flaky-fibrous and dark in colour, weathering grey. (I have no doubt that it is of the same texture as described by Mueller; the greyness is a matter of weathering.) It is not a thick bark, and a typical Box-bark, such as *E. bicolor*, *E. microtheca*.

Timber deep red, drying to reddish-brown, very heavy, coarse fibred, very curly and more or less interlocked, breaking off into thinnish pieces.

**Mature leaves**—rather thick, lustre rather dull, petiolate, linear-lanceolate, slightly falcate (say from 1 to 1·5 dm. long, with an average width of 1 to 1·5 cm.), venation fine and obscure, the lateral veins making an angle of 30 to 35 degrees with the midrib; intramarginal vein close to the edge.

**Juvenile leaves.**—I have not seen the juvenile leaves in the earliest stage, but in the intermediate stage only. They are very thin, narrow-lanceolate to acuminate, shortly petiolate, 5–12 inches long, veins moderately distinct, forming an angle of 30–35 deg. with the midrib. Mataranka Station, Northern Territory, C. E. F. Allen, No. 731. Mr. Allen states that the suckers are very hard to find. It is one of those species which pass quickly from the juvenile to the adult age, and therefore the juvenile leaves are not striking or persistent on young or old plants. Mr. Allen forwarded fruiting specimens with the fruits 5–6 in the umbel, which are almost identical with the type.

**Illustrations.**—See figs. 7a–d, Plate 263. Narrower leaves have been figured at fig. 7a, Plate 263 (C.E.F. Allen, 683). But we still do not know the juvenile leaves of this species, and when we get the inflorescence, with plump buds, showing anthers, we shall be able to state its position.

**RANGE.**

The type came from the dry banks of the Roper River, Northern Territory. It has since been found at Mataranka Station, Roper River (C. E. F. Allen, No. 683), and near the junction of the Waterhouse and Roper Rivers, on red sandy loam (Allen,
So that we still know but little of its range, and this is doubtless contributed to by the fact that the trees have the same monotonous type of bark so common in the tropics. Added to this, the population of the Northern Territory is sparse in the extreme, and therefore botanical examination of individual trees is not easy.

AFFINITIES.

This is one of those species whose place in the genus cannot be definitely stated because we lack essential material (in this case inflorescence).

With *E. lirata* (W. V. Fitzgerald) Maiden.

Its superficial similarity to *E. lirata* lies chiefly in the conspicuous pedicellate fruits of *E. patellaris*, which are usually two or three in number. The species are, however, very dissimilar in the long narrow lanceolate acuminate leaves of *E. patellaris*, and in the shape and structure of the fruit; the latter has a broad disc fused to the carpels, and the outer edge projects beyond the rim of the calyx-tube, which gives it a campanulate appearance.
LXXXVII. E. Pimpiniana Maiden.

See Part XV, with figs. 2 and 2b, Plate 72.

Some specimens collected at Immana, near Ooldea, South Australia, by Prof. J. B. Cleland, August, 1922, and figured at fig. 2c, Plate 281, throw light on this imperfectly known species. It will be seen that the leaves may be larger than those depicted in Plate 72. Buds are now available which, though not quite in the bursting stage, have sub-cylindrical calyx-tubes of about 1 cm. long, capped with a bluntly pointed attenuated operculum of about equal length. The base of the operculum slightly exceeds that of the calyx-tube. The decumbent umbels are up to nine in the head, when not perfectly ripe slightly urceolate and gradually tapering into the peduncle; when riper less urceolate, and with the staminal ring indurate and well-marked, after the fashion of E. eremophloia. The tips of the valves well sunk.

AFFINITY.

As compared with E. Isingiana (see Plate 235, Part LVII), E. Isingiana has campanulate fruits (not cylindrical ones) when young, and when mature, broad pyriform and not cylindrical as those of E. Pimpiniana.

Were it not for the slight difference in the shape of the fruits, both species would appear to be conspecific on the present evidence, and my advice to local botanists is to complete the material and the evidence.
DESCRIPTION.

CCCLXXIII. *E. cylindriflora* Maiden and Blakely.


**Mallee** caulibus erectis e trunco colunmae basi simili orientibus, 10-15 feet alta, 3-5 inches diametro, cortice tenni, albo, pulvereo cortice fracto viridi, liguo pallide brunneo; foliis junioribus, primis 3-4 paribus oppositis, spathulatis vel oblongis, breviter petiolatis, obscure viridibus, 4-5-5 cm. longis, 1-5-2-5 cm. latis, venis inconspicuis, venis secundariis e costa 35-50° orientibus, vena peripherica a margine remota; foliis maturis alternatis lacinibus supra subtusque nitentibus, angusto-lanceolatis in petiolum breve anguste 5-8 cm. longis, 5-10 mm. latis; venis inconspicuis, venis lateralis e costa 30° orientibus, vena peripherica margini approximata; inflorescentia axillari vel alqando semiterminali, umbellis pedunculatis 3-6 floris, filamentis albis, alabastris pedicellatis cylindraceis 1-5 cm. longis, diametro 5-7 mm.; operculo conico obtuso calycis tubo semiovato aequilongo; antheris majoribus oblongo-ovatis, longitudinaliter aperientibus; fructibus breviter cylindraceis vel semiovatis truncatis traus apicem 1 cm. longi, 7 mm. latis, annulo staminis vix dilatato coronatis; valvis parvis inclusis.


**Juvenile leaves.**—Only the first 3-4 pairs opposite, spatulate to oblong, shortly petiolate, pale, or a very dull green when dry, 4-5-5 cm. long, 1-5-2-5 cm. broad; venation not conspicuous, the secondary veins making an angle of 35-50 degrees with the midrib, intramarginal vein distant from the edge.

**Mature leaves** alternate, smooth and shining on both surfaces, narrow-lanceolate to lanceolate-falcate, narrowed into a short petiole, 5-8 cm. long, 5-10 mm. broad; venation obscure, lateral veins making an angle of 30 degrees with the midrib, intramarginal vein close to the edge.

**Inflorescence** axillar or sometimes appearing semi-terminal, the peduncle bearing an umbel of 3-6 white flowers. Buds cylindrical, about 1-5 cm. long, 5-7 mm. in diameter. Operculum conical, obtuse, about the same length as the semi-ovate calyx-tube; the pedicels are also about the same length. Anthers rather large, oblong-ovate, slightly emarginate with a long dorsal gland. Floral disc forming a slightly thickened layer around the calyx-tube and extending over the sunken ovary.

**Fruit** shortly cylindrical or somewhat semi-ovate, truncate, crowned by the scarcely enlarged staminal ring, 1 cm. long, 7 mm. across the top, the pedicels about 1 cm. long, valves small, well enclosed. Capsular disc not conspicuous, forming with the staminal ring an oblique, slightly thickened band around the inside of the capsule and extending nearly halfway over the free valves.
RANGE.

Confined to Western Australia, so far as we know at present. Found at Bendering, on loam flats, with Melaleuca unicinata (C. A. Gardner, No. 1909). Bendering is on the railway line from Narrogin to Narembug, and about 120 miles east of Perth.

AFFINITIES.

1. With *E. erythronema* Turez., depicted in Part XXII, p. 23 (*Crit. Rev.*)—from which it differs in the white filaments, in the more cylindrical, somewhat thin, smooth fruits, and in the shape of the calyx-tube, which is not expanded at the top as is the case with *E. erythronema*; and also in the somewhat obscure disc, as against the conspicuous disc of *E. erythronema*. The fruit of *E. erythronema* is broadly turbinate and crowned by a broad, sharp disc, and with the valves of the capsule protruding well beyond it. In *E. cylindriflora* the disc is obscure and the valves are well enclosed in the capsule, and they do not protrude beyond the small disc. The anthers of *E. cylindriflora* appear to differ from those of *E. erythronema*; they are more emarginate and the dorsal gland is more attenuated. The only juvenile leaves we have seen of *E. erythronema* are from a cultivated plant, and they are narrower and smaller than those of *E. cylindriflora*.

2. With *E. eremophila* Maiden.

The shape of the fruits is similar in both species, but those of *E. eremophila* are thicker and the staminal ring which forms the disc is much larger; it sometimes extends over the top of the fruit. The fruits of *E. cylindriflora* are thin and the staminal ring very narrow.
DESCRIPTION.

CCCLXXIV. × E. Westoni Maiden and Blakely.


Arbor mediocris, ramis patentibus, cortice lamellosa vel subfibroso cinereo; ligno pallido albescente vel carneo; foliis junioribus crassisculis subglauces supra subtusque, inferioribus foliis oppositis sessilibus angusto- vel late-oblongis, 3–6 cm. longis, 8–20 mm. latis; venis prominentibus, venis secundariis e costa 30–45° orientibus; vena peripherica a margine remota; foliis maturis crassisculis petiolatis angusto-lanceolatis vel falcato-lanceolatis, 10–17 cm. longis, 1–5 mm. latis; venis modice distinctis, venis secundariis e costa 30–45° orientibus, vena peripherica margine approximata; inflorescentia axillari; alabastris 5–7 in capitulo, cylindraceis 8–9 mm. longis; operculo acuto conoideo 3 mm. longo; antheris versus-tibus oblongis longitudinaliter aperientibus; fructibus campanulatis 7 mm. longis, 5–6 mm. diametro, valvarum brevium et crassarum apicibus albis calyceis marginem excedentibus.

A medium-sized tree with spreading branches, rough barked to the small branches, rough or slightly flaky to sub-fibrous, greyish. Timber pale, whitish to pinkish, dries pale, not tough.

Juvenile leaves somewhat thick, drying the same colour on both sides, the lower ones opposite, sessile, narrow to broad-oblong, the margins slightly undulate, 8 to 20 mm. broad, 3 to 6 cm. long, veins fairly prominent, the intramarginal vein distant from the edge, the secondary veins making an angle of 30 to 40 degrees with the midrib.

Mature leaves thickish, petiolate, narrow-lanceolate to falcate-lanceolate, and with a long acuminate point, 1 to 1·5 cm. broad, 10 to 17 cm. long, the intramarginal vein close to the edge, the secondary veins making an angle of 30 to 45 degrees with the midrib.

Inflorescence axillary, the umbels on slightly compressed peduncles about as long as the buds. Buds 5–7 in the head, cylindrical, or gradually tapering into the thick, short pedicel, 8–9 mm. long, somewhat glossy, the operculum acute, conoidal, the lower portion slightly thicker than the calyx-tube, 3 mm. long. Calyx-tube cylindrical to slightly campanulate, 4 mm. long, the pedicel 2 mm. long. Anthers versatile, somewhat similar to those of E. macrophylla. Floral tube forming a thickish covering around the top of the calyx, and projecting a short distance over the ovary.

Fruit campanulate, 7 mm. long, 5 to 6 mm. in diameter, thickish, the short thick, white-tipped valves protruding beyond the calyx rim. Capsular disc forming a truncate or domed rim on the top of the capsule, the inner margin free from the valves, and sometimes exceeding the staminal ring, which is nearly always present on the mature fruit.

In honour of Thomas Charles George Weston, formerly of the Botanic Gardens sub-Department, Sydney, and for some years past Afforestation Officer of the Federal Territory at Canberra, a competent hybridist, cultivator, and forester.
RANGE.

Found so far only on the Yass-Queanbeyan road, near Gungahleen Federal Territory (C. Weston), a locality, of course, carved out of southern New South Wales.

AFFINITIES.

1. With *E. maculosa* R. T. Baker, it bears a very strong resemblance in buds, fruits, and mature leaves, but it is distinct in its cortical character. The bark of *E. maculosa* is smooth and blotched, while the bark of *E. Westoni* is rough and slightly flaky to sub-fibrous, greyish, somewhat after the colour of *E. hemiphloia*. The seedling of *E. maculosa* is much broader than that of *E. Westoni*. The latter may be described as narrow and rigid.

We suggest that perhaps it may be a hybrid of which *E. maculosa* is one of the parents. Mr. Weston, the discoverer of the plant, and one of the present writers, found only two trees, but this is often the case with a reputed hybrid until after prolonged search.

2. With *E. viminalis* Labill., in the shape of the buds, and also in the shape of the fruits. These characters, however, are in threes in *E. viminalis* typica, but when the multiflowered form is compared with *E. Westoni*, the affinity is even more apparent. *E. viminalis* also has rough bark at the base, but not so fibrous, nor so persistent up the trunk as in *E. Westoni*. 
DESCRIPTION.

CCCLXXV. E. microneura Maiden and Blakely.


Arbor parva, cortice Box simili, ramulis gracilibus pendulis; foliis junioribus non visis; foliis maturis parum glaucis supra subtusque obscuris angusto- v. lato-lanceolatis tenuissimis, marginibus undulati; 8-16 cm. longis, 1-2.5 cm. latis; petiolis teretibus 1.5-2.5 cm. longis, venis tenuissimis, parum conspicuis; venis lateralis et costa 40-45° orientibus, vena peripherica margini approximata; inflorescentia terminal paniculata 3-6 cm. longa vel longior, pedunculo umbellarem singularum tereti 3-5 flores pedicellatos ferente; alabastris glaucis parum ellipticis 5-6 mm. longis, 3 mm. diametro; operculo calycis tubo, campanulato paulo longiore; antheris semi-terminalibus; fructu turbinato v. campanulato pedicellato obseque 2-3 costa, 5-6 mm. longo, apice 5-6 mm. lato; valvis brevibus latis, apicibus parum exertis.

A small tree with a Box-like bark and slender drooping, glaucous leaves and branchlets.

Juvenile leaves not seen

Mature leaves slightly glaucous and dull on both surfaces, narrow to broadish lanceolate to falcate lanceolate, acuminate, very thin with slightly undulating margins, 8-16 cm. long, 1-2.5 cm. broad, petioles terete and slender, 1.5 to 2.5 cm. long. Venation very fine, almost invisible, the midrib depressed or channelled above, prominent beneath, the lateral veins making an angle of 40-50 degrees with the midrib, intramarginal vein close to the edge.

Inflorescence a terminal panicle, 3 to 6 cm. long, or longer, the common peduncle of each umbel terete, about 1 cm. long, supporting three to five distinctly pedicellate flowers. Buds glaucous, somewhat elliptical, acute, 5 to 6 mm. long, about 3 mm. in diameter, the operculum slightly longer than the campanulate, faintly ribbed calyx-tube. Anthers semi-terminal. Floral disc obscure, represented by a thin, dark membrane lining the shallow calyx-tube and extending over the convex ovary.

Fruit turbinate to campanulate, pedicellate, faintly two or three ribbed, 5-6 mm. long, about 5 mm. broad at the top, truncate, 3-4 celled, the valves short and broad, with the tips sometimes slightly protruding. Capsular disc thin, forming with the staminal ring a slightly thickened oblique rim over the top of the capsule.

The type is C. T. White, No. 1385, February, 1922, and his No. 1384 may be taken as a co-type.

RANGE.

So far as we know at present, it is confined to northern Queensland, for it has only been collected on the Gilbert River. "Very abundant, Box-bark" (C. T. White, No. 1385, February, 1922. The type). "Small trees, Box-bark," Forsayth (Etheridge Railway), North Queensland (C. T. White, No. 1384, same date).
AFFINITIES.


Both species are Boxes, with a hard, more or less deeply furrowed bark, but the colour of the timber of *E. microneura* is unknown, while that of *E. Spenceriana* is a dark red. The leaves of both species are very much alike as regards venation and texture, but the leaves of *E. Spenceriana* are not glaucescent, and other characters, such as the anthers and the fruit, are also dissimilar to those of *E. microneura*.


This is also a Box with a wide northern range, and in cortical characters it resembles *E. microneura* and *E. Spenceriana*, which is also a northern species. The leaves of *E. microtheea*, like those of *E. microneura*, are more or less glaucescent, but the venation is coarser in the former, and the fruits are small and very different to those of *E. microneura*.

3. With *E. Whitei*, n.sp.

Some of the fruits of *E. Whitei* resemble those of *E. microneura*, and the leaves of both are more or less glaucescent. *E. Whitei* is, however, an Ironbark, and not only does it differ from *E. microneura* in the bark, but also in buds and anthers, as well as in the venation and texture of the leaves. Both species are found at no great distance from each other, and they may eventually be found in close association.
CLXX. E. Dundasi Maiden.

In Crit. Rec., Part XXXIII, p. 82, and Plate 129.

Messrs. Kessell and Gardner publish a photograph of the tree, and the following amplified account of this little known species at pp. 42, 43 of their "Key to the Eucalypts of Western Australia" (Forests Department, Western Australia, Bulletin No. 34, 1924).

E. Dundasi Maiden—"Dundas Blackbutt" (2532, 4121), (2,532, 4131).

An erect tree of 30 to 60 feet, with erect or scarcely spreading branches, and the usual obconical, or umbrella-like appearance of the common Goldfields trees. Trunk to 20 or 25 feet, and up to 30 inches diameter. Bark of the base of the trunk forming a dark-coloured butt, of 6 to 11 feet in height, rarely extending to the branches, and often ending abruptly, with a sharp distinction between the upper and lower barks. Butt bark thick, black, tessellated, or shortly, narrowly, and deeply fissured, brown in outer section, yellowish-white in inner section. Upper bark thin, rich reddish-brown, with grey crisped flakes of shedding bark, white in fracture. Timber dark brown, exceedingly hard and dense, with a white sapwood of about ⅛ inch thick in mature trees. Leaves small and bright dark shining green; flowers white, about ½ inch diameter.

Economic uses.—An uncommon tree, except in its restricted habitat. Has been used to some extent in the past for mining timber in the Norseman district. All the trees examined were sound and free from termites.

Habitat.—From about 4 miles south of Lake View (Gilmore's), northwards to near Higginsville, in red, gravelly loam, forming pure stands in the alluvial soil around Lake View and Dundas, but more scattered to the north of Norseman, where it is rare. It flowers in April.

Botanical characteristics.—Juvenile leaves at present unknown. Mature leaves alternate, on slightly angular or terete branchlets, narrow-lanceolate, acuminate, with a hooked apex, on petioles of ⅓ to ⅔ inch, the whole leaf 2½ to 3⅔ inches long, and under ⅛ inch wide, bright shining green on both sides, rather leathery and thick, with a prominent midrib and slightly thickened margins, and inconspicuous roughly parallel veins, the intramarginal one close to the edge. Flowers in axillary, or rarely lateral umbels, on a slender slightly flattened peduncle, thickened at the top, and supporting four to six flowers on short pedicels. Calyx-tube dark shining green (drying almost black), slightly over ¼ inch long, cylindrical-lanceolate or constricted about the middle, striate or obscurely ribbed, dilated at the orifice. Operculum hemispherical with a
prominent beak, or hemispherical-conical, about half the length of the calyx-tube. Filaments white, a little over $\frac{1}{2}$ inch long, inflected in the bud, with oblong anthers attached near the base and opening in parallel cells. Fruit cylindrical, about 4 lines long, with short distinct pedicels, dark green, angular, or finely but obscurely ribbed, straight or slightly constricted above the middle, the orifice not constricted, with a prominent narrow rim and deeply sunk capsule with short well included deltoid valves. Seeds very small, brown and minutely striated.

The species is related to *E. oleosa*, and the other members of that series, having almost the operculum of some of the Mallee forms of that species. The perfectly cylindrical fruits and different anthers, together with the venation of the leaves, make it distinct. The habit is that of a Morrel, with a bark closely similar to that of *E. Stricklandi*, but darker in the butt.

I have seen a specimen from Gilmore's, 25 miles south of Dundas, Western Australia (C. A. Gardner, No. 2230, May, 1924 Figured at Plate 282.) Buds three to six in the umbel, distinctly urceolate or constricted in the middle, as is the case in the undeveloped fruits. Ripe fruits oblong-cylindrical, slightly ribbed, the valves well enclosed. Anthers versatile, opening in long parallel slits.
LXXXIV. *E. diptera* Andrews.

See Part XVI, p. 206, with Plate 71.

This is another rare species which Mr. C. A. Gardner has rediscovered, and the following account of it is taken from Kessell and Gardner's "Key to the Eucalypts of Western Australia," Forests Department, Western Australia, Bulletin No. 36 (1924), p. 39.

*E. diptera* C. Andrews—"Bastard Gimlet." (1532, 5451).

A small tree of 20 to 27 feet, with a slender trunk of 6 to 10 feet, fluted or angular, and thin erect branches and reddish branchlets, trunk to 8 inches diameter. Bark thin, brownish-green, or greenish-red, exactly similar to that of the true Gimlet, smooth throughout. Timber brown, rather pale, hard and dense, tough. Leaves dark shining green, flowers greenish-yellow.

Economic uses.—Of no commercial use.

Habitat.—Vicinity of Salmon Gums on the Esperance Railway, northwards to Gilmores and Lake View, in clay loam, on flats, in the Salmon Gum and Merrit or Blackbutt forest. Flowering months, June-July.

Botanical characteristics.—The juvenile leaves are unknown at the time of writing. Mature leaves alternate, erect, on twisted, slightly flattened petioles, narrow-lanceolate, thick and shining, 2½ to 3½ inches long and ½ to ¾ inch wide, the same colour on both sides, the midrib prominent with the thickened reddish margins, the secondary veins inconspicuous, roughly parallel, with the intramarginal vein fairly close to the edge. Flowers axillary or lateral in sessile clusters of two to three, usually rather compressed laterally. Calyx-tube almost hemispherical but compressed, much flattened in the lower portion, into a wing which continues longitudinally up the sides to form two conspicuous wings. Operculum conical, compressed with two vertical acute angles corresponding to the continuation of the vertical wings of the calyx-tube, about ½ inch long and acute, scarcely as broad as the calyx-tube, but more or less continuous with it, and reddish-green, contrasting with the green calyx-tube. Filaments lemon-yellow, sharply inflected in the bud, nearly ½ inch long, with oblong anthers opening in longitudinal back-to-back cells. Ovary with a conical summit and thick calyval green style. Fruit hemispherical, with the broad compressed base and vertical wings of the calyx-tube continuing to the top, ½ inch diameter without the wings, or sometimes smaller—rather variable in size—and not quite the same length. Rim thick and broad, the capsule slightly sunk, with three to six valves, deltoid, and more or less flush with the orifice, but slightly exserted.
The affinities are with \textit{E. conglobata} and \textit{E. salubris}. \textit{E. conglobata} is a shrubby species, or a Mallee with a silvery-yellow or grey bark, and much larger leaves and smaller flowers of a different shape. It has a closer affinity to \textit{E. salubris} and \textit{E. campaspe}, differing from the former in its wider fruits and buds, and from the latter in its total absence of glaucousness, and from both in the very remarkable broad wings of the buds and fruit. Locally it is looked upon as a "Gimlet."

With some good specimens, Mr. C. A. Gardner sent me the following note:

"A tall shrub, or more frequently a small tree of 15–26 feet, with a slender trunk of 6–8 feet in height and 6 inches diameter, with erect branches and the usual obconical shape of Goldfields trees. Bark exactly like that of \textit{E. salubris}, but the trunk not quite so fluted; the colour, thickness and texture otherwise the same as that of \textit{E. salubris}. Leaves dark green along the flattened top of the tree, fruits fairly densely distributed on the branchlets below the leaves. Flowers greenish-yellow. Fruits usually 4-6 valved." Salmon Gums, 60 miles north of Esperance, in open forest of Salmon Gum (\textit{E. salmonophloia}), \textit{E. cremophloia}, and \textit{E. Flocktonia} (Mallee). (C. A. Gardner, No. 2226, May, 1924).

The calyx and operculum are sharply winged. The fruit larger than that figured in the present work, Part XVI, Plate 71. See additional figures in Plate 283.
DESCRIPTION.

CCCLXXVI. E. ovularis Maiden and Blakely.

In Journ Roy. Soc., N.S.W., lix, 194, (1925).

Frutex parvus Mallee similis 6-12 feet altus, caulibus gracilibus; cortice stratis tenuibus secedente; foliis junioribus non visis; foliis maturis alternatis, petiolatis, supra subtusque atro-viridibus, nitentibus crassiulcis angusto-lanceolatis vel acuminatis leviter falcatis 6-10 cm. longis, 5-10 mm. latis; venis obscuris, venis lateralis e costa 25-30° orientibus; vena peripherica margini leniter incrassatae approximatae; inflorescentia axillari, peduneulo leniter compresso, sursum dilatato, umbellam 5-floribus pedicellatis ferente; alabastris urceolatis, calycis tubo operculum obtusum plus dimidio excedente 5 mm. longo, 3 mm. diametro basin versus; antheris oblongis truncatis longitudiniter aperientibus; fructibus ovoideis 4-6 mm. longis, 4 mm. diametro, orificio contractis, plus minusve obscure costatis, margine angusta valvis bene inclusis.

A small Mallee-like shrub, 6-12 feet high, with pinkish-grey, slender stems and flaky bark decorticating in thin flakes. Locally known as "Narrow-leaved Mallee." (C. A. Gardner).

Juvenile leaves not seen.

Mature leaves alternate, petiolate, dark green on both surfaces, shining and somewhat thick, narrow-lanceolate to somewhat acuminate, slightly falcate, 6-10 cm. long, 5-10 mm. broad. Venation obscure; lateral veins spreading at an angle of 25-35 degrees with the midrib; intramarginal vein very close to the somewhat thickened margin.

Inflorescence axillary, the common peduncle slightly compressed and expanded upwards, bearing an umbel of 5-8 pedicellate flowers. Buds somewhat urceolate, the calyx-tube slightly more than twice the length of the short, almost obtuse operculum, 5 mm. long, 3 mm. in diameter at the base. Filaments cream-coloured, inflected in the bud. Anthers oblong, or broader at the top, truncate, opening in parallel slits, the dorsal gland rather large and globose, inserted on the upper half of the anther. Floral disc represented by a membranous-like lining over the top of the ovary, and extending around the calyx-tube towards the base of the staminal ring.

Fruit ovoid, 4-6 mm. long, 4 mm. diameter, three-celled, contracted at the orifice, the rim narrow, the surface more or less faintly ribbed, valves deeply sunk. Capsular disc forming a slightly thickened convex band around the orifice of the capsule, and slightly exceeding the calyx rim.
RANGE.

It is confined to Western Australia, so far as we know at present. Found at a locality called Salmon Gums, 66 miles north of Esperance, in open forest, with E. diptera. (C. A. Gardner, No. 2227, 24th May, 1924. The type.)

AFFINITIES.

   The buds of E. ovularis are very like some of the small-flowering forms of E. dumosa, and the immature anthers also resemble those of the latter species, but the fruits and other characters are very dissimilar.

2. With E. Kondininensis Maiden and Blakely, p 401.
   The anthers of both species are somewhat alike, and the leaves are also narrow, but they are easily separated by other morphological characters.

3. With E. oleosa F.v.M.
   Some forms of E. oleosa are noted for their narrow leaves and in the absence of fruits could be easily passed over as E. ovularis. And as both species are of a somewhat similar habit, it is quite easy to make a mistake.

4. With E. Dundasi Maiden. See Part XXXIII.
   Its affinity with E. Dundasi is mainly in the narrow, glossy leaves, and in the slightly urceolate buds, but the operculum is more rostrate in E. Dundasi, and the anthers are narrower.

   The buds and fruits of E. ovularis are somewhat similar to some of the small forms of E. cladocalyx, but they are much smaller in the former, and the anthers are quite different.
DESCRIPTION.

CCCLXXVII. E. Kesselli Maiden and Blakely.


Frutex parvus Mallee similis: ramulis angularibus; folia juniora non vidimus; folis, maturis alternatis longe petiolatis crassis coriaceis olivan colore referentibus, utroque latere nitentibus, angusto vel lato-lanceolatis, 8-11 cm. longis, 2-2.5 cm. latis, petiolis 3-5 cm. longis; venis obscursculis, costa non prominente et utroque latere obscure striata, venis lateralis tenuissimis e costa 30-40° orientibus, vena peripherica a marginae remota; inflorescentia axillari, floribus tribus breviter pedicellatis pendulis; pedunculo compresso dilatato 2-2.5 cm. longo, media parte 4 mm. lato; alabastris statu perfecto non visis; antheris magnis leniter reniformibus; fructibus crassis turbinatis truncatis, 9-12 valdis costis circa apicem in pedicellum breve crassum angulare 15-18 mm. longum et apice equilatum, valvis acutissimis et valde exsertis.

A small Mallee-like shrub, with somewhat angular branchlets.

Juvenile leaves not available.

Mature leaves alternate, on long petioles, thick, coriaceous, rather flat, olive-green and shining on both surfaces, narrow to broad-lanceolate, 8 to 11 cm. long, 2-2.5 cm. broad, the petioles up to 3.5 cm. long. Venation obscure, the midvein slightly channelled on both surfaces, and scarcely raised above the surface of the leaf; lateral veins very fine, rising at an angel of 30 to 40 degrees to the midrib; intramarginal vein removed a short distance from the edge.

Inflorescence axillary, consisting of three shortly pedicellate, drooping flowers, the common peduncle compressed, dilated upwards, 2-2.5 cm. long, about 4 mm. broad in the middle. Buds not seen, but, judging by the length of the style, the pericarpium is rather long. Stamininal ring broadish, raised above the calyx-rim. Filaments cream coloured, inflexed in bud. Anthers large, almost reniform in shape and larger and broader than the anthers of E. goniantha; gland dorsal, large, and globular.

Fruit thick, turbinated, truncate, with 9-12 strong corrugations around the top, which diminish into the short, thick, angular pedicel, 15-18 mm. long and as broad at the top. Valves usually four, with needle-like points protruding well beyond the top of the capsule, as in E. oleosa and E. longicornis. Capsular disc conspicuous, forming a raised ring around the orifice, and slightly higher than the elevated corrugations of the capsule.

In honour of Stephen Lackey Kessell, Conservator of Forests of Western Australia, who has, during his period of office, given every facility for the elucidation of the flora of his State.
RANGE.

Only known from Western Australia. Found in sandy loam in Mallee thickets at a place called Salmon Gums, 66 miles north of Esperance. (W. P. Brown, per C. A; Gardner, No. 944A. The type.)

AFFINITIES.


Both species are Mallees, and have much in common as regards the buds and fruits, but *E. Kesselli* seems to differ mainly from *E. corrugata* in the broad compressed peduncle and in the more turbinate fruits, the valves of which are more slender, and the capsular disc is broader. The anthers are also broader than those of *E. corrugata*.


The buds and fruits of *E. Griffithsii* are in threes, like those of *E. corrugata* and *E. Kesselli*, but the operculum is very short in *E. Griffithsii*, and the fruits are of a different shape and only faintly ribbed, while the common peduncle is terete.


From the imperfect material of *E. goniantha* it appears to differ from *E. Kesselli* in the narrower leaves, different venation, and in the more numerous flowers of the umbel. The anthers of both species are very much alike, but those of *E. goniantha* seem to be smaller and narrower.
CCCLXXVIII. *E. Desmondensis* Maiden and Blakely.


*Frutex* gracilis glaucus 10-15' altus, ramulis longis flexuosis pendulis, caulis ad 4' diametro, cortice laevi albo pulvereo; folis junioribus non visis, foliis maturis petiolatis oblungis vel lanceolatis, crassis, supra subtusque glaucis, 6-11 cm. longis, 12-25 mm. latis; venatione obscure, venis lateralis et costa 40-50° orientibus; vena peripherica a margine incrassata remotis; inflorescentia axillaris, pedunculo plano 15-19 mm. longo, 5 mm. lato superiore parte; pedicellis fere absentibus, alabastris fere infundibuliformibus, operculo acuto longioribus; antheris versatilibus oblongis late paralleliter dehiscentibus glandula magna; style fere quadrangulari; stigma parva disco simili; fructibus non visis.

A slender glaucous shrub, with long flexuose, drooping branches, 10-15 feet high, the stem up to 3 or 4 inches in diameter. Bark smooth, almost white, and powdery almost to the ground. (C. A. Gardner).

**Juvenile leaves** not seen. They will, without doubt, be more glaucous and broader than the mature ones.

**Mature leaves** alternate, petiolate, oblong to lanceolate, thick, glaucous on both surfaces, 6-11 cm. long, 12-25 mm. broad. Venation somewhat obscure, lateral veins forming an angle of 40-50 degrees with the midrib, the intramarginal vein distant from the somewhat thickened margin.

**Inflorescence** axillary, the peduncle strap-shaped, dilated upward into a broadish disc under the flowers, 15-19 mm. long, 5 mm. broad in the broadest part. Buds nearly sessile, almost cylindrical, 7-15 in the head. Calyx-tube somewhat funnel-shaped, longer than the pointed and slightly rostrate operculum. Filaments cream-coloured. Anthers versatile, oblong, opening in broad parallel slits, the dorsal gland large, not exceeding the cells at the top. Style almost quadrangular; stigma small, disc-like.

**Fruits** not seen.

---

**RANGE.**

Only known at present from Western Australia. Desmond, near Ravensthorpe, in sandy, stony soil, on rising ground or ridges. (C. A. Gardner, No. 2183, May, 1924).
AFFINITIES.

In the absence of fruits and juvenile leaves, the position of this plant cannot be stated with certainty, but it appears to be new.

1. With *E. accedens* W. V. Fitzgerald.
   Differs from this species in size (it seems to be a small shrub or tree), glaucousness, more sessile buds, longer and broader common peduncle, and in the more pointed operculum, and also in habit.

2. With *E. reduxca*.
   It is very close to this species, but the habit and inflorescence are quite different. (C. A. Gardner.)

3. With *E. sepulcralis* F.v.M.
   The species has much the habit of *E. sepulcralis*, but has greener leaves.
LXXXIV. *E. aggregata* Deane and Maiden.

**SYNONYM.**

*E. Rydalensis* Baker and Smith:

In "Research on the Eucalypts," ii, 48 (1920), with a figure of a cluster of four fruits.

The description is as follows (only in English, with none in Latin, as required by botanical law):

"A medium-sized tree reaching a height of 40-50 feet, and a diameter of 18 inches; with a thick and spongy, rough deccorticating bark, extending well up the tree. Abnormal leaves shortly petiolate or sessile, ovate to broad-lanceolate, opposite or alternate. Normal leaves lanceolate to broad-lanceolate, more or less shining, acute, usually under 3 inches long; venation fairly distinct in the older leaves, intra-marginal vein well removed from the edge, lateral veins distant, roughly parallel, inclined at an angle of 30-40 degrees with the midrib. Oil glands more prominent in the young leaves. Peduncles short, 1 to 2 lines long, axillary, lateral or in short terminal panicles, each bearing a head of about seven flowers. Buds sessile or almost so, calyx-tube turbinate, 1 line in length; operculum hemispherical, half as long as the tube. Fruit broad, turbinate to hemispherical, sessile, more or less shining; rim domed; valves broad and short, exserted; 2 lines long and 2½ lines in diameter. The fruit rather closely resemble those of *E. Macarthuri* than any other, the slightly rounded rim being perhaps the chief difference. Habitat, Rydal, New South Wales." (Only three trees seen.)

Mr. Baker has given me a specimen of the best material available, and from this the drawing has been prepared. But as, in my view, the material is not sufficient to differentiate it from other species, I give it no number at present.

The affinities of this incomplete material seem to lie between *E. Macarthuri*, *E. maculosa*, and *E. aggregata*.

I can match the buds with either of the first two species, but the fruits are more like those of *E. Macarthuri* than *E. maculosa*; nevertheless they might pass for those of the latter.
There are no juvenile (Mr. Baker's "abnormal") leaves, but intermediate ones, which are oblong to oval, scarcely lanceolate, and therefore resemble those of *E. maculosa* to some extent. It seems to me that three characters point to *E. maculosa*, viz., buds, fruits and intermediate leaves, and two to *E. Macarthuri* viz., buds and fruits.

I do not see the affinity so close to *E. Macarthuri* as to *E. aggregata*. In the former we have a greater tendency to stem-clasping opposite juvenile leaves; in the latter we have the oval leaf seen in *E. Rydalensis*. Typical juvenile leaves of *E. Rydalensis* are not available, and without them it seems to be nearest to *E. aggregata* in general appearance, but not in buds.
This imperfectly known and rare Western Australian species has been collected by Mr. C. A. Gardner, who furnishes the following note:—

"A Marllock, not a sandplain species, but a species with a very reduced stock. 10-20 feet high, erect and erectly branched. Stem or stems to 6 inches in diameter, but usually under 3 inches. Bark greyish, smooth, white in old specimens, a darker greenish-grey in the typical younger plants, smooth, or shedding in small, ribbony flakes. Leaves erect, rather dull, but a shining green, thick and copiously oil-dotted. Buds, flowers, and fruits pendulous. the buds and flowering calyx, also the immature fruit a bright shining scarlet, becoming golden orange-yellow as the fruit ripens, ultimately greenish-grown. Filaments lemon-yellow. Grasspatch and southwards to near Scaddan, and northwards to Salmon Gums, in grey sandy loam, forming low, dense thickets, some specimens flowering in May, but this is not the usual flowering season, which probably occurs in the summer months."

A specimen from Grasspatch (C. A. Gardner, No. 2225), with smaller leaves, and buds with long rostrate operculum nearly as long as the calyx-tube, is figured at fig. 6b, plate 283. Compare Plate 95.
Mallee 4–10 feet altus; caulibus erectis vel patentibus 2–3’ diâmetro dense ramulosis; cortice pallide cinereo, trunci junioris laevi, trunci autem vetusti lamellos; foliis junioribus non visis, foliis maturis, alternatis petiolatis angusto-lanceolatis crassis rigidis laevis pallido-glucis, supra subtasque nitentibus 4–6 cm. longis, 5–9 mm. latis, basi in petiolum breve et compressum angustatis; venis obscurissimis, venis lateralibus e costa 30–40° orientibus, vena peripherica margini confluent; inflorescentia axillari, pedunculo communi tereti alabastra cylindracea 3 parum obtusa ferente; calycis tubo campanulato operculum fere hemisphericum longitudine plus duplo excedente, alabastro omni 10 mm. longo; pedicellis gracilibus 2–3 mm. longis; filamentis colore lactis floris imbuitis, indaco obscuribus dispositis; antheris versatilibus longitudinaliter aperientibus; fructibus crassis late campanulatis 7–9 mm. longis, 7 mm. latis, margine truncata, valvis brevibus et inclusis.

“Narrow-leaved Mallee.” A Mallee, 4–10 feet high, of widely spreading habit. Stems erect or spreading, more or less virgate, densely branched, imparting to the plant an almost globular outline. Bark light ash-grey in colour, smooth when young, but becoming flaky when old, with tardily shedding plates of darker grey bark. Stems 2–3 inches diameter. Leaves glaucous, narrow, buds shining with reddish opercula, and young reddish-green fruits, which become mealy-white with age.

Juvenile leaves not available.

Mature leaves alternate, petiolate, narrow-lanceolate, somewhat thick and rigid, more or less acute, tapering into a rather short, compressed petiole, smooth, pale glaucous green and shining on both surfaces, 4–6 cm. long, 5–9 mm. broad. Venation obscure, the midrib more or less channelled on both sides of the leaf; the lateral veins spreading at an angle of 30 to 40 degrees to the midrib; intramarginal vein confluent with the nerve-like margin.

Inflorescence axillary, the common peduncle terete, about 5 mm. long, bearing three cylindrical, slightly obtuse buds. Calyx-tube somewhat campanulate, more than twice the length of the somewhat conical operculum, the entire bud about 10 mm. long; pedicel slender, 2–3 mm. long. Filaments cream-coloured, arranged in two rows around the staminal ring. Anthers (immature) versatile, oblong or nearly so, opening in long, parallel slits, the dorsal gland large, occupying nearly the whole of the back and usually projecting over the top of the cells in front. Floral disc forming a dark-coloured lining over the top of the ovary and extending up the calyx-tube to the slightly raised staminal ring.

Fruit moderately thick, broadly campanulate, four-celled, 7–9 mm. long, 7 mm. broad, somewhat shining, the rim or disc truncate, valves short and well enclosed. Capsular disc forming a moderately sharp, slightly raised convex ring around the top of the fruit, or what was formerly the staminal ring, which still maintains its raised position.
This species is named in honour of Miss Mary Merrick, who, in her capacity as Librarian and Stenographer, Botanic Gardens, Sydney, has been of very great help to us in our Eucalyptus work.

RANGE.

So far it is only known from Western Australia. It has been found at Grasspatch in sandy, loamy depressions around the salt lakes and saline flats, among other Mallees and small dense shrubs. (C. A. Gardner, No. 1718, on field notes, No. 2218 on herbarium label, 23rd May, 1924.)

AFFINITIES.

1. With *E. Ebbanoensis* Maiden, depicted in Part XLVI, Plate 189.

In the absence of complete material, that species appears to be its nearest affinity in its Mallee-like habit, in the buds and fruits being in threes, and to some extent in the shape of the immature anthers. The other botanical characters are, however, entirely different.

2. With *E. eudesmioides* F.v.M.

This species is also more or less of a Mallee-like growth, and the inflorescence appears to be always in threes. The leaves, however, are opposite for a long period, and they are much shorter and broader than those of *E. Merrickae*, while the buds and fruits, although bearing a slight resemblance, are nevertheless quite distinct from those of *E. eudesmioides.*
CLXXXIX. *E. clavigera* A. Cunn., var. *Gilbertensis*
Maiden and Blakely n. var.

See *E. clavigera*, Part XXXVII, p. 179, with Plate 152.

"A tree of stunted, crooked growth, stem clean, or slightly scaly at base." Ridges, Gilbert River, North Queensland (C. T. White, February, 1922.)

The above are all the field notes available.

The leaves are delicately petiolate, semi-peltate, thin, the same colour on both sides, and both leaves and stems are covered with minute, white, stellate hairs. Leaves opposite. The flowers are on short racemose stems, axillary. The fruits are thin, oblong, slightly constricted, three-valved.

AFFINITIES.

1. With *E. clavigera* A. Cunn.

This appears to differ from the typical *E. clavigera* in the smaller and narrower petiolate and semi-peltate, minutely hispid or hispid-stellate leaves. In *E. clavigera* the hairs are not stellate. The leaves are a different green, and thicker and larger. The leaves of the form under consideration are so uniformly narrow that I am inclined to think it is distinct from *E. clavigera*. This note is published in order that the plant may be further searched for. The fruit, although small, does not differ materially from *E. clavigera*.

2. With *E. ferruginea* R.Br.

It seems to be nearer to *E. ferruginea* in the vestiture, but it is white and more setose, while the midrib is not compressed on both sides like that of *E. ferruginea*.

3. With *E. aspera* F.v.M.

The cordate character of the leaves seems to point in the direction of *E. aspera*, but the fruits are different.

The leaves of *E. clavigera*, *E. ferruginea* and *E. aspera* are sessile or very shortly petiolate, so that it does not match any of these species in this respect.
THE SPECIES QUESTION.

1. What is a Species?

The amount of literature on the "Species question" is enormous; some of it has been referred to as the work progressed, and one can only quote a little at this place.

The Botanical Society of America, at its meeting of 1st January, 1908, held a symposium on the subject, and Publication 34 of the Society (published at Baltimore, 30th May), comprises a number of brilliant papers, as follows:—

5. "An Ecological Aspect of the Conception of Species," by Dr. H. C. Cowles.

These were followed by a discussion, admirable, like the papers. I only wish I could reprint the whole report.

"The question, What do we mean by a species? is far too difficult a matter to discuss now... I believe we cannot do better than continue to use the word in the same sense as Darwin used it, i.e., essentially in the sense of a Linnean species." (Dr. D. H. Scott, F.R.S., in Pres. Address [Botany], B.A. Meeting, Edinburgh, 1921.)

Leonard Huxley’s "Life and Letters of Sir Joseph Dalton Hooker," vol. 1, chapter xxiv (On Species), is well worth reading here.

2. Variety or Species.

"Tournefort declared that it troubled him very little whether the species he cited were species or varieties, as long as they differed in remarkable and perceptible qualities; Adanson approves this view, remarking that it seems to him sufficient and reasonable..." And again,

"All properties of plants which are subject to change, form either a subspecies or a variety. By the former we understand such forms as continue indeed during some reproductions, but at last, by a greater difference of soil, of climate, and of treatment, are either lost or changed." (Britton; Symposium, quoted above.)

The American botanist, Dr. G. H. Shull, says that taxonomists have definitely abandoned the use of the term "variety" to the horticulturist. Although there is undoubtedly a tendency in this direction, particularly perhaps, amongst American botanists, varieties are acknowledged in the International Rules of Botanical Nomenclature, adopted by the International Botanical Congress of Vienna, 1905, and we
should obey the ruling of this Congress until it is constitutionally altered. A form described as a variety sometimes proves, on further examination, to be worthy of specific rank, and it has sometimes been practically convenient to so keep it in suspense as to whether a certain plant is deemed to be a species or a variety is not of the greatest importance. Those who look upon it as a distinct entity have it in common that they are agreed that it is distinct, and this is really important; those who look upon one as a variety of another go further, and indicate affinity; this may be a valuable opinion.

3. INEQUALITY OF SPECIES VALUES.

In this connection it may be well to be reminded of the pronouncement of the immortal Hooker (Intro. Flora of Tas., XXX, 1859):—

"I need hardly remark that the very different opinions entertained by botanists as to what amount and constancy of difference between many forms of plants should constitute a species, renders all such comparisons vague, and I may add that no two or more botanists can ascertain the comparative value of their opinions except they have exactly the same materials to work with. It is too often forgotten that in the sciences of observation what are called negative facts and evidence are worthless as compared with positive."

Dr. B. L. Robinson expresses a similar view in different language:—

"It is easy to see that species as now recorded in literature are by no means alike, and that they cannot be regarded as equivalents in any complete or logical system of classification. Curiously enough the term 'species' seems to be growing more and more popular, as it means less and less. Often, and on all sides we hear lengthy arguments and emphatic assertions to the effect that this or that plant is a 'perfectly good species,' and if in the course of monographic work a so-called species is let down to varietal rank, it rarely fails to find somewhere its ardent defenders, who appear to hold the curious view that the monographer has not merely expressed a scientific opinion, but has somehow perpetrated an injustice upon the plant or its describer. It will soon be accepted as indisputable that 'species must be subjected to a gradual reclassification along more definite lines. . . . Each species must be examined in the light of vastly more copious material than at present exists, even in our largest herbaria. . . . Let us then, proceed with the accumulation of material, with the collection of specimens that may illustrate each species at every stage of development in which it occurs. In this matter we are much behind zoologists; they often work with hundreds, or even thousands of specimens, while we try to draw like inferences from dozens." (Pres. Add. before the Botanical Society of America, quoted in my Pres. Add., Linna. Soc., N.S.W., Proc., xxvi, 801, 1901.)

4. NO FIXED LINE OF DEMARCATION BETWEEN SPECIES.

"Varietates levissimas non curat botanicus," says Linnaeus.

Asa Gray to Darwin, 30th June, 1855, remarks—

". . . for the rest it would not be extraordinary if, in any case, the discovery of intermediate forms compelled their union" (of species).

The same botanist observes—

"The fewer the materials, the smaller the likelihood of forms intermediate between any two, and, what does not appear, being treated upon the old law-maxim as non-existent. . . ."
Then Alphonse de Candolle says—

"But as the materials increase, so do the difficulties. Forms which appeared totally distinct, approach or blend through intermediate gradations; characters, stable in a limited number of instances or in a limited district, prove unstable occasionally, or when observed over a wider area; and the practical question is forced upon the investigator: What here is probably fixed and specific, and what is variant, pertaining to individual, variety or race?" ("On the Variation and Distribution of Species," by Asa Gray, Collected Works (Sargent), i, 132).

A brief discussion on the really insoluble question as to the amount of difference from an existing species to constitute a new one, will be found at Part XXVIII, p. 159 (under E. vernicosa), and at pp. 161, 162 (under E. Muelleri).

The intermediate forms can be indicated by curves. In a Presidential Address (Proc. Linn. Soc., N.S.W., xxvi, 799, 1901), before the Society, I tried to emphasise the variation of species in Eucalyptus, and the way in which the forms belonging to allied species overlap, by suggesting the use of concentric circles, and offered a figure. Where these intersect, a form may be said to be referable to one species or the other. So variable, however, is Eucalyptus, that someone has perpetrated the joke that all forms are varieties of one species—E. australis.

The reviewer (Journ. Bot., xxxii, 315) of the "Letters of Asa Gray," quotes him as "half dead with Aster," which large genus he was revising. "Never was there so rascally a genus! I know at length what the types of the old species are; but how to settle the limits of species I think I shall never know." And so on.

In the same volume (p. 225) we turn to Hanbury's "Notes on British Hieracia," which also shows that botanists in older countries have difficulties in regard to the demarcation of species similar to those which confront us in Australia in Eucalyptus. And when we also dip into such genera as Salix and Rubus, we see that their difficulties are most formidable, in spite of the fact that they have wider experience than we.

As one example out of many, let us consider the relations of E. botryoides and E. saligna, whose puzzling overlapping I have tried to work out (quoted in Part XXIII, p. 52).

Until such time as every plant on the earth has been collected, and every species appraised (and while this is being done other species are in the making), it must be the case that there are inequalities of value between species, some being termed "strong," probably because we have not stumbled upon their close relations. I say "stumbled upon" advisedly, because, except over small areas, collecting in Australia has been done unequally, and even spasmodically. There is little of the drag-net about it. The element of luck comes in, for, in a continent, a careful man may easily miss an interesting species, while a careless and even ignorant one may stumble upon it. Many species of Eucalyptus were first collected fortuitously.
Referring to Australian Desmidiaceæ, the late Mr. G. I. Playfair wrote to me—

"I find the polymorphism so widespread and intricate in these aquatic organisms that to a large extent I have had to give up the attempt to arrange the nomenclature on a true biological basis, and have returned to conventional species as far as the nomenclature goes."

See also the remarks of Dr. B. L. Robinson, under "Inequality of Species Values" at p. 434.

I have already quoted Irving Bailey (Part LIV, p. 196) as showing that anatomical study of timbers breaks down as regards classification. In his "First and Last Things," H. G. Wells gives a presentation of this and cognate matters, in his usual lucid way:—

"A mind nourished on anatomical study is, of course, permeated with the suggestion of the vagueness and instability of biological species. A biological species is quite obviously a great number of unique individuals which is separable from other biological species only by the fact that an enormous number of other linking individuals are inaccessible in time (are in other words, dead and gone), and each new individual in that species does, in the distinction of its own individuality, break away in however infinitesimal degree from the previous average properties of any species, even the properties that constitute the specific definition, that is not a matter of more or less. (p. 14.)"

"... And this is true not only of biological species. It is true of the mineral specimens constituting a mineral species, and I remember as a constant refrain in the lectures of Professor Judd upon rock classification, the words 'they pass into one another by insensible gradations.' It is true, I hold, of all things. (p. 15.)"

"... It is true you can make your net of logical interpretation finer and finer, and you can fine your classification more and more—up to a certain limit. But essentially you are working in limits, and as you come closer, as you look at finer and subtler things, as you leave the practical purpose for which the method exists, the element of error increases. Every species is vague, every term goes cloudy at its edges; and so is my way of thinking, relentless logic is only another name for a stupidity, for a sort of intellectual pig-headedness. If you push a philosophical or metaphysical inquiry through a series of valid syllogisms (never committing any generally recognised fallacy), you nevertheless leave behind you at each step a certain rubbing and marginal loss of objective truth, and you get deflections that are difficult to trace at each phase in the process. Every species waggles about in its definition, every tool is a little loose in its handle, every scale has its individual error. (p. 18.)"

"... There is a growing body of people which is beginning to hold the converse view—that counting, classification, measurement, the whole fabric of mathematics, is subjective and untrue to the world of fact, and that the uniqueness of individuals is the objective truth. As the number of units taken diminishes, the amount of variety and inexactness of generalisation increases, because individuality tells for more and more. Could you take men by the thousand billion, you could generalise about them as you do about atoms; could you take atoms singly, it may be you would find them as individual as your aunts and cousins. That concisely is the minority belief, and my belief." (p. 34.)

5. JORDAN'S SPECIES.

"Let us take as an example the numerous forms of Linnaeus's species, Draba (Erophila) verna studied by Jordan (1873)... He distinguished more than 200 forms (an extreme case, J.H.M.), each of which preserved its own special characters for many generations with complete constancy. There can be no doubt that more extended investigations would have resulted in the discovery of an even greater number of forms, distinguished by minuter differences, so that, in short, there would appear to be no limits to species-mongering." (Jost's "Plant Physiology," Gibson's Trans., p. 385.)
Bateson says: "Between Jordan with his 200-odd species for *Eroplila* and Grenier and Gordon with one, there is no hesitation possible, Jordan's view . . . is at least a review of natural facts, whereas the collective species is a mere abstraction."

Jost uses the phrase "species-mongering" perhaps with a little pardonable impatience, bearing in mind the human tendency to form two camps, the "splitters" and the "lumpers," both groups of honest empirics. The fact remains that the extent to which the working botanist will divide plants will remain a matter of expediency—if the subdivision be too minute, nomenclature defeats the very object for which it was established, and in place of no names at all, we substitute an unworkable aggregation of them.

6. A Classical Case of "Splitting."

Jordan's is scientific splitting, but Swainson's case of empirical splitting is wicked. It is in an unlikely place to look for it, viz., "Further Papers relative to the Discovery of Gold in Australia." Presented to (British) Parliament, December, 1854. Botanical report by William Swainson, F.R.S., pp. 98 et seq.

I have abstracted it in my Presidential Address before the Linnean Society of New South Wales (*Proc.* XXVI. 797, 1901). Swainson had the temerity to give an exhibition of reckless species-making that, so far as I know, stands unparalleled in the annals of botanical literature. As a "shocking example" as to what lengths an unbridled systematist may go, it certainly should not be buried in the pages of a geological Blue-book. *Of Eucalyptus* alone, from limited areas in Victoria, and one in New South Wales, he makes no less than 1,520 species and varieties. After that performance, his list of 201 species of *Casuarina* from a limited area is a mere trifle.

7. Application of Zoological Tests to a Botanical Species.

Speaking of a zoological classification of galls, i.e., according to the animal causing the gall, Kerner and Oliver ("The Natural History of Plants," ii, 528) say—

"A systematic classification of this sort, on the lines of the classification of animals, might be of use to zoologists, but to the botanist its value is only secondary. He must, as in other similar cases, keep to morphology as the primary ground of classification, and has to arrange the structures according to their agreement in development."

For a long time I hoped that the insects forming Brachyscelid galls would exercise such a discrimination towards species of Eucalyptus that a basis of Eucalyptus classification would be available, but it broke down as knowledge progressed. See Part LXVI, p. 282, of my "Forest Flora of New South Wales."

Following a somewhat similar train of thought, zoologists may make interesting observations that the White Ant or the Native Bear take up certain attitudes to plants representing certain botanical species, but, inasmuch as these animals cannot, as a rule, be practically applied to specimens of Eucalyptus to secure diagnoses based on their food plants, we cannot employ them as a means to that end.
8. Variation in the Genus.

Let me invite attention to what has been written in Part I, p. 1, and Part VIII, p. 246 ("Variation is going on now").

The plates of the present work are eloquent as to variation in individual species, even after making allowance for differences of opinion as to whether a few of the forms depicted may possibly be preferably put into adjacent species.

See also, as almost casual references, "On the General Phenomena of Variation in the Vegetable Kingdom" (Hooker's "Introductory Essay to the Flora of Tasmania," v), and "Darwinism," by A. Russel Wallace, p. 76 (1889), Section on "The Variability of Plants." "The variability of plants is notorious," &c., as, indeed, is the experience of everyone who has come into intimate association with them.

The first and most common variation resulting from excessive food supply is a general increase in size. This is illustrated by the coastal giants, and the mallees, and also by the dwarf species on exposed mountain tops, dwarfed partly by exposure and partly by deficiency of nutriment.

"Experience has shown that when once variation of this nature (arising from excessive nutrition) has set in, other variations in shape, texture, colour, flavour, &c., may reasonably be expected." ("Year-book of Agriculture," 1896, p. 92.)

Turning to another contributing cause—

"All the phenomena of life have a definite relationship to environment, and therefore, as I shall endeavour to show in this book, the consideration of the configuration of the organs of plants is not merely a comparative historical criticism, but must take into account all the conditions of environment which we find at the present day." (Preface, German edition, "Organography of Plants," Goebel, i.)
THE STRUGGLE FOR TAXONOMIC DEFINITENESS.

1. The Ideal of the Type.

On 5th December, 1917, instead of formally reading my paper, "Notes on Eucalypts (with description of a new species), No. V," I obtained permission of the President of the Royal Society of New South Wales (Dr. J. B. Cleland) to offer certain observations on species, of which following is an abstract:—

"Last winter a friend with chemical leanings said to me, 'I do not understand this talk about species.' I replied that I could sympathise with him, for chemistry is a fundamentally different subject to what it was when I studied it as a young man. . . . An outstanding 'fact' in natural history is the type, and the ascertainment of this is a function of the naturalist. It is not that of the chemist.

"It would not be easy to exaggerate the importance of definiteness in regard to the type. Personally, I have shown the strength of my faith, by the way in which I have spent freely of my limited financial resources with the view of seeing or procuring types, and have given up my leave over and over again with the same object. I may point out that Mr. Charles Hedley has been engaged in analogous work in the domain of entomology, and it would not have been possible for him to enunciate some of his philosophical generalisations concerning affinities and migration unless, by his researches he could plant his feet firmly on the rock of the type. And with another passing reference to the work of those who regularly attend our meetings, may I point out, Sir, the drudgery that you and Mr. Cheel have found it necessary to undertake in regard to the types of fungi, so necessary for your researches into life-histories.

"In many cases ascertainment of the type is still open to proof, and sometimes, in search of it, we go up one lane and down another, and finally, maybe, we find that we are on the wrong track. But we may make a direct contribution to human knowledge by showing that we have gone on the wrong track, provided we record details of our pilgrimage. It will be a warning to others not to proceed in that direction. The fact that botanists sometimes follow wrong clues does not necessarily show that their methods were wrong, but that they are fallible human beings with some of the defects of the human intellect.

"A man who takes the risk of guessing at the type may build on a shifting foundation; he must at times be uneasy because he knows that the true type may be found, and much of the superstructure and inference he has built may have to be remodelled. In such a case the brave man is he who faces the facts, who says, Truth is eternal, that nothing matters but the truth! So that a man may be judged by his recantations, if any, and certainly the bravery of holding an impossible position, although a glorious thing in the poetry of war, has no analogy in science. Recantation
may be a sign of strength and not of weakness, and it is necessary to emphasise this where there may be flabbiness in regard to principle. On the other hand, we must not make a recantation without very carefully considering the evidence that seems to tell in favour of such a course, otherwise we shall be like a straw blown by the wind.

"Different workers give what I have referred to as physiological species different names. This is an expression of the desire to co-ordinate form and function. I have written and spoken on this subject for many years, at least from 1889, in my Linnean Presidential Address for 1902, and in my British Association paper in 1914, for example. The lines of demarcation of the physiological species are always hard to define. There must always be a penumbra. In 1902 I employed comparison of the overlapping of circles and water supplies; in 1914 I quoted, taking an illustration from history, the saying of Lord Haldane that the historian surely must resemble a portrait painter rather than the photographer. . . . (See Part LVII, p. 291.)

"And so through the gamut of human experience the outstanding lesson we have to learn is to view subjects from as many aspects as possible. The point that non-taxonomists and non-botanists often confuse is that while physiological characters may illuminate our eyes in order that we see morphological points which were not previously clear, we cannot use these physiological characters for the purpose of classification in ordinary taxonomic work, except in so far as they can be translated into the morphological character correlated to them. . . ."

2. HOW TO DESIGNATE THE TYPE.

Useful papers for reference are:


"The type specimen of an organism constitutes a fixed point in the taxonomic survey of the group of individuals which make up the species, and, while it may not be typical of the latter in the ordinary English sense, it does at least determine one form which must remain in the species no matter how opinions may vary as to its limits. It is now generally held that only one specimen is to be regarded as the true type (holotype), all others studied by the author in describing his species being paratypes or co-types . . . . In the case of trees, shrubs and perennial herbs, it is furthermore possible to collect fresh sets of specimens in subsequent years from the type plant, thus rendering it possible to send specimens to all parts of the world. The word merotype has been proposed to designate such specimens, and may be defined as follows:—merotype (mucos, a part). A part of the individual organism that furnished the type specimen of a new species, such part usually containing organs homologous to those represented in the type specimen."

(2) "Clastotypes, clonotypes and spermotypes, means for multiplying botanical type specimens," by Walter T. Swingle, op. cit., ii, 344, August, 1912.

"It is often possible to distribute to other herbaria fragments of existing types, and these, even if very small, often have a high value. Such parts of types may be called Clastotypes (Klintos, broken). . . . Cuttings or buds taken from the plant that furnished the type specimen can be indefinitely multiplied by vegetative methods. Specimens cut from such plants may be called Clonotypes (Klon, a young shoot, a twig). . . . Still another method of multiplying typical material is the sowing of seeds collected from the individual plant that furnished the type specimen. Specimens cut from the seedlings may be termed Spermotypes (Sperma, a seed)."

"It is becoming more and more evident that only by the use of the method of types (Cook: O. F., 1898, "The Method of Types," in *Science* (N.S.) viii, 513-6, No. 198, October 14; Cook, O. F., 1900, "The Method of Types in Botanical Nomenclature," in *Science* (N.S.) xii, 475-98, No. 300, September 28) can any stability be secured in taxonomy. In spite of a growing realization of this fact, there has been no adequate appreciation on the part of botanists of the great advantages offered by plants over animals in the facilities they afford for the multiplication of type material. The paper is divided into—

"Primary Types. . . . "The type specimen is therefore unique, and cannot exist in duplicate."

"Reproduced Types.—This deals with photographs and casts.

"Syntypes and Paratypes.—If, as is usually the case, several specimens from distinct plants and often from different localities are used by the author in describing his species, the type material belongs to one of two categories. Either the author did not directly or indirectly designate a type, and therefore all the specimens are Syntypes ('Scientific Volapuk,' by F. A. Bather, in *Natural Science*, iv, 57, No. 23, January, 1894), or a type was designated, in which case the other specimens studied by the author are Paratypes (A paratype is a specimen belonging to the original series, but not the type, in cases where the author has himself selected a type. It should, however, be one of the specimens mentioned or enumerated in the original description. (Oldfield Thomas, *Proc. Zool. Soc.*, 1893, p. 242.)"

"What are here called Syntypes are also known as Co-types. (A co-type is one of two or more specimens together forming the basis of a species, no type having been selected. No species would have both type and co-type, but either the former, or two or more of the latter (Oldfield Thomas, L.c.), but unfortunately the latter word is also very commonly, though erroneously, used to designate paratypes. Although syntypes are usually segregated sooner or later into a type (lectotype, see Charles Schuchert in Geo. Merrill, 'Catalogue of the Type and figured specimens of Fossils, Minerals, &c., in the Department of Geology, U. S. National Museum,' Bull. 53, Fossil Invertebrates, p. 12), and paratype, it is nevertheless important to avoid any confusion in type material such as is likely to result from using the term Co-type. It would, indeed, be better to abandon altogether the word Co-type. The rules which have been formulated for the typification of species, particularly those given in the American code of botanical nomenclature, suffice in very many cases to determine which of the Syntypes is to be made the Lectotype. (J. C. Arthur et al. "American Code of Botanical Nomenclature," in Bull. Torrey Bot. Club, xxxiv, 172-4, April, 1907.)"

Dr. Swingle's paper contains a valuable summary at the end, and a bibliography which has only been partly quoted by me.

Let us turn to a local paper, "What are type-specimens; how should they be named?" by F. Chapman, A.L.S., *Vict. Nat.*, xxix, 59 (August, 1912).

This is an admirable paper, with useful references. The author quotes Dr. G. B. Goode (*Bull. U.S. Nat. Mus.*, No. 53, p. 8, 1905), defining a type as "A specimen which has been used by the author of a systematic paper as the basis of detailed study, and as the foundation of a specific name. In cases where a considerable number of specimens has been used, it is desirable to separate one or more as being primary types, while the other specimens, which may have been used in the same study for the purpose of comparison, may be regarded as collateral types."

Mr. Chapman pleads for the proper care of types, for it is impossible to overestimate their value, although non-naturalists sometimes seem to think that such special care is really faddism. One of the most difficult things to do is to impress on a
non-naturalist the value of types. He offers a selection of the most important and generally useful terms that he has employed with the palaeontological collections in his care, viz.:

**Holotype** (Schuchert, 1897).

**Co-type** (Waterhouse, redefined by Oldfield Thomas).

**Paratype** (Thomas), together with others mostly already enumerated by Swingle, and which need not be repeated here.

The following paper continues the work of American botanists. In “Type, Co-type and Topotype Labels,” E. D. Merrill (*Torreya*, xvii, 13, January, 1917), the author is speaking of the segregation of valuable specimens belonging to the Bureau of Science of the Philippines. Labels were printed in red ink for Types and Co-types. He then worked up specimens “from localities which are ‘classical’ regions in Malayan botany, and naturally the collections are very rich in Topotypes. The topotype label is printed in green ink, to distinguish it at once from type and co-type specimens. For all practical purposes these topotypes are nearly as valuable as types or co-types.”

In my Presidential Address (*Proc. Linn. Soc., N.S.W.*, xxvi, 802, 1901) I make a small contribution to the subject under the caption of “The duty of clearly indicating species,” and show that, so far as the National Herbarium of New South Wales is concerned, the staff and visitors can readily ascertain the type specimen, so designated by a member of the staff.


A useful, short article showing, “paradoxical as it may sound, that it is the effort made during the last twenty years or so to bring about stability and uniformity in the use of names that has caused such a bewildering diversity.” The difficulties in arriving at a stable botanical nomenclature, partly arising out of the erroneous definitions of genera and species by Linnaeus and some subsequent authors, and the attempts to remedy them, are discussed by a competent taxonomist who has had consideration of such problems forced upon her.

3. Model Descriptions.

The pains I have been at to quote *literatim*, original descriptions of species, have shown me very distinctly that they have been constructed on various models. Had I time and space, I would, in addition to the original description, which is indispensable, have submitted a uniform description, following an approved model, one advantage of which would be that missing data could be inserted in their proper sequence as they became available. I submit, for consideration, the following model for such descriptions. The indication of blanks would be a ready guide to students as to the material still required to complete a full account of the characters of the species.
EUCALYPTUS SCHEDULE.

(a) For Botanical Descriptions.

Species determined.
Locality (including particulars of soil, drainage, &c.).
Collector and date.
Size and habit.
Bark.
Timber.
Young (juvenile) leaves.
Intermediate leaves.
Mature leaves.
Inflorescence (pedicels, peduncles, &c.).
Calyx-tube.
Operculum.
Stamens.
Fruit.
Seed.
Seedling.

(b) For a mainly Economic Work, such as my "Forest Flora of New South Wales."

Botanical Name.
Synonyms.
Vernacular Name.
Aboriginal Name.
Leaves, Oil.
Flowers.
Fruit.
Bark.
Timber.
Exudate.
Size.
Habitat.
Propagation.
Host for Fungi.

4. Labels and Schedules.

E. D. Merrill (University of the Philippines) has a paper "On the Utility of Field Labels in Herbarium Practise," (Science, N.S., xlv, No. 1141, pp. 664–70, 10th November, 1916).
He submits two Field Labels, the following, which will meet the requirements of most establishments, and a second for a special purpose:—

*Collector's Label.*

<table>
<thead>
<tr>
<th>Island</th>
<th>Prov.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality</td>
<td>No.</td>
</tr>
<tr>
<td>Collector</td>
<td>Date</td>
</tr>
<tr>
<td>Local Name</td>
<td>192</td>
</tr>
<tr>
<td>Dialect</td>
<td>Habitat</td>
</tr>
<tr>
<td>Altitude</td>
<td>M.</td>
</tr>
<tr>
<td>Height</td>
<td>M.</td>
</tr>
<tr>
<td>Diameter of trunk</td>
<td>c.m.</td>
</tr>
<tr>
<td>Flower</td>
<td>Fruit</td>
</tr>
<tr>
<td>Special Notes</td>
<td>Economic Notes</td>
</tr>
</tbody>
</table>

In the above, the only notes likely to be locally modified are "Island" and "Prov.", and also "Dialect."

The label of the Forestry Commission of New South Wales runs as follows:—

<table>
<thead>
<tr>
<th>No. of Collection</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>When identified</td>
<td>Species</td>
</tr>
<tr>
<td></td>
<td>Herbarium record</td>
</tr>
<tr>
<td>Name of Collector</td>
<td>Date of Collection</td>
</tr>
<tr>
<td>Common name</td>
<td>Native name</td>
</tr>
<tr>
<td>Locality</td>
<td>Habitat</td>
</tr>
<tr>
<td>Altitude above sea</td>
<td>Tree, shrub, brush, vine, herb</td>
</tr>
<tr>
<td>Height of plant</td>
<td>Diameter at 4 feet 3 inches above ground</td>
</tr>
<tr>
<td>Flower (odour, colour, &amp;c.)</td>
<td>Fruit (kind, odour, colour, &amp;c.)</td>
</tr>
<tr>
<td>Special notes</td>
<td>Economic uses</td>
</tr>
</tbody>
</table>

These labels are of great value for plant-records. As controller of a large herbarium, I know how scanty are the particulars on most labels. As regards Eucalyptus, for obvious reasons I have tried to see to it that the labels are reasonably full, but I find it sometimes very difficult to secure this. A great thing is to give a
locality as definite as possible, and then the heights and distances are often available from the usual sources. It is desirable to err, if at all, in the direction of fullness of particulars. Let them be taken down at once, while standing in front of the tree if possible. It is surprising what a treacherous thing memory is.

Some Aphorisms.

Huxley ("Life," i, 445) says—

In Observational Science we have the collection of facts, and to proceed to
Classificatory Science, by which the facts are arranged, and end with
Inductive Science, in which facts are reasoned upon and laws deduced from them.

Buckle remarks that induction as a reasoning to principles, by which we rise from the concrete to the abstract. The inductive philosopher is naturally cautious and patient, while the deductive one is more remarkable for boldness, dexterity and, sometimes, for rashness. Dear old Darwin (to Wallace, 28th August, 1872), said: "I never feel convinced by deduction, even in the case of H. Spencer's writings." He may be quoted for another thought: "How few generalisers there are among systematists! I really suspect there is something absolutely opposed to each other, and hostile in the two frames of mind required for systematising and reasoning on a large collection of facts." ("Life and Letters of Charles Darwin," ii, 39.)

In the following passage, a critical philosopher speaks of "... Generalisations ..., which, like most generalisations, were mainly wrong, but which stimulated further inquiry." (Leslie Stephen "English Literature and Society in the Eighteenth Century," p. 184, 1921), where he is doubtless referring to our friends the deductive philosophers. Aristotle is credited with having gone further, in having said: "Nothing can be positively known, and even this cannot be positively asserted." This should keep us humble-minded.

On the other hand, every close student of a subject at times feels disheartened by a thought such as this:—"I do not know whether you ever had the feeling of having thought so much over a subject that you had lost all power of judging it." (C. Darwin to C. Lyell, in the former's "Life and Letters," iii, 72.) This is a hint that one must from time to time determinedly lay a subject aside until the mind is refreshed.

While contemplation of the discoveries of our predecessors and contemporaries is right and proper, Milton reminds us that they are also a bugle-call to duty—"The light which we have gained was given us, not to be ever staring on, but by it to discover
onward things more remote from our knowledge." In his "Areopagitica," we have a stimulus of another kind—"Give me the liberty to know, to utter and to argue freely, according to conscience, above all liberties."

Maeaulay, in his essay on the poet Montgomery, gives utterance to a cognate idea when he says—"Men are never so likely to settle a question rightly as when they discuss it freely."

And Gladstone taught us the value of enthusiasm, without which no progress can be made in science—"It is a pity Gladstone puts so much heat, so much irritability into business. Now I (Sir George Lewis) am as cool as a fish.' The worst of being as cool as a fish is that you never get great things done, you effect no improvements and you carry no reforms, against the lethargy or selfishness of men and the tyranny of old custom." (Morley’s "Life of Gladstone," i, 519.)

And yet "So many worlds, so much to do. 
So little done . . ." (Canto 73, Tennyson’s "In Memoriam.")

And in order to keep a man of science humble, when he has got a few facts together and publishes some conclusions concerning them, we are reminded—"That is the worst of erudition—that the next scholar sucks the few drops of honey that you have accumulated, sets right your blunders, and you are superseded." (A. C. Benson, "From a College Window"—"Books.")

A further cheek to personal pride is the thought which has been selected as the motto of this work—that the best men do but add a very little to the pile of knowledge. Another phase of the same idea is conveyed in the following :—"All beginnings are, obscure; something is borrowed from the past, and something is invented for the future till it is vain to fix the gradations of invention which terminate in what at length becomes universally adopted." (Isaac D’Israeli, "Amenities of Literature," Earl of Surrey and Sir Thomas Wyatt.)

We are searching after the truth, although we proceed by different ways, and the great gift is the spirit of truth or "candour." "Candour is a very essential part of a naturalist, and this accomplishment our great countryman, Mr. Ray (the seventeenth century botanist) possessed in an eminent degree; and that rendered him so excellent, if a man was never to write on natural knowledge till he knew everything, he would never write at all, and therefore a readiness to acknowledge mistakes on due conviction is the only certain path to perfection." (Gilbert White, of Selborne, in "Life and
Letters," i, 166.) Nearly a century later we have the same idea—"Truth is truth, whether it is accepted now or in millions of years. Truth is in no hurry, at least it always seemed to me to be so." (Max Müller, "My Autobiography," p. 301.)

"In the study of posture, therefore, it is the same as in other parts of science. Every step of progress makes it possible to formulate new questions, and to delimit anew the bounds of the unknown. In proceeding, one reaches summits which do but open new prospects over vast fields yet to be explored." R. Magnus, Croonian Lecture on Animal Posture, Proc. Roy. Soc. (Biological Sciences), Series B, vol. 98, p. 353, 1925.
EXPLANATION OF PLATES 280-283.

PLATE 280.

_Eucalyptus crassus_ Maiden.

1a, 1b, 1c. Successive stages of opposite juvenile leaves tending towards maturity; 1d, buds and flowers. Yorkrakine Rocks, Westonia, Western Australia. (C. A. Gardner, No. 1750, Western Australian Forests Department Herbarium, 5th October, 1922.)

2. Pair of leaves (from a cultivated tree) almost as advanced as those of 1c. The tree continues to be cultivated at Sydney to see to what extent the leaves progress towards sileakeenes, a sign of maturity. [To supplement Plate 242, which shows leaves far more mature than those of the present Plate.]

_E. kondinina_ Maiden and Blakely, n. sp.

3a. Juvenile leaves, not quite opposite and therefor.e not quite in the earliest stage; 3b, 3c, mature leaves those of 3c being the narrower and more mature; 3d, buds; 3e, front and back view of anther; 3f, fruits. Kondinin, Western Australia (C. A. Gardner, No. 1966, Western Australian Forests Department Herbarium, 9th July, 1929.) The type.


5. Umbel with four buds _in situ_, the buds quite smooth, like the preceding. Darwin.—Schultz (National Herbarium, Melbourne.) [To supplement Plates 164, 165, of _E. terminalis_ F.v.M.]

PLATE 281.

_E. patellaris_ F.v.M.

1a, 1b. Leaves, those of 1b being more mature than 1a. See also those figured at figs. 7a-d, plate 163, which are comparatively short: 1c, compound umbel of fruits showing some deciduous disc slightly hinged to the valves of the fruit and indicating a Corymbosae affinity. The discs of some of the Corymbosae separate from the fruit in a similar manner. 1d, top of fruit, enlarged, showing the tips of the valves and the marked rim, and also 1e, a broad deciduous disc slightly adhering to the carpels, but not fused to it. Mataranka Station, Roper River, Northern Territory. (C. E. F. Allen, August, 1922.) [To supplement Plate 163.]

_E. Pimpiniana_ Maiden.

2a. Buds; 2b, front and back views of immature anthers; 2c, twig with mature leaves and fruits; 2d, fruits, not quite mature; 2e, fruits, ripe and almost cylindrical. Immama, near Ooldea, South Australia (Transcontinental Railway). (Prof. J. B. Cleland, M.D.) [Supplementing 2a, 2b, Plate 72.]

_E. cylindrica_ Maiden and Blakely, n.sp.

3a. Juvenile leaves in the opposite stage; 3b, juvenile leaf, further advanced, in the alternate stage; 3c, twig with mature leaves, buds and flowers; 3d, front and back views of anthers; 3e, fruits. Bendingin, Western Australia (C. A. Gardner, No. 1899, Western Australian Forests Herbarium 5th February, 1926.) The type.
PLATE 282.

_E. Westoni_ Maiden and Blakely, n.sp.

1a. Twig of juvenile leaves; 1b, two mature leaves; 1c, twig with fruits; 1d, buds; 1e, front and back views of anthers; 1f, fruits. Yass-Queanbeyan road, near Gungahleen, Federal Territory (C. J. Weston.) The type.

_E. microcarpa_ Maiden and Blakely, n.sp.

2a. Twig with flowers, the venation of the leaves very fine; 2b, front and back views of anthers (semi-terminal); 2c, fruits; 2d, a fruit looked at from above. Gilbert River, Northern Queensland (Cyril Tenison White, February, 1922, No. 138). The type.

_E. Dunbari_ Maiden.

3a. Mature leaf; 3b, twig with one mature leaf, buds and young fruits with persistent styles; 3c, front and back views of anthers; 3d, mature, cylindro-urceolate fruits. Gilmoros, Western Australia. (C. A. Gardner. Western Australia Forests Department Herbarium, May, 1924.) [See also PLATE 139.]

PLATE 283.


1a. Mature leaf; 1b, buds, with opercula (not in Plate 71); 1c, 1d, 1e, views of an anther, from the front, back and side respectively. The anthers taken on a four-sided appearance, as the connective between the two pollen-cells is very wide. (The anther shown on Plate 71 was from a pressed specimen.) 1f, fruit (the fruit shown at fig. 5c, Plate 71, is immature, the exserted valves not yet showing. The winged pedicel is also less prominent as growth proceeds.) Salmon Gums, 66 miles north of Esperance, Western Australia. (C. A. Gardner, No. 2226, Western Australian Forests Department Herbarium, 24th May, 1924.) [See also Plate 71.]

_E. ovularis_ Maiden and Blakely, n.sp.

2a. Twig with mature leaves and head of buds; 2b, mature leaf; 2c, front and back views of anthers; 2d, fruits. Salmon Gums, Western Australia. (C. A. Gardner, No. 2227, Western Australian Forests Department Herbarium, May, 1924.) The type.

_E. Kesselli_ Maiden and Blakely, n.sp.

3a. Twig with leaf and immature fruits; 3b, three views of anthers, not fully mature. They are unusually large; the ordinary magnification has been used. Salmon Gums, Western Australia. (W. P. Brown, through C. A. Gardner, No. 944a, Western Australian Forests Department Herbarium, August, 1924.) The type. Very little material is available at present of this interesting species.

_E. Desmondensis_ Maiden and Blakely, n.sp.

4a. Mature leaf; 4b, head of buds; 4c, front and back views of anthers. Desmond, near Ravensthorpe, Western Australia. (C. A. Gardner, No. 2185 of Western Australian Forests Department Herbarium, collected 18th May, 1924.) The type.
E. aggregata Deane and Maiden.

5a. Twig with broad mature leaves and buds; 5b, a narrow mature leaf; 5c, front and back views of anthers; 5d, fruits. Rydal, New South Wales. (C. F. Laseron, 20th August, 1909.)

This is the type of E. Rydalensis R. T. Baker and H. G. Smith. I cannot see in what character it differs from E. aggregata. The juvenile leaves of E. aggregata are broadly lanceolate, and I have seen none broader than those of E. Rydalensis. [See Plate 235.]

E. Forrestiana Diels.

6a. Mature leaf, narrower than previously seen; 6b, bud, showing a longer operculum than previously. 6a and 6b are attached on the original twig. Grasspatch, Western Australia. (C. A. Gardner, No. 2225 of the Western Australian Forests Department Herbarium, 22nd May, 1924.) [See Plate 95.]

E. Merrickae Maiden and Blakely, n.sp.

7a. Twig with mature leaves and buds; 7b, front and back views of anthers, not perfectly mature; 7c fruits. Grasspatch, Western Australia. (C. A. Gardner, May, 1924, No. 2218 of the Western Australian Forests Department Herbarium.) The type.

E. clavigera A. Cunn. var. Gilbertensis Maiden and Blakely, n.var.

8a. A juvenile leaf which did not attain full development; 8b, juvenile leaf; 8c, portion of the base of 8b plentifully besprinkled with stellate or white coral-like seta. 8d and 8e, leaves attaining various degrees of maturity; 8f, front and back views of anthers (a few stamens were loose); 8g, a fruit, slightly constricted and possibly not fully mature, for E. clavigera fruits are readily deciduous. There are three valves, deeply sunk. Ridges on the Gilbert River, Northern River. (Cyril Tenison White, February, 1922.) Type of the variety. [For normal E. clavigera see Plate 152.]
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:

- acacioides A. Cunn. (xlvi).
- acmenioides Schauer (xxxii).
- affinis Deane and Maiden (lvi).
- amygdalina Labill. (xvi).
- Andrewsii Maiden (xxi).
- Bakeri Maiden (lxx).
- Baueriana Schauer (lvi).
- Baueriana Schauer var. conica Maiden (lvi).
- bicolor A. Cunn. (xlii).
- Boornani Deane and Maiden (xlv).
- Bosistoana F.v.M. (xliii),
- Caleyi Maiden (lv).
- capitellata Sm. (xxvii).
- conica Deane and Maiden (lvi).
- Consideniana Maiden (xxxvi).
- coriacea A. Cunn. (xxvii).
- corymbosa Sm. (xii).
- Dalrympleana Maiden (lxiv).
- divers Schauer (xii).
- dumosa A. Cunn. (lxv).
- eugenioides Sieber (xxii).
- globulus Labill. (lxvii).
- hamastoma Sm. (xxxiv).
- longifolia Link and Otto (ii).
- maculata Hook. (vii).
- melleodora A. Cunn. (ix).
- Muelleriana Howitt (xxx).
- numerosa Maiden (xxvii).
- obliqua L'Hérit. (xxxi).
- odorata Behr and Schlectendal (xii).
- paniculata Sm. (viii).
- pilularis Sm. (xxi).
- piperita Sm. (xxxiii).
- polyanthemos Schauer (lxi).
- populifolia Hook. (lxvii).
- propinqua Deane and Maiden (lvi).
- punctata DC. (x).
- radiata Sieb. as amygdalina (xvi).
- resinifera Sm. (iii).
- robusta Sm. (lxvii).
- rostrata Schlecht. (lxi).
- rubida Deane and Maiden (lxi).
- saligna Sm. (iv).
- siderophloia Benth. (xxxix).
- sideroxylon A. Cunn. (xxxiii).
- Smithii R. T. Baker (lxx).
- stellulata Sieb. (xlv).
- tereticornis Sm. (xi).
- viminalis Labill. (lxv).
- virgata Sieb. (xxv).

* Government Printer, Sydney. 4to. Each part contains 4 plates and other illustrations.

**Note by Government Printer.**

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual parts will be raised to 2s. 6d. each.

For those parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

INDEX OF PARTS PUBLISHED
(continued from last page of cover).

PART LXII.
  335. E. Gaudern n.sp.
  336. E. oarvignae n.sp.
  337. E. Borgegni, n.sp.
  11. E. Ristoni Hook. f. var. eulae Benth.
  338. x E. Chisholm Maiden and Blakely, n.sp.
  339. x E. Taylor n.sp.
  73. E. olcost F.v.M.
  300. E. Norrowa n.sp.

  Plates, 252-255. (Issued March, 1924.)

PART LXIII.
  211. E. longicornis F.v.M.
  175. E. Webstertiana Maiden.
  361. E. nitans F.v.M.

IX.—The Seed.
  1. Historical.
  2. Danger of Collecting Seed of Inferior Species.
  7. The Wing.
  8. Hilum.
  10. Testa.
  12. Size.
  13. Seeds of Species not seen by me.
  14. Description of Seeds—
      Series Striolata,
      Plates 256-259. (Issued February, 1925.)

PART LXIV.
The Seed.
(Continued from Part LXIII, page 121.)
Series Striolata [concluded].
Series Levigatana.
Series Furcatana.
Series Alveolata.
Series Bifurpam.
Series Lepidotoc-Fimbriata.
(A. Hilum ventral.
B. Hilum terminal.
Series Funicular.
Series Coelhanta.
Series Nucrotorn.
Series Macrith.
Series Pyramidalae—D-shaped.
Plates, 260-265. (Issued December, 1925.)

PART LXV.
VI. The Leaf.
(With Special Reference to Evolution.)
(Continued from Parts LXI and LVII, and the Plates of Part LX.)
  1. Introduction.
  3. Angles of secondary veins with midrib.
  4. Juvenile leaves (note only).
  5. Mature leaves (note only).
  6. Correlation of Seedlings and Juvenile Leaves (adventitious shoots)—
      (a) Terminology of Juvenile Leaves.
      (b) Coloured Plates.
      Juvenile Leaves.
  7. Additional descriptions.
      Plates 264-267. (Issued March, 1926.)

PART LXVI.
Range.
  1. Definitions of Climographs.
  2. Species arranged according to Climographs.
  3. Species arranged according to States.
  4. Tropical Species—
      North-Western Australia.
      The term “Pilbara.”
      Northern Territory.
      Use of the term “North Australia.”
      Northern Queensland.
  5. Extra Australian Species.
      E. Naukianius and some synonyms, doubtful and otherwise.
      Phillipines and New Britain, Papua, Timor.
  6. Australian Species cultivated abroad.
  7. Addition to Range of individual Species (as already given under each species).

The Leaf.
(Continued from Part LXV, page 230.)
The Intermediate Leaf.
  1. Preliminary.
  2. The “ Saplings” of Howitt.
      Plates 268-271. (Issued June, 1926.)

PART LXVII.
  362. E. Blossemae Maiden, n.sp.

Papers on Range or Distribution.
  1. Australia in General.
  2. Western Australia.
  3. South Australia.
  4. Tasmania.
  5. Victoria.
  7. Queensland.
  8. Northern Territory.

Factors which Influence Range or Distribution.
  Introductory.
  Altitude.
  Geology.
  Geological Formations, Soils—
  Victoria.
  South Australia.
  New South Wales.
  Queensland.
  Northern Territory.
  Effect of Drought Conditions.
  Note on Species of apparently anomalous Range.

Age and Area.

The Leaf.
(Continued from Part LXVI, p. 313.)
Mature Leaves.
      Plates 272-275. (Issued December, 1926.)

PART LXVIII.
  363. Eucalyptus Dwyari Maiden and Blakely.
  364. E. Birracropytaeensis Maiden and Blakely.
  365. E. Whittii Maiden and Blakely.
  366. E. Desparracross Maiden and Blakely.
  367. E. Sturti Maiden.
  368. E. Boolegii de Beuzerille and Webb.
  369. x E. Kelangitocross Maiden and Blakely.
  370. E. aldona Maiden and Blakely.
  371. E. boolegii Simmonds.
A.—The Desirability of Studying Eucalyptus in the Bush.
B.—The Value of the Study of Eucalyptus in a Scheme of Education.
      Plates 276-278. (Issued July, 1927.)
EUCALYPTUS CRUCIS MAIDEN. (1, 2) [See also Plate 242.]

E. KONDININENSIS MAIDEN and BLAKELY, n. sp. (3).

E. TERMINALIS F. V. M. var: LONGIPEDATA MAIDEN and BLAKELY, n. var.; (4-5).

[See also Plates 164, 165.]
EUCALYPTUS PATELLARIS F.v.M. (1). [See also Plate 163.]

E. PIMPINIANA MAIDEN. (2). [See also Plate 72.]

E. CYLINDRIFLORA MAIDEN and BLAKELY, n. sp. (3).
x Eucalyptus Westoni Maiden and Blakely, n. sp. (1).

E. Microneura Maiden and Blakely, n. sp. (2).

E. Dundasi Maiden. (3). [See also Plate 139.]
EUCALYPTUS DIPTERA ANDREWS. (1). [See also Plate 71.]
E. OVULARIS MAIDEN and BLAKELY, n. sp. (2).
E. KESSELLI MAIDEN and BLAKELY, n. sp. (3).
E. DESMONDENSIS MAIDEN and BLAKELY, n. sp. (4).
E. CLAVIGERA A. CUNN.; var.: GILBERTENSIS,
    n. var. MAIDEN and BLAKELY. (5). [See also Plate 152.]
E. AGGREGATA DEANE and MAIDEN;
    (E. HYDALENSIS BAKER and SMITH) (6).
E. FORESTIANA DIELS. (7). [See also Plate 95.]
E. MERRICKÍE MAIDEN and BLAKELY, n. sp. (8).
A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

Vol. VII. Part 10.

PART LXX OF THE COMPLETE WORK.

(With Four Plates.)

Price Three Shillings and Sixpence.

Published by Authority of

The Government of the State of New South Wales.

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER.

1928.
A Critical Revision of the genus Eucalyptus

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

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

The author of this standard work, Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., died on 16th November, 1925, at the age of 66 years.

It is most regrettable that he did not live to see the completion of his great work, of which 65 Parts have already appeared, and the final Parts were prepared by him for publication prior to his death.

With the kind permission of Dr. Darnell-Smith, Director, Botanic Gardens, Sydney, this and the subsequent Parts will be edited by Messrs. R. H. Cambage, C.B.E., F.L.S., and W. F. Blakely, Assistant Botanist, Botanic Gardens, both of whom have been in constant touch with the late Mr. Maiden during the progress of the work.

Vol. VII. Part 10.
Part LXX of the Complete Work.

(with four plates.)

"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and, even when they fail, are entitled to praise."

Macaulay's "Essay on Milton."

PRICE THREE SHILLINGS AND SIXPENCE.

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

Sydney:

ALFRED JAMES KENT, GOVERNMENT PRINTER, PHILLIP-STREET.

1928.
CCCLXXX. E. Baxteri (Benth.) Maiden and Blakely, n. comb

<table>
<thead>
<tr>
<th>Description</th>
<th>Synonyms</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 451

Var. pedicellata Maiden and Blakely, n. var.

<table>
<thead>
<tr>
<th>Description</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 457

CCLVII. E. Blaxlandi Maiden and Cambage.

<table>
<thead>
<tr>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 460

CCCXXXVI. E. agglomerata Maiden.

<table>
<thead>
<tr>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Page 461

CCCLXXXI. E. orgadophila Maiden and Blakely, n.sp.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Affinities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 462

XXVI. E. acmenioides Schau. var. tenuipes Maiden and Blakely, n. var.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 464
**CCCLXXXII. E. Murphiyi** Maiden and Blakely, n.sp.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>465</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>466</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Affinities</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>466</td>
</tr>
</tbody>
</table>

**CXXX. E. Stuartiana** F.v.M.

<table>
<thead>
<tr>
<th>Additional Notes</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>467</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>468</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Var. grossa, Maiden</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>469</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Affinities</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>469</td>
</tr>
</tbody>
</table>

**CCLXII. E. angophoroides** R. T. Baker.

<table>
<thead>
<tr>
<th>Range</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>470</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Affinities</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>470</td>
</tr>
</tbody>
</table>

**COTYLEDONS**

**1. VERNACULAR NAMES**

<table>
<thead>
<tr>
<th>A few non-Australian opinions on Vernaculars</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>473</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of Botanical Names the ideal</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>474</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of the term “Bastard”</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>475</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of Botanical Names for trade purposes</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>475</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Old Vernaculars</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>476</td>
</tr>
</tbody>
</table>

**2. VERNACULAR NAMES FOR TIMBERS**

**3. ABORIGINAL NAMES**

<table>
<thead>
<tr>
<th>Explanation of Plates (284-287)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>484</td>
</tr>
</tbody>
</table>
DESCRIPTION.

CCCLXXV. E. Baxteri (Benth.), Maiden and Blakely, n. comb.

Leaves ovate, or ovate-oblong, obtuse, usually very oblique, under 3 inches long, very thick, with oblique, scarcely conspicuous veins. Peduncles thick and angular, mostly very short. Flowers closely sessile, in a dense head. Calyx-tube nearly 3 lines diameter, and shorter than broad. Operculum thick and hemispherical, the buds nearly globular (more or less verrucose, J. H. M. and W. F. B.). Ovary flat-topped. E. Baxteri Herb., S. Coast (of Australia), probably Kangaroo Island, Baxter (Herb. R. Br.). The heads of the flowers are very much like those of E. dumosa var. conglobata, but the operculum, and especially the anthers, are quite different. Fruit not seen. (Bentham in B. Fl. Ill, 207, 1866).

The fruits, from the specimens collected by W. J. Spafford, Kangaroo Island, may be described as follows:—

Fruits usually crowded into globular heads, turbinate to somewhat pyriform, sessile to very shortly pedicellate, rarely strictly truncate, but often more or less domed, with short exserted valves, 10-12 mm. long, 8-10 mm. broad. Capsular disc usually prominent, forming a broad, thick, oblique band around the top of the fruit, and exceeding the calycine rim by 3-4 mm., the lower inner portion of the disc slightly fused to the base of the valves.

Description of the Seeds.—Fertile seeds glossy, light to dark brown or nearly black, 2½ to 3 mm. long, 1½ mm. broad, very irregular in shape, the majority somewhat oblong-cuneate, with a flat or slightly concave ventral surface, wedge-shaped towards the small hilum. Dorsal surface usually convex, striate or rugose. The shorter and thicker seeds more pyramidal, with two or three radiating ridges, testa thin and brittle. Sterile seeds glossy, crystalline, cubiform to D-shaped, a light reddish-brown, slightly shorter and broader than the fertile seeds. Differing from the seeds of E. Blaxlandi in being more uniformly narrower and more cuneate. Kangaroo Island, Hundred of Cassine, South Australia, W. J. Spafford, May, 1916.

Extract from letter from Mr. W. Gill, Conservator of Forests, Adelaide, dated 5th October, 1919:—"The Stringybark is a valuable timber in the S. East much used for house building, regarded as equal to hickory for buggy and wheelwright work."
SYNONYMS.

1. E. capitellata Sm. var. (?) latifolia Benth.


The type specimen of the former does not appear to differ from the type specimen of the latter. See, as regards the synonymy of E. Baxteri, Part VIII, pp. 212 and 213, and, as regards E. capitellata var. (?) latifolia Benth., p.212, both under E. capitellata Sm.

The above conclusion has been pretty strongly indicated in Part VIII, and will be useful to amalgamate or co-ordinate the localities of the two forms, which have been kept apart too long.

A further specimen from Kangaroo Island (which is doubtless the type locality for E. Baxteri and E. santalifolia var. Baxteri) has been collected by W. J. Spafford, May, 1916. The specimen does not appear to differ from those collected by J. G. Robertson and W. Adams at Portland Bay, Victoria. The latter is the type locality of E. capitellata Sm. var. latifolia Benth. There seems no room for doubt that E. capitellata var. latifolia Benth., and E. santalifolia var. Baxteri Benth., are conspecific. As the name latifolia is pre-occupied by a valid species, that of Baxteri has the next claim.

In my (J.H.M.) paper (Journ. Bot., July, 1906, p. 234) occurs the passage:—

"The specimens in the British Museum, on which Bentham based his variety (E. santalifolia var. (?) Baxteri) are labelled by Brown ‘Eucalyptus, Mr. W. Baxter, received 1328, probably South Coast (of Australia) perhaps Kangaroo Island, or possibly V. D. Land.’ Bentham has written on the sheet, and quotes in Fl. Austral. the name E. Baxteri R. Br., but Mr. Britten informs me that this name does not appear in Brown’s MSS.” So that, on the principle of never making a man say what he did not say, the species cannot be E. Baxteri R. Br.; it should be E. Baxteri Benth. As a matter of fact, Bentham never conceded it more than varietal rank, and, since we have worked out the species, it should, in accordance with the rules of modern nomenclature stand as E. Baxteri (Benth.), Maiden and Blakely.

Illustrations.

The following specimens of E. Baxteri have been already figured:—

1. Figures 8a-d, Plate 37 (E. capitellata var. (?) latifolia), Portland, Victoria.
2. Figures 9a-c, Plate 37 (E. santalifolia var. Baxteri), Portland.
3. Figures 10a, b, Plate 37, Portland (W. Adams).
4. Figures 11a, b, Plate 37, Narracoorte, S.A. (W. Gill).
5. Figures 12a-c, Plate 37, Grampians, Victoria (H. B. Williamson).
6. Figures 1a-f, plate 38, Mount Lofty, South Australia (Max Koch.)
7. Figures 2a-c, Plate 38, Osler’s Creek, Victoria (A. W. Howitt), var. pedicellata n. var.
RANGE.

This species is confined to South Australia and Victoria, so far as we know at present. Westerly it has been found as far as the Mount Lofty Ranges around Adelaide.

South Australia.—We have already seen that Robert Brown said that Baxter collected the plant (now called E. Baxteri) "South Coast, probably Kangaroo Island or possibly V. D. Land." We know that Baxter collected on Kangaroo Island, and, in response to my inquiries, the late Mr. Thomas Gill, a most reliable authority, informed me that he believed that the only South Australian locality visited by Baxter was that island. See my (J.H.M.) "Records of Western Australian Botanists" in Journal W. A. Natural History Soc., 1909). I know of no Victoria locality visited by Baxter, and I think Brown's surmise of Kangaroo Island is correct. The species has never been found in Tasmania.

The following come from the South Australian mainland; the fruits are sessile, and mostly turbinate to pyriform in shape. Let us begin near the Victorian border, in the south-east of South Australia.

1. Penola Forest (W. Gill, June, 1918). Buds verrucose, fruit depressed globular. We have also specimens from Mr. C. C. Robertson, of the Forest Department, Pretoria, South Africa, collected in the same district in October, 1924, one of which is a seedling which is narrow and has some resemblance to that of E. eugeniodes. Another is broad, for the most part broadly oblong, with denticulate margins. It is much more glabrous than seedlings of E. capitellata. A reversion shoot, 1 dm. long, has broad cordate leaves, and is more or less hispid with stellate hairs. Fruits closely sessile, concealing the short pedicel, globular to shortly turbinate. Leaves thick, broadly oblong to obliquely and broadly lanceolate.


3. Leaves thick, lanceolate; buds clavate, rugose, the common pedicel short; fruit large, sessile, globular, with small valves. Between Kangaroo Island and Millicent, which is in the south-eastern corner of South Australia (Prof. J. B. Cleland, No. 91).

4. "This is quite different from any of the Eucalypts that I have yet seen." (Hundreds of Cassine, Kangaroo Island, W. J. Spafford, No. 7, May, 1916). The buds of this specimen are very rugose and the opercula are somewhat pointed. The fruits are closely sessile and turbinate (see description, p. 451), while the leaves are thick and broadly lanceolate.

5. Leaves broadly oblong, oblique, strongly veined; fruit turbinate. Hindmarsh Tiers. Encounter Bay (Prof. J. B. Cleland).
We are now in the hills around Adelaide.

1. Mount Lofty (Max Koch), with rugose buds. Compare those from the Grampians at p. 455.

2. Juvenile leaves slightly stellate, the lower leaves cordate, the upper broadly oblong, and more or less oblique. Buds rugose, the calyx attenuated; fruit turbinate. Aldgate (J. H. Maiden, January, 1907).

3. Buds clavate, almost smooth; fruit sessile, more or less turbinate. Leaves broad and thick. Willunga (W. Gill).

4. Buds clavate, slightly rugose. Leaves small, narrow-lanceolate; fruit not seen. Mount Compass, about halfway between Willunga and Myponga (Professor J. B. Cleland, No. 26).

The following specimens in the National Herbarium, Sydney, match the above. They are all from Victoria:

1. Leaves broad and short; buds clavate, slightly rugose or verrucose, contracted towards the base. Calyx much longer than the short, blunt operculum. Fruit globular to shortly turbinate, concealing the very short common peduncle. Major Mitchell's Heath, near Portland, 20th March, 1842. Supposed 497 of J.G.R. (J. G. Robertson, No. 503).

2. Fruit only, depressed globular with small valves and more or less truncate. Heath near Portland Bay, 20th March, 1842 (J. G. Robertson).

Bentham (B. Fl. III, 206) says of a Portland Bay specimen:—"Leaves short, obliquely ovate, very thick and much more straight, the bark deciduous (Robertson), Victoria. Heath near Portland (Robertson). Possibly a sessile-flowered form of E. santalifolia, but the form of the calyx is more that of E. capitellata, and quite different from that of E. santalifolia var. Baxteri."

3. Leaves of 497 rather thick, oblique, broadly lanceolate. Buds clavate, contracted towards the base, the calyx attenuated. "5 miles from Portland on the road to Bridgewater Bay. Shrub 6-10 feet high, 5th February," 1844." (J. G. Robertson, No. 497) This and 503 are in flower and early fruit; No. 503 is in ripe fruit also.

The following specimen was collected from the same locality sixty years later:—

4. Leaves thick, narrow to broad lanceolate, a few of the short ones oblong. Buds clavate, the calyx tapering into the short pedicel; operculum shortly conical, slightly rugose. Fruit globular-truncate with a fairly large disc and very small, slightly exserted valves. Portland (W. Adams, per A. E. Kitson, November, 1904).
The following two localities are west of Portland Bay and close to the Victorian—South Australian boundary:—

5. Stringybark. Bark not deciduous, timber white, from 10 to 30 feet high (J. G. Robertson, No. 498, 21st January, 1844). Leaves short and broad: buds clavate, contracted towards the base, opercula very obtuse, slightly rugose. Heath, 10 miles west of Rossneath, Glenelg River.

6. Juvenile leaves broadly oblong to almost orbicular, mucronate, the lower ones hispid, the upper smooth, 2½ to 5 cm. long, 1½ to 3½ cm. broad. "Heath, Steepbank Rivulet, growing at foot of 498 and supposed to be young of it, 12th June, 1843." (J. G. Robertson, No. 500.) (Juvenile foliage.)

The following specimens from eastern Victoria have also fruits sessile or nearly so, and are not far removed from the type:—

1. Bark stringy but not persistent to the highest branches. Leaves thick, oblique, oblong-lanceolate. No buds. Fruit globose to somewhat turbinate. Sealer’s Cove (A. W. Howitt and J. L. King).

Following are two specimens from the Grampians:—

1. Leaves thick, oblong-lanceolate, 1½—2 inches long. Fruit pyriform.

2. Leaves very broad and short; buds verrucose; fruit depressed globular; valves short, scarcely exsert. (Both Charles Walter, March, 1887.)

A third specimen from the Grampians (at 2,000 feet, H. B. Williamson) is very similar to specimens nearer the coast, but the buds (both calyx-tube and operculum) are markedly verrucose. Figured at 12a, 12b, 12c. Plate 37 (under E. capitellata).

South Australia.—The following additional specimens from South Australia, and arranged geographically in the same way as the more typical ones already enumerated, have fruits pyriform or turbinate to shortly pedicellate, and may be looked upon as intermediate between the typical form and those which are more pedicellate (var. pedicellata, n. var).

1. Fruit up to 14 in the head, pyriform, truncate, the valves small and scarcely exsert. Mount Burr Forest, Millicent (W. Gill, January, 1915).

2. Caroline Forest near Glenelg River and Victorian border, 13 miles south-east of Mount Gambier (W. Gill).

3. Clavate, scarcely angular, buds, with domed fruits, valves well exsert. Sandy rises, covered with fern undergrowth, Narracooorte (W. Gill). Figured at figs. 11a and 11b, Plate 37, Part VIII, under E. capitellata.
4. Buds very young, clavate, minutely rugose. Fruit globular to globular-turbinate, very shortly pedicellate. One or two miles west of Bordertown, where the scrub of the 90-Mile Desert begins (J. M. Black, December, 1918).

We are now at the Mount Lofty Ranges around Adelaide. The following specimens have fruits pyriform or turbinate to shortly pedicellate. They are intermediates.

1. Stringybark, Mount Lofty Ranges (Max Koch, September, 1902). The figures (fig. 1, plate 38, the fruits if immature and therefore the valves not exsert) show the remarkable variation in the shape of the fruits in this tree. Buds rather small, some with conical operculum, and some with clavate shape of buds; many of them slightly rugose. I doubt if the Mount Lofty specimens can be separated from those labelled "Eucalyptus fabrorum, Schlechtendal. In montibus steriorilibus elatis, November, 1848. Dr. Mueller." (Probably Mount Lofty, South Australia); see this work, Part I, p. 40, cf. also Part II, p. 60.

Mueller's specimen of E. fabrorum from Mount Lofty Range is in young bud and immature fruit. Buds cylindrical, opercula conical, slightly rugose. Immature fruit pyriform to slightly pedicellate.

2. Buds clavate, contracted towards the base, rugose, fruit more or less pyriform, shortly pedicellate (R. H. Cambage, March, 1901).

3. Fruit pyriform, leaves thick (W. Gill, October, 1905). Both with short, broadish leaves, ovoid, shiny, slightly tuberculate buds, almost sessile, squat, conoid to hemispherical domed fruits. See fig. 11, Plate 37, Part VIII.

4. Seedlings the same as those of Mr. C. C. Robertson from Penola Forest previously mentioned (see p. 453). Buds slightly rugose; fruit globular-truncate, shortly pedicellate; not fully developed.

Var. *pedicellata*, Maiden and Blakely, n. var.

With distinct pedicels, of which the specimen figured at 2c, Plate 38, Osler's Creek Victoria (A. W. Howitt) may be taken as the type.

1. Seedling, minutely hispid with stellate hairs. The first four pairs of leaves opposite, shortly petiolate, the margins minutely denticulate, lanceolate, 3½ cm. long, 10-113 mm. broad. Intermediate leaf elliptical, oblique, 12 cm. long, 9 cm. broad. Adult leaves broadly lanceolate to obliquely lanceolate, 10-12 cm. long, 3⅓ to 6 cm. broad. Buds clavate, pedicellate, rugose. Fruit pedicellate, globular, with short protruding valves, 12-14 mm. long, 8-10 mm. broad. Osler's Creek, Gippsland (A. W. Howitt).

Trees of var. *pedicellata* are usually larger than the typical *E. Baxteri*, some of which according to Mr. D. W. C. Shiress, reach a height of 70 feet and produce a much better timber, probably equal to that of *E. Muelleriana* and its congeners.


3. Seedlings the same as No. 1. Wandin Yallock (A. W. Howitt).

4. Seedlings and intermediate leaves the same as No. 1. King Parrot Creek (A. W. Howitt).

5. With the same characters as No. 1, but the fruits larger with longer pedicels and also with a smaller orifice. Drouin West (A. W. Howitt).


7. Leaves large, strongly veined, narrow to broad lanceolate, strongly oblique; buds clavate, contracted towards the base or the base slightly enlarged; fruit globular, shortly pedicellate, the valves small. Dagholm (A. W. Howitt).

8. Leaves narrow to broad lanceolate, rather thick; fruit pedicellate, globular, rather small with small, scarcely protruding valves. Darlimula, S. Gippsland (H. Deane, March, 1897).

9. Intermediate leaves broadly cordate to broadly oblong, a few almost orbicular; buds rather young, cylindrical, the opercula conical; fruit globose to somewhat turbinate, distinctly pedicellate. Boggy Creek, Buchan Road (J.H.M.).

10. Buds not seen; calyx attenuated; fruit globular to turbinate. Buchan Road, East Gippsland (A. W. Howitt).
11. Leaves narrow to broadly lanceolate; buds attenuated and very rugose or somewhat verrucose, especially the operculum, 14mm. long. The buds are the longest that we have seen of this variety. Fruit distinctly pedicellate, depressed globular with rather strong valves. Naynook, Latrobe Valley (J. H. Simmonds, June, 1921).

12. Seedlings slightly stellate and somewhat similar to those of Osler's Creek (No. 1). The intermediate leaves are also similar. Buds about half developed, clavate, rugose, the operculum very blunt. Fruits pyriform, distinctly pedicellate. South-west corner of Victoria, where it occupies the rising ground and the river margins, flats, and extensive plain-lands in the counties of Dundas and Normanby (A. D. Hardy).

The following three specimens are from the Wimmera:—

13. Buds clavate, smooth or nearly so; fruit globular, slightly pedicellate. Wimmera (F. Reader).

14. Leaves narrow-lanceolate; buds clavate, slightly rugose; fruit pedicellate, globose, with small protruding valves. Dimboola (J. Staer).

15. Buds clavate, rugose; fruits globular to pyriform, shortly pedicellate. Nhile (J. Staer).

AFFINITIES.

1. With E. Blaxlandi Maiden and Cambage, from which it differs in the following characters:—Seedling leaves broader and more sessile, both in the opposite and the alternate stages. Intermediate leaves broader and thicker, somewhat resembling those of E. capitellata. Adult leaves invariably broader and thicker. Buds often rugose, more elongated and contracted in the middle, or the base more or less swollen. Calyx usually longer. Fruit variable, ranging from almost globular, turbinate to pyriform and from closely sessile to shortly pedicellate. It will be seen that the buds and fruits of E. Baxteri have a greater range in morphological characters than those of E. Blaxlandi. As regards the fruits, attention has already been drawn to them. See the Mount Lofty specimens, all from the same tree, figs. 1b to 1f, Plate 38, and remarks thereon. There is also a difference in the size of the trees of both species. According to J. G. Robertson’s field notes, E. Baxteri ranges from 6 to 30 feet high, and trees with pedicellate fruits appear to be much higher than those with sessile fruits. From our own observations E. Blaxlandi is never less than 30 feet high, and in some districts it reaches a height of 80–100 feet.

2. With E. capitellata Sm. Both are coastal species and sometimes Mallee-like in habit, which is due, no doubt, to the somewhat similar environmental conditions under which they grow. The seedling leaves of both species are somewhat alike, also the adult leaves. The buds and fruits, however, are very dissimilar, and are the main characters by which they are readily distinguished one from the other.
3. With *E. agglomerata* Maiden. This is a small to a large Stringybark with rather thick heavy adult foliage somewhat resembling that of *E. Baxteri*, but with the buds of *E. eugenioides* and the fruits of *E. capitellata*. Its affinity, therefore, to *E. Baxteri* is more distant than any of the preceding species.

4. With *E. eugenioides* Sieb. This is one of the most variable of the Stringybarks and in its normal state it is a medium-sized tree producing a good serviceable timber similar in texture and quality to that of *E. Baxteri*. In some localities, however, it is Mallee-like. In the early seedling stages, like the preceding species, it bears a general resemblance to *E. Baxteri*, but, as the seedlings advance the leaves become much narrower, more stellate and crinkled than those of *E. Baxteri*. There is also a marked difference in the buds of both species. Those of *E. Baxteri* when about half developed are nearly always clavate and often slightly verrucose, while the buds of *E. eugenioides* are smooth and stellate. The fruit of the latter is also much smaller than the fruit of the former.

5. With *E. alpina* Lindl., vide Part IX, p. 259. This is the small stunted stringybark which appears to be confined to the highest parts of the Grampians (Victoria). And in its fibrous bark, harsh, thick, rather broad, foliage, verrucose, buds and sub-globular fruits, it bears affinity to *E. Baxteri*. The operculum of the latter, however, is not nearly so verrucose as that of *E. alpina*. The calyx of *E. Baxteri* is also smooth both in bud and in the mature fruit, whereas the calyx, and sometimes the fruit of *E. alpina* are distinctly verrucose. As a general rule the fruits of *E. alpina* are larger than those of *E. Baxteri*. The anthers of both species, also, have much in common.
CCLVII. E. Blaxlandi Maiden and Cambage.

(See Part XLV, p. 150.)

As there stated, the species is figured at Part VIII, Plate 38, figs. 3a, 3b, 3c, 5. In addition, the mature leaf, up till then unfigured, has been given at Plate 187, fig. 5. To these may be added 4a, 4b, 4c, Plate 38, with fruit with valves less exsert than those of the type, and Plate 289, Part LXXVI, of my "Forest Flora of New South Wales." Additional figures will be found in Part XLV, p. 150, of the present work. Then follows Range, and with our subsequent knowledge of E. agglomerata Maiden (Part LVII, p. 341 of the present work), and of E. Baxteri (Part LXX, p. 451), it has been found that certain specimens of the above two species have been attributed to E. Blaxlandi. The necessary corrections to be made are as follows:—

RANGE.

It is mainly confined to the Western and Southern Tablelands of New South Wales, and does not extend to Victoria and South Australia, as previously stated. The following are the definite localities for the species:—

N.S.W.—Western localities:—Blackheath, and other parts of the Blue Mountains from Blaxland to Cox's River, Bowenfels, Marrangaroo, Jenolan Caves and Mount Wilson, also Mount Currucudgy (Rylstone district), Upper Meroo and Yerranderie.

Southern localities:—Summit of Mount Jellore, Bowral to Bullio.

AFFINITIES.

These are already stated under E. agglomerata, Part LVII, p. 342, and need not be repeated.
DESCRIPTION.

CCCXXVI. E. agglomerata Maiden.

For an account of this species see Part LVII, p. 341; plate 232, figs. 1 and 2.

RANGE.

The following localities may be added to those already quoted in the above Part:

New South Wales:—Near Rocky Hall (C. C. Robertson and W. A. W. de Beuzeville); Bago (Percy Murphy); Kurrajong Heights, "Large trees, timber largely used for fencing, building and for sleepers" (W. Dunstan); Ku-ring-gai Chase, about ½ mile east of Cowan Railway Station, "Trees 40-60 feet high, 1-2 feet in diameter, with a thick fibrous bark on trunk and lower portion of main branches, upper portion of branches smooth" (W. F. Blakely); about 2 miles north of Cowan Railway Station, there is a narrow belt of this species in association with several small trees of Red Cedar (Cedrela Toona) and White Cherry (Schizomeria ovata): some of the trees are up to 100 feet high, with clear, straight stems, and the foliage has a decidedly blue cast (W. F. Blakely and D. W. C. Shiress); Mangrove Mountain, Gosford district, common on many parts of the Mountain from Gosford to Mangrove Creek by the side of the old Wiseman’s Ferry Road (W. F. Blakely, D. W. C. Shiress and P. Murphy); Top of Mount Penang, near Gosford (W. F. Blakely, D. W. C. Shiress and H. Bott, June, 1926); Hazelbrook, "A very straight, tall tree, growing in the gullies; bark stringy right out to small branches" (E. Steinberger).

Victoria:—"Small-fruited Yellow Stringybark," but when freshly cut and green, the heart wood is brown in colour. Wangarabelle, also found plentifully between Genoa and Mallacoota, and at Cann River, also at Orbost (H. Hopkins, 1915). I have seen only the Wangarabelle specimen, which is typical of the species.
DESCRIPTION.

CCCLXXI. *E. orgadophila*, Maiden and Blakely, n.sp.

Arbor 30–40' alta; cortice trunci basin versus Box simili, parte superiore ramisque laevibus; foliis iunioribus alternatis, ovatis vel obovatis, emarginatis, breviter petiolatis, 4–8 cm. longis, 2.5–6 cm. latis; foliis maturis angusto-lanceolatis vel falcato-lanceolatis, in petiolum teretem gracilem angustatis, 9–12 cm. longis, 1–2.5 cm. latis; venis obscuris, vena peripherica margini valde approximata; inflorescentia axillari, terminali; pedunculis gracilibus; floribus albis 4–7, in umbellis; alabastris clavatis, pedicellatis, 6–10 mm. longis, 4–5 mm. diametro; operculo obtuso ca. 3 mm. longo; calyx tubo conoideo, 4–5 mm. longo; antheris semiterminalibus a latere dehiscentibus; fructu breviter cylindraceo vel leviter pyriformi, 8–13 mm. longo, 5–7 mm. lato; valvis 3–5, brevibus, plerumque inclusis.

A medium-sized tree, 30–40 feet high, locally known as “Gum-topped Box.” Bark box-like at base of the trunk, upper part of trunk and branches smooth. In the field it looks like *E. melliodora* (C. T. White).

**Juvenile leaves** (not seen in the earliest stage) alternate, broadly ovate to obovate emarginate, thick and dull, shortly petiolate, 4–8 cm. long, 2.5–6 cm. broad; venation conspicuous, the secondary veins making an angle of 30–35° with the midrib; intramarginal vein prominent, usually distant from the edge, except towards the apex and base.

**Intermediate leaves** alternate, broadly lanceolate, obtuse or emarginate, on longer petioles than the juvenile leaves, 7–9 cm. long, 3–5 cm. broad; venation the same as in the juvenile leaves.

**Mature leaves** narrow-lanceolate to falcate-lanceolate, alternate, rather dull, narrowed into the long, terete, slender petiole, 9–12 cm. long, 1–2.5 cm. broad; venation somewhat obscure, lateral veins making an angle of 35–40° with the midrib; intramarginal vein very close to the edge.

**Inflorescence** axillary and terminal; peduncles slender, sometimes deflexed, bearing umbels of 4–7 white flowers. Buds clavate, pedicellate, 6–10 mm. long, 4–5 mm. in diameter. Operculum obtuse or sometimes very shortly mucronate, thin, coriaceous, about 3 mm. long. Calyx tube conical to somewhat pyriform, 4–5 mm. long, about 4 mm. in diameter at the top; pedicels 4–6 mm. long. Filaments all antheriferous, much exceeding the short, thick, terete style. Anthers semiterminal, most irregular in shape, much broader at the top than at the base, opening in irregular lateral slits; gland dorsal or frequently absent as in many of the Terminales. Floral disc inconspicuous.
forming a thin carnose lining around the top of the calyx-tube. Fruit shortly cylindrical to somewhat pyriform, truncate or more or less contracted at the top, with 1–3 short, faint ribs, and usually crowned by the enlarged staminal ring which forms the capsular disc, including the pedicels 8–13 mm. long, 5–7 mm. broad at the top; valves 3–5, short, usually enclosed.

**RANGE.**

Cooranga North, Northern Darling Downs, Queensland (C. T. White, No. 2482 21st April, 1925). The type. Warwick, Darling Downs (Dr. J. Shirley, August, 1913) The buds of this specimen are smaller than the buds of the type, but the anthers are identical.

**AFFINITIES.**

1. With *E. melliodora* A. Cunn., described in Part XIV, p. 135, from which it differs in the longer, thicker, and different shaped juvenile leaves, in venation, larger buds and fruits, and the different shaped anthers.

2. With *E. Bosistoana* F.v.M., vide Part XI, p. 1, also referred to in Part LVI, p. 270. The buds and fruits are somewhat similar to those of *E. Bosistoana*, but the juvenile leaves of the latter are more orbicular and broader, while the adult leaves are usually coarser and thicker, and the fruits are more hemispherical, without the prominent disc. The anthers are also different. *E. Bosistoana* does not appear to extend further north than St. Mary's, Nepean River district, New South Wales.
XXVI. *E. aeminioides* Schau. var. *tenuipes* Maiden and Blakely, n. var.

Leaves narrow-lanceolate, shortly petiolate, thin and pale, drying a yellowish-green colour; venation indistinct, 6–15 cm. long, 8–18 mm. broad. Buds not seen. Peduncles slender, slightly angular, up to 17 mm. long, bearing 7–10 pedicellate fruits. Pedicels terete, very slender, 7–11 mm. long. Fruit hemispherical or goblet-shaped, 4 mm. long, 5 mm. in diameter, usually 4-celled, valves small, enclosed; rim rather sharp, exceeding the capsular disc.

Differing from the typical form in the very narrow leaves, and in the more slender and elongated pedicels. Perhaps a distinct species.

---

**RANGE.**

Meteor Creek, South Central Queensland, local name "Peppermint Stringybark" (Dr. H. I. Jensen, July, 1921, per C. T. White).
DESCRIPTION.

CCCLXXXII. E. Murphysi Maiden and Blakely, n.sp.

Arbor magna 40–80' alta; cortice in trunco duro et valde sulcato, in ramis laevi; ligno rubro, duro, durabile; folis iunioribus alternatis angusto-oblongis vel angusto-lanceolatis, petiolatis paulo obtusis, 4–8 cm. longis, 1–1.5 cm. latis; folis maturis angusto-lanceolatis vel falcato-lanceolatis, petiolatis, 7–10 cm. longis, 1–1.5 cm. latis; venis fere obscuris, vena peripherica margini approximata; inflorescentia in umbellis axillaribus vel paniculis brevibus terminalibus; pedunculis gracilibus; floribus 3–6, pedicellatis; alabastris lineari-clavatis vel lineari-conoides, 7–10 mm. longis, 3 mm. diametro; operculo brevissimo, acutissimo, conoideo; fructu cylindraceo-pyriformi, truncato, 8–10 mm. longo 4–5 mm. diametro; valvis 3–4, plerumque in orificio inclusis,

A large tree 40–80 feet high, 2–4 feet in diameter, and usually very sound, locally known as "Ironbark Box." Bark on trunk hard and deeply furrowed like an Ironbark; branches clean and smooth. Timber pale red, hard, but easy to work. It is used for sleepers and is quite as good as E. sideroxylon and equal to E. crebra. (A. Murphy).

Juvenile leaves (not seen in the earliest stage) alternate, light green, narrow-oblong to narrow-lanceolate, petiolate, obtuse or mucronate, 4–8 cm. long, 1–1.5 cm. broad; venation very fine, almost invisible; intramarginal vein close to the edge.

Intermediate leaves thicker than the juvenile leaves, alternate light green, narrow-oblong to narrow lanceolate, 5–9 cm. long, 1.5–2.5 cm. broad; venation more or less obscure, the lateral veins very fine and somewhat distant; intramarginal vein usually distinct and fairly close to the edge.

Mature leaves narrow-lanceolate to falcate-lanceolate, very thin, on long terete petioles, 7–10 cm. long, 1–1.5 cm. broad; venation very fine, the lateral veins making an angle of about 40° with the medrib; intramarginal vein close to the edge.

Inflorescence in axillary umbels or forming short terminal panicles; peduncles slender, slightly angular, bearing 3–6, or sometimes more, pedicellate flowers. Buds linear-clavate to narrow conical, somewhat imperfectly quadrangular, acute, usually showing indications of the first operculum, 7–10 mm. long, about 3 mm. broad at the top. Operculum very short, conoid, very acute. Anthers semi-terminal, irregular in shape shorter and broader than those of E. conica, opening in terminal slits, and sometimes more than halfway down; gland usually absent. Floral disc inconspicuous, as in nearly, all the boxes and Ironbarks.

Fruit cylindrical-pyriform truncate or slightly contracted at the top, including the pedicels 8–10 mm. long, 4–5 mm. in diameter. Capsular disc very small, represented by the slightly enlarged staminal ring; valves 3–4, usually well enclosed within the orifice.
The name *Murphyi* will commemorate Mr. Andrew Murphy and Mr. Percy Murphy, father and son, collectors of native seeds, who for nearly thirty years have enriched the Eucalyptus collection with specimens from different parts of the Commonwealth, and furnished many interesting notes concerning a number of species.

---

**RANGE.**

Only known from Wongoni, near Merrygoen, 254 miles north-west of Sydney, New South Wales. (Andrew and Percy Murphy, January, 1919, and November, 1921.) The type; and from Bent State Forest near Dubbo (R. A. Samuels, February, 1918).

---

**AFFINITIES.**


It appears to have the pendulous habit of *E. conica* and resembles it a great deal in the slender branches and narrow leaves, but the bark is coarser and more deeply furrowed, while the juvenile leaves are much narrower, the buds more angular, and the fruits are thicker and more contracted at the top, and not funnel-shaped like the fruits of *E. conica*. The anthers are also different and more variable.


The bark of *E. Murphyi* is somewhat like that of *E. crebra*, especially on the trunk, but it changes on the branches to such an extent that it is then quite smooth. The juvenile leaves of both species are narrow, but those of *E. crebra* are much narrower—in fact, they are sometimes almost grass-like. There is also a great difference between the anthers of both species, but they have much in common as regards the colour and texture of the timber. If anything, the timber of *E. crebra* appears to be the darker and harder of the two.
CXXX. E. Stuartiana F.v.M.

(See the present work, Part XXIV, p. 67, Plate 101, figs. 2–3, also Plate 102, figs. 3–4.)

In Part XXI, p. 7, under E. cinerea F.v.M. var. multiflora, I stated, partly on the authority of the late J. G. Luehmann, that it is this form that is depicted as E. Stuartiana by Mueller in the "Eucalyptographia". It has since been pointed out to me that such is not the case, but the form depicted is the same as (E. Bridgesiana R. T. Baker) E. Stuartiana F.v.M., and that it agrees more fully with Mueller's description of the latter species than it does with E. cinerea var. multiflora. It is undoubtedly Mueller's definition of his revised E. Stuartiana, notwithstanding that under general observations and reference to certain specimens, some of his remarks are more or less applicable to E. cinerea var. multiflora. On the other hand, they would also apply to E. Stuartiana, especially as regards size, habit, and bark.

Mueller describes and figures the flowers of E. Stuartiana with slender stalklets, whereas the flowers, also the fruits of E. cinerea var. multiflora, are all closely sessile and differ in shape from those of E. Stuartiana. (See Mueller's figures of the fruits of E. Stuartiana in the "Eucalyptographia," figs. 8–9, which are distinctly stalked, and also the lower clusters of fruits on the main spray, with their narrow turbinate bases and small deltoid valves.

If we compare Mueller's figure of E. Stuartiana with the figures of E. cinerea var. multiflora in Part XXI, Plates 89, 90, of the present work (with the exception of fig. 10, Plate 89, with stalked fruits, near Castlemaine, Victoria, Blackburne, which is E. ovata, with small fruits from a twig which was killed before the fruits were fully developed), it will be seen that it is distinct from E. cinerea var. multiflora in the disposition of the buds and fruits, also in their shape and sculpture.

In the "Eucalyptographia" Mueller describes the leaves of E. Stuartiana as being shiny and equally dark green on both sides, copiously dotted, but the oil-glands often partly concealed. The leaves of E. cinerea var. multiflora are more or less glaucous and dull, while the leaves of E. Stuartiana are somewhat glossy on both sides and usually conspicuously dotted, which is one of the distinguishing characters of the species. In fact, the leaves of some specimens are densely covered with dark oil-dots that are visible without the aid of a lens.

It is well known that E. cinerea var. multiflora is a more or less glaucous tree; far more glaucous in all its parts than E. Stuartiana. The buds and fruits of the former, apart from being sessile, are invariably glaucous, while the buds and fruits of the normal E. Stuartiana are rarely glaucous when fully developed. The twigs and fruits of some of the large forms and of var. grossa are glaucous, but the adult leaves are green. Mueller does not appear to have seen the latter form, as it was not collected when he revised the
description of *E. Stuartiana*. The juvenile leaves of both species are very much alike in shape, and they are also glaucous, but those of *E. cinerea* var. *multiflora* are without doubt more glaucous than those of *E. Stuartiana*.

Mueller describes the fruits of *E. Stuartiana* as being “quite small, semi-ovate to top-shaped, not angular, with deltoid exserted valves,” so that the small fruited forms of *E. Stuartiana* are near the type. My specimens of the fruits from “Back,” road between Bright and Germanton, Victoria, figured at Plate 101, fig. 2g, are almost typical, according to Mueller’s description and figure. The large fruits depicted on Plate 101, fig. 3, from Armidale, New South Wales (A. W. Howitt), seem to be a transit to var. *grosa*.

The figure of the fruits of *E. Stuartiana* in the “Eucalyptographia” almost matches a specimen of *E. Bridgesiana* R. T. Baker from Bungendore. (W. Baueerlen, June, 1898). The buds are also very similar in shape to those depicted by Mueller. They also resemble a specimen from Mudgee (Woolls), one of the localities quoted by Mueller for his revised *E. Stuartiana*. Mr. Baker’s specimen from Towrang, which he attributed to *E. angophoroides* is also typical *E. Stuartiana*.

Mueller, throughout his description of *E. Stuartiana*, does not mention glaucousness which goes to show that he was not dealing with such a glaucous plant as *E. cinerea* var. *multiflora*, for such an outstanding character could hardly have been overlooked by him when drawing up his description. It would, therefore, seem that the important characters such as buds, fruits and leaves of his plant were not glaucous.

The small-fruited form referred to in Part XXIV, p. 71, as var. *parviflora* is referable to the typical form. It will be seen that the form which agrees with Mueller’s description and figure is not confined to Victoria, but extends over a very wide area in New South Wales, and in some districts it is associated with the slightly larger or intermediate form which I regarded as normal *E. Stuartiana*.

---

**RANGE.**

The species occurs from north-eastern Victoria to south-eastern Queensland. In New South Wales it extends along the tablelands from end to end of the State.

Victoria.—The following are the revised localities for the species, according to specimens in the National Herbarium, Sydney. It would appear that in the same locality it is often associated with *E. angophoroides* R. T. Baker:—

Toongabbie; Dargo, Gippsland (Dr. A. W. Howitt, H. Hopkins); Ovens River (Mueller); Hume River (Jephcott). These localities are referred to by Mueller for *E. Stuartiana*. Munro; Buchan (H. Hopkins); Lower Tambo River (J.H.M.), associated with *E. angophoroides*; Bright district (J.H.M.); Mildura (E. Cheel).
New South Wales.—The following are some additional localities to those already quoted under “Range” in Part XXIV, p. 70:

Southern Localities.—Black Mountain and on the Brindabella-Uriara Road, Canberra (C. Weston); Gilmore Creek, Batlow (Miss M. Breading, J. L. Boorman); Wolongawah, Tumut district; Talbingo, Co. Buccleuch (W. A. W. de Beuzeville).

Western Localities.—Marrangaroo (Dr. E. C. Chisholm and W. F. Blakely); Lithgow district (C. R. Luther); Hervey Range State Forest, No. 634 (A. Julius); Mullion Range State Forest (per Secretary, Forestry Commission).

Queensland.—So far it has only been recorded for Stanthorpe and Dalveen in the northern State, where it is associated with E. nova-anglica.

Var. grossa Maiden, Part XXIV, p. 69, Plates 101, 102.

Besides the localities quoted in the above Part, this well marked form has been found at Tamworth (A. E. Norton). The fruits are large and turbinate, with large, very exserted, deltoid, spreading valves.

________________________________________________________

AFFINITIES.

Its affinity with various species, including E. cinerea var. multiflora, is discussed in Part XXI, p. 4, also in Part XXIV, p. 72, but it seems advisable to restate the case so far as the above species is concerned.

E. cinerea F.v.M. var. multiflora differs from E. Stuartiana in the following characters:—It is a much smaller tree with a more fibrous bark, more glaucous leaves and twigs. The juvenile leaves, although somewhat similar in shape, are more glaucous and more rigid, while the intermediate leaves are smaller and have shorter petioles, besides differing somewhat in shape. The buds are sessile, often very acute, and sometimes mealy-white, with a slightly angular calyx-tube and sharp rim, especially when about half developed. The fruits are sessile, glaucous, ovoid-globose, thick, usually conspicuously domed for their size, with three or four very short valves. As regards the fruits they are somewhat similar in shape and size to the fruits of E. maculosa.
CCLXII. E. angophoroides R. T. Baker.

For a description and figure of this species see Part XLVI, p. 175, Plate 190, figs. 6-9; also Plate 191, figs. 1-2.

RANGE.

In the above Part, under "Range," p. 175, I stated that it was confined to the coastal districts of New South Wales, and may be expected to be found in eastern Gippsland, Victoria. That prediction has now been confirmed by examination of several specimens which were attributed to E. Stuartiana F.v.M. In Victoria it appears to be associated with E. Stuartiana, a tree it very closely resembles in all its botanical characters.

Victoria:—Castle Burn Creek, Crooked River Road; Stratford; Four Mile Creek, Port Road (Dr. A. W. Howitt); Mount Lookout, near Bairnsdale (H. Hopkins); Lower Tambo River (J.H.M.)—material mixed: the large fruits seem to be E. angophoroides, and the small fruits are typical E. Stuartiana.

New South Wales:—Wolumba (J. S. Allen); Boyne State Forest, 4 miles north of Bateman's Bay (L. Walker); Cockwhy Creek, Nelligen district (W. F. Blakely and C. C. Robertson).

AFFINITIES.

In Part XLVI, p. 177, its affinity with E. Stuartiana is already stated, to which the following additional notes may be added.

In the Herbarium the species may be separated on the following characters:—

E. Stuartiana: Juvenile leaves thick, almost equally glaucous on both surfaces. Adult leaves thick, smooth, somewhat glossy, and sometimes densely covered with dark oil-dots, becoming pale on both surfaces with age. Buds and young fruits rough with numerous oil-dots. Mature fruits often with 3-4 spreading deltoid valves.

E. angophoroides: Juvenile leaves thin, much paler beneath than on the upper surface; the intermediate leaves larger and thinner than those of E. Stuartiana. Adult leaves thin, dark green above, pale coloured and dull beneath, usually retaining the same colour when dry; oil-dots obscure. Buds and fruits comparatively smooth, the latter nearly always turbinate with a thickened rim, and usually 3-5 erect valves. Some forms of E. ovata resemble E. angophoroides very much in the leaves and fruits.
COTYLEDONS.

(See Plates 286, 287).

As might be expected in such a unique genus as the Eucalyptus, there is a fair amount of diversity in the cotyledons, but the cotyledon is no exception to the general rule that while two or more groups are more or less well defined, and therefore valuable for classification purposes, the vast majority of intermediate ones are vague, and shade into indefiniteness. The adoption of the cotyledon indicates at the outset a valuable phytogenetic grouping, and indications of affinities, fundamental or more or less superficial, will be brought out in the development of the key to the species.

A study of the cotyledons brings together species which are very distinct from each other in morphological characters, even in the sculpture and texture of the seed, but possess similar cotyledons; the only character in which they may be said to resemble each other, as will be seen presently.

The life-history of the Eucalyptus seedlings will be dealt with under "Seedlings," which will appear in a subsequent Part, together with examples of seedlings, reproduced by the "three-colour process." I may state briefly that I have classified the seedlings into three divisions, according to the shape of their cotyledons, viz.,

Reniforme; Bilobae; Bisectae.

These are again subdivided into sections as follows:

Reniforme.

(1) Large cotyledons; (2) Medium cotyledons; (3) Small cotyledons.

The sections are further divided into series, and named after a well-known member of the series or some outstanding character of the group or series.

Reniforme is a large division, and some of its members possess the largest cotyledons of the genus, as well as embracing a number of well-defined groups, viz., Bloodwoods, Stringybarks, Blackbutts, Ashes, and some Gums, Mallees, Boxes, and two or three small groups which are more or less closely allied to the Bloodwoods.

Bilobae.

This division is subdivided into twenty-six series. It is sometimes difficult to draw a line between the Reniforme and the Bilobae, and it is idle to suggest that, in some cases, one has not been biassed by a knowledge that the species is Renantherous or not. Its members include Boxes, Ironbarks, Mallee-Boxes, White, Grey, and Blue Gums.

Bisectae.

This unique division is divided into fifteen series. Some of its members approach the Bilobae, but broadly speaking, it seems to me to be the most well defined division of the three. It includes nearly all the Mallees or Marlocks, and a number of dwarf species which belong to regions of very low rainfall. It also embraces species with the largest flowers and fruits of the genus.
Of upwards of 110 species now referred to, more than half the cotyledons come within the section Reniformae, including both the large and small forms, while the remainder are nearly equally divided between Bilobae and Bisectae.

Several Australian botanists who have given close attention to the genus Eucalyptus are inclined to the opinion that the Corymbosae group are among the oldest living forms of the genus, and if this be so, it may be inferred that the Reniform cotyledon, which includes the Corymbose (Bloodwood) group, is the ancestral type, while the other sections represent more specialised forms.

There is an instructive paper on "The Evolution of the Eucalypts in Relation to the Cotyledons and Seedlings" by Cuthbert Hall, M.D., Ch.M., in *Proc. Linn. Soc., N.S.W.*, XXXIX, 473, 1914.

The representative figures of the cotyledons of the three divisions depicted on Plates 286 and 287 show at a glance how they run into each other, but at the same time they indicate a natural classification. They are described in detail in the Explanation of Plates, p. 485, and need not be discussed here.

There are, of course, figures of cotyledons with the plates of Coloured Seedlings already referred to, but these are parts of wholes in which the colour-character of the cotyledon is well brought out, and should be studied in conjunction with black and white figures on Plates 286 and 287, which are somewhat more sharply defined.

## 1. VERNACULAR NAMES.

Perusal of the indexes will at once show how numerous they are. I have taken the indexes of only the first five volumes, and have selected the most numerous vernaculars. There is more or less duplication in the various indexes, but, as the numbers are, they prove my point that there are many Bloodwoods, many Boxes, and so forth, all, or nearly all, with prefixes.

- Bloodwood—15 (Vol. 4), 7 (Vol. 5).
- Box—14 (Vol. 1), 39 (Vol. 2), 9 (Vol. 3), 22 (Vol. 5).
- Gum—38 (Vol. 1), 34 (Vol. 2), 46 (Vol. 3), 64 (Vol. 4), 30 (Vol. 5).
- Ironbark—15 (Vol. 1), 21 (Vol. 2), 12 (Vol. 5).
- Mallee—14 (Vol. 2), 17 (Vol. 4), 7 (Vol. 5).
- Mahogany—8 (Vol. 3).
- Peppermint—10 (Vol. 3).
- Stringybark—15 (Vol. 1).
- Yate—8 (Vol. 4).

The person who complains (without qualification) of the confusion of common names applied to Australian plants sometimes loses sight of the fact that Australia is as large as Europe, and that even in Europe the application of vernacular names to plants is often profuse and bewildering. The Briton, Greek, and Scandinavian have different languages of course, but their plant names are (like those of Australians), often uncertain and difficult of interchange. Our difficulties have arisen partly because the continent only began to be settled rather more than a century and a third ago, and then by a
handful of people, very few of whom were educated; they came to a continent whose flora was unknown, even to botanists, and, as they spread into new a era they gave similar names to trees which appeared to them to be similar, and which, in many cases, have only recently been shown to be different.

The predominant vegetation (Eucalyptus) has a more or less similar facies, and it is not to be wondered at that the ordinary citizen has shown no greater knowledge of it than the botanist. Then again, the early colonists had a limited vernacular, because they could only use comparative terms, and the trouble was that the plants of their native countries were about as unlike those of their new homes as it was possible for them to be.

In some cases the aboriginal names have been adopted by the white population. Some attempt has been made to standardise the vernaculars for Australian plants, but the chief difficulty arises from the fact that all over the world experience shows that most plant names are restricted to small areas. However, with the spread of education, it is confidently expected that the use of botanical names, at least as to genus, will present fewer difficulties. Of course, it must be borne in mind that the study of natural history has an attraction for only a limited portion of the population, while of the naturalists but few take special interest in plants, and fewer still in their vernacular nomenclature. I do not think we can guide the public much in the use of vernacular names. A country's plant names come by intuition, not by tuition.

Botanists are bound by the decisions of the various International Botanical Congresses (that of Vienna, 1905, being the most important), in regard to their names, but the coiner of vernaculars is free as the air to make as much confusion as he sees fit. Australians are inclined to be a law to themselves, partly because of their geographical isolation, and a phase of this is that some are not willing to obey the botanical laws made on their behalf in Europe. There will ever be extremists in coining new names, but the two most remarkable cases in history are those of Swainson (for particulars see my Presidential Address before the Linnean Society of New South Wales, Proc. Linn. Soc., N.S.W., XXVII, 1902), and Otto Kuntze, whose vagaries of twenty years ago are well known to taxonomists.

The Victorian Plant Names Committee, with the best of intentions, has set out to bolster up the use of vernaculars. Where more than one name exists for a particular plant, a selection is made, after the fashion of the Acadamie Francaise. Where there is no ascertained name, one is invented, such names being often translations of the existing botanical one. The question naturally arises in such a case, Why not encourage the public to use the existing botanical one? I do not know any precedent for endeavouring to impose vernaculars on the community, and think that the energy employed in such an attempt would be better expended in the advancement of botanical science.

1a.—A few non-Australian opinions on Vernaculars.

In the "Scientific Papers of Asa Gray" (C. S. Sargent), two vols., 1889, at 1, 106, Gray discusses the attempts of Bentham in his "Handbook to British Flora" (1858) to solve the problem of the utilisation and adaptation of vernacular names to a flora which
was fairly well-known to non-botanists who, in the course of hundreds of years, had applied a very large number of vernaculars to plants, many of them unambiguously. Both Bentham and Gray must be referred to to see how difficult the adaptaiton of vernaculars is, even under conditions far more favourable than in Australia.

Then we have Ruskin's "Prosperina, Studies of Wayside Flowers, etc." ("The Nation", No. 528, 12th August, 1875). See Asa Gray, I, 199. Ruskin trounces the nomenclature of the botanists, and laboriously endeavours to be funny at their expense; but Gray with his imperturbable and kindly humour, shows, from Ruskinian extracts: what a fool the philosopher makes of himself when he dogmatises on a subject that he obtrusively confesses he knows nothing about.

In "Plant Names," P. J. Wester, "Philippine Agric. Review", Vol. X, 55-63 (1917), draws attention to the absurdity of vernacular names in use for tropical plants. But he by no means confines himself to these. The paper is a valuable one, and shows the pitfalls and absurdities which are the result of reliance upon attempts to utilise existing vernaculars, or to improve upon them. He concludes by stating that writers on agricultural and horticultural subjects in the tropics "would make their papers much more instructive and intelligible if they quoted the botanical names after the various popular ones, many of which are but little or not at all known outside the countries of their origin."

Again, "Scientific and Vernacular Naming," "Agricultural News" (Barbadoes XIV, No. 353, pp. 353-355 (1915), is a useful article dealing with aspects of the perennial question. A trouble as regards vernaculars is that they may be coined and applied equally by the illiterate and the educated, the only recommendation to the crowd is that they may be catchy," and this is most often secured by the former class. Few people have the faintest idea of the responsibility they assume when they coin a new name. As one who has travelled much in Australia, I can say that the use of local vernaculars is intensely subdivided. As regards the giving of new botanical names, it is well known that botanists have varying ideas of their responsibilities to the botanical world in this respect. Reverence for types is by no means as wide-spread as it should be.

b. Use of botanical names the ideal...

I feel very strongly that any attempt at a stable trade nomenclature of Eucalyptus timbers, based on vernaculars, is doomed to disappointment. We will do our best to establish one, but when people become better educated in the technical schools and universities such a provisional arrangement will be swept away. In a very few years we shall have an approximately stable botanical nomenclature for Eucalyptus, and an educated public will study it because of the direct practical advantage of its use. The timber-getter, the timber-merchant, and the user will all plainly see the pecuniary advantage to them of the use of botanical names. This is not a matter confined to botany for it affects zoology and palaeontology also,
c. Use of the term "Bastard."

The inelegant word "bastard" is applied by Australians to timbers, and especially to Eucalyptus, to an extent equalled in no other part of the world, and it is therefore idle to ignore it. It must be borne in mind that a civilised race has only come into contact with these trees during recent times, and that the plants are different from those of any other country. With difficulty the first workers amongst them gave names to certain trees or groups of trees, such as Ironbark, Box, Blackbutt, Blue Gum, Red Gum, and constituted these as types in their own amateur way, at all events, over more or less limited areas. Then, as a man's experience widened, it dawned upon him that certain trees or timbers did not conform to the standards he had set up. His nomenclature had been used up, and yet he wished to indicate resemblance to his prototypes, and so some ingenious person first thought of the prefix "Bastard," and it has stuck to Australian trees with remarkable pertinacity. Originally there was no idea of cross-pollination, though the use of the term in the mouth of the intelligent bushman may, in some cases, afford a suggestion to the botanist. As a rule, the term merely means a difference from an accepted standard, however arrived at, and this difference may be brought about by environment, as well as by pollination.

d. Use of Botanical names for Trade purposes.


If this principle be not very judiciously applied, instead of good resulting, the divorce between the Eucalyptus nomenclature of botanists and that of commercial men will be widened. In the case of a species name such as *E. globulus*, and a very large number, indeed the vast majority of species, there are no differences of opinion as to validity; in other words, the scientific name can be used for timber or oil or any other branch of commercial nomenclature with perfect safety. But the use of a name which has not one, but many synonyms, is on a different footing, and its use for trade purposes leads to the very confusion we all desire to avoid. A firm receives this name in perfectly good faith, indeed it may not have the knowledge on which to form an independent opinion; oil is supplied under that name to its numerous customers. The name becomes involved in trade transactions, and, having once adopted it, a firm naturally becomes unwilling to withdraw it. In other words, a non-botanist takes botanical sides, and he is actuated by one of the strongest of human motives, pecuniary interest, and there is no doubt that, money being at stake, the commercial name will be closely adhered to, to an extent measured by the demand for the oil, irrespective of any evidence the dissentient botanist may adduce. This unfortunate state of affairs, which may obstruct endeavours to arrive at a settled nomenclature, is always liable to take place in the case of acceptance of any botanical name for trade purposes before it has been thoroughly tested. In other words, we shall probably find it necessary, in future, to employ two lists, one the stereotyped list that the stability of trade requires, and a
second list of equivalents according to the laws of botanical nomenclature. It is not the fault of botanists that the nomenclature of Eucalyptus cannot be stereotyped to-day. A really remarkable amount of work has been done in this direction, particularly during the last twenty-five years, and while all species will not be discovered and examined, even in a century to come, I consider that it would be a feat of which botanists might be proud, if they find themselves able to secure a fairly stable nomenclature of species in this genus in the course of a further twenty-five years.

e. Old Vernaculars.

The following may be added to the list of old vernaculars quoted in Part L, p. 308.

Oxley's "Journal of Two Expeditions . . . 1817–18" (published 1820), quotes the following, mostly from western New South Wales:—p. 15, "Dwarf Box" (E. bicolor); p. 63, "Dwarf Gum" (the first name for Mallee) E. dumosa; p. 99, "Blue Gum" (E. rostrata); p. 136, "Box" (E. melliodora); p. 162, "Bastard Box" (E. bicolar); p. 190, "Straight Blue Gums" (E. rostrata); 170–197, "Ironbark" (E. crebra); 170–197, "Stringybark" (E. macrorrhyncha); p. 346, "Red Gum," near Redhead, Newcastle (E. tereticornis).


Bentham (B. Fl. III. 188, 1866) gives a list of vernaculars (39) attached to 104 species.

Christie's paper in Journ. Roy. Soc., N. S. W. (1876) is important because it is the earliest account we have of the vernaculars of New England (N.S.W.) timbers. Some of his specimens are extant.

No. 20 Bastard Yellow Jacket (E. melliodora); 17 and 18. Ironbark (E. sideroxylon or E. Coleyi); 12. White Box (E. albens); 1. Spotted Gum (E. tereticornis (?)); 2, 2a, 3a. Red Gum (E. tereticornis); 3. Blue Gum (E. Bancrofti); 10 and 10a. Yellow Jacket (E. melliodora); 13. Peppermint (glaucons) (E. Stuartiana—now Black Peppermint); 14. Box Messmate (E. Andrewsii); 4. Brown barked Gum (E. dealbata) (in Sydney Herbarium); 6. Pink-barked Gum (E. rubida); 11. Blackbutt (E. Andrewsii) are also in the Sydney Herbarium.

Mueller ("Eucalyptographia") quotes vernaculars to a limited extent, but does not furnish a list. Frank Cowan (Greensburgh, Penn., U.S.A.), publishes a "Check-list of the Common Names of the Eucalypts or Gum-trees of Australia," pp. 26 (1894), which is a mere compilation of the vernacular names contained in Mueller's work.

In this district (North and East Gippsland) the bushman's name for E. Stuartiana is "Apple-tree" or "Apple-tree Box." E. Baueriana is also "Apple-tree" in the vernacular. E. goniocalyx, in the lowland country at least, is "Spotted Gum" in the language of the bushmen and sawmillers of Gippsland, and the north-eastern district. E. Sieberiana is "Mountain Ash" throughout eastern Gippsland. E. regnans to the Gippsland bushman is always "Blackbutt." . . . "Swamp Gum" is an expressive name often applied
to *E. viminalis*, *E. Gunnii*, and sometimes to *E. rubida* when growing in low-lying swampy localities. I have not known it to be applied to 'Red Gum' in the district (either *E. rostrata* or *E. tereticornis*, both of these often grow in the low-lying river flats, which are subject to flooding') (Harry Hopkins, Bairnsdale, Victoria).

The above letter is useful as a specimen of the way in which general statements of the vernaculars in use in limited areas can be submitted. They should be very much multiplied, but of course, only by experienced observers.

2. VERNACULAR NAMES FOR TIMBERS.

I have dealt with the literature of the subject at Part LIII, pp. 128–136, and attention may be drawn to it at the present place, as it may be desired to make a difference between the vernaculars of timbers and the trees producing them. That the matter is of some importance to the consumer is well known. In 1918 the Interstate Commissioner held an inquiry as to House Rents, which brought the price of timber under review. The following evidence was given, referring to Tasmanian Stringybark (*Eucalyptus obliqua*):

It sells at 4s. 6d. and 5s. 6d. per 100 feet at the mills, and from 6s. 6d. to 10s. in Sydney, but is sold at 33s. as Tasmanian Oak. . . . To become Tasmanian Oak it requires careful treatment and seasoning for a couple of years. . . . It simply becomes seasoned Stringybark. One of our well-known merchants used to sell Tasmanian Hardwood as Tasmanian Tallow-wood. Tallow-wood is a well-known timber in New South Wales (*E. microcorys*). One other well-known timber was quoted (*Sydney Morning Herald*, report of inquiry, 19th December, 1918; letter 20th December).

In other words, juggle with the vernacular or "common" names (which are often not "common"), and you can rob the public with impunity.

I have for many years drawn the attention of the public to the confusion of the vernacular names in the case of Eucalyptus timbers, and will confine myself to a few references:

1. In my "Useful Native Plants of Australia," p. 427 (1889), as follows:

Scarcey a branch of Australian economic botany is in a more confused state than that which pertains to the timbers of the Eucalyptus. The genus is perhaps the most difficult one in the world, intrinsically, and also because of accidental circumstances, i.e., difficulty of obtaining flowers and fruit, and irregular flowering seasons; moreover, the trees vary according to climate and soil to such an extent as to render the definition of a species rather expensive, and as this difference often extends to the wood, timbers of totally different character are sometimes reckoned under the same species. In consequence, the botanical synonyms are very numerous, and this being so, the non-botanist must not be upbraided for his formidale list of vernacular names. These names have been given at some length in the following pages, as a practical knowledge of Eucalyptus timbers cannot be dissociated from them, and surely no other genus has ever been honoured by such a number. The author believes that it will be found that some of the vernacular names given have been assigned to wrong species by some observers, but he offers the notes as a contribution towards the compilation of a glossary of Eucalypt names.
2. In my article "Some of the Pale Hardwoods of New South Wales," published in the "Building and Engineering Journal," Sydney, of 10th September, 1892, the subject is referred to:—

"I will endeavour, as far as possible, to push botanical names and scientific phrases into the background, but I would venture to sound a note of warning in regard to quacks who profess to deal with our hardwoods without any reference to scientific names. I am addressing a body of gentlemen (architects) whose training lies not only in the domain of art, but also of science, and I put it to you that, if you would desire more than a smattering of knowledge in regard to our hardwoods, you will find it necessary to occasionally employ botanical names for the sake of precision. You will find that the same timber goes under different names in different districts, and the same name has been employed to designate more than one timber; hence, to avoid circumlocution, at any rate, it will be necessary to fall back upon botanical names sometimes, as landmarks or starting points. Of course, with some timbers, such as Tallow-wood, there is no ambiguity in this colony, but their number is very few. Tallow-wood is Tallow-wood in New South Wales, one species and no other, although a voluble timber-getter will, after vainly using all his powers of persuasion to prove to you that a certain timber is Tallow-wood, blurt out "Well, it's a bastard Tallow-wood then," which may mean anything. I therefore employ botanical names (in conjunction with vernacular ones) in this paper, simply to make it quite clear what particular timber I am referring to, and the vernacular names I use are those I believe it is desirable to employ, as far as possible, when referring to the particular species under consideration. In Europe, vernacular names have been in use so long that they have acquired a precision of a high order, and an architect has only to refer to a timber by its vernacular name for a definite substance to be understood thereby. In our colony, the use of vernacular names as applied to native timbers has often led to uncertainty, disappointment, and dispute, and the architect who desires a fair acquaintance with our native hardwoods must look the facts squarely in the face and endeavouring to tackle the small amount of botany, or rather, use of botanical terms, requisite for their discrimination. My subject is a most appropriate one to bring before architects, as, in one part of the colony or another, every timber I shall bring under review is either used by them in the construction of buildings, or, in case of some of the inferior ones, they are endeavoured to be foisted on the architect under misleading names.

My efforts for the subsequent thirty years to arrive at a settled timber nomenclature are, I think, well known.

3. In the "Report of the Interstate Conference on Forestry held at Perth (W.A.), November, 1917" (Perth, 1918), I contributed a paper "An attempt to secure a uniform nomenclature for Australian Timbers," pp. 17-22. This paper caused a discursive discussion, amusing for the way in which it disclosed the unscientific ideas of some gentlemen in regard to the fundamental principles of nomenclature.

I took a list of the principal commercial timbers of each State, from the writings of a recognised authority belonging to each State. The next step was to submit List 1—"Practical unanimity in the use of common names." The cases are, however, few. Then came List 2—"More than one vernacular name for the same timber"; List 3 is one of "Stringybarks, Ironbarks, and Mahoganies"; List 4 is "The same vernacular name in use for two or more timbers." Following each list came a commentary and suggestions, without which the lists have little practical value.

Then came (p. 20) "The question of suppression of names under a single vernacular." After some introductory remarks, I proposed the following terms for the overseas trade, viz., 1, Ironbark; 2. Jarrah; 3. Blackbutt; 4. Box; 5. Spotted
Gum; 6, Tallow-wood, showing how I proposed to group certain commercial timbers under these six names, suppressing some local ones for the common good, in order that both seller and buyer might be spared a good deal of the confusion which at present results from our rich collection of common names.

I also made two suggestions:—

A. Timber Committee.—There would require to be established an expert timber committee, on which all the Forest Departments would have representation, and this would be in touch with the Customs Department. One of its functions would be to state the various timbers which are from time to time approved for export, and under what names. For example, the name "Jarrah" means a timber of a certain standard, and the committee would not permit any to pass under that name which would lower the standard agreed upon.

B. Timber Grading.—When we have correct nomenclature, and when we have got over our difficulty of suppression of unnecessary local names (for export purposes), we will still have to devise rules for grading. For example, as regards Ironbark, we might have Red Ironbark and Pale Ironbark, and of the former, say three qualities, 1, 2, 3. This would be an important work of the Timber Committee, and standard timbers, approved both as to name and to various qualities, would be placed conveniently at every place of export and in other suitable places. Provision would doubtless be made for branding timber to briefly indicate names and qualities.

The suggestions made in my paper were not taken up at the time, and I did not expect them to be. This is not the only Eucalyptus matter in which I have been ahead of my time. There is too much interstate jealousy in the timber trade yet to permit much serious working together for the common good. I ask my readers to read the whole of my paper, of which I have only given an abstract, and I say to my critics:—"Instead of offering a blind eye to my paper, point out where I am wrong, and why, and, better still, make constructive suggestions which will help us out of a state of things which is at present a public scandal." Destructive criticism is the easiest thing imaginable, but constructive criticism alone advances knowledge. I am sometimes inclined to be down-hearted in regard to the results of my efforts, extending over so many years, to improve the nomenclature of our timbers, but have come to the conclusion that no real improvement will be made until we have an educated public. This we will have to make, and our teaching must commence in the elementary schools.

(To save repetition, some of the early work, involving the nomenclature of timbers, will be found in Part LIII of the present work, pp. 128-136.)

4. In my "Forest Flora of New South Wales" I have made an occasional digression in regard to the advantage of a stable nomenclature in timbers. Thus, under E. saligna at Part IV, p. 76, I discuss the losses and uncertainties which have arisen through foreign buyers receiving totally different timbers under the one name of Blue.
Gum, and under *E. punctata*, at Part X, p. 202, the subject is discussed under the futile attempts to have "one species, one common name." *E. punctata* is a well-known Grey Gum, but it has not the monopoly of that name by any means, and the consequent situation is pointed out. But when one desires to thresh the matter out, vested interest and expediency always effectively prevent it.

3. ABORIGINAL NAMES.

The aboriginal owners of the soil were split up into tribes with different languages, and in the comparatively few cases in which they had names for plants, these names did not pass current over large areas. I am unable to ask my readers to believe that the aboriginal knowledge of Eucalyptus was (or is) profound, for I have no evidence of it. I have endeavoured to attach names to species to the best of my ability. It is further regrettable that, in many districts, by the time the white man had begun to possess more than a superficial knowledge of the Eucalypts, the aborigines had died out.

Speaking of far more civilised races than the Australian aborigines, Hooker said:

Throughout our travels in India, we were struck with the undue reliance placed on native names of plants, and information of all kinds; and the pertinacity with which each linguist adhered to his own crotchet as to the application of terms to natural objects, and their pronunciation. It is a very prevalent, but erroneous, impression, that savage and half-civilised people have an accurate knowledge of objects of natural history and a uniform nomenclature for them. (*Himalayan Journals*, II, 328 (1854).)

For many years I have made a point of setting down the names stated to be those of the Australian aborigines for Eucalypts, and indeed plants of all sorts, but with only a limited amount of success. I do not dispute for a moment, that the aborigines had names for some plants that we have not ascertained, and that, with their simple requirements, they put certain plants, or parts of plants, to uses that the white man has not put on record. But kindly sympathy with a disappearing race has often led worthy people to believe that they discriminated species to an extent which is very unlikely, or that they had uses for plants which were not obvious from superficial examination of their properties.

There is great lack of uniformity of orthography in aboriginal names. For example the name "Urac" given by Drummond (see Part XVII, p. 240). In that passage I did not remember the botanical name as *E. salmonophloia*, but the aboriginal name of this species is by Lort Stokes spelled "Wooruc," and by Mr. Geo. F. Best (see *Western Mail* of 24th April, 1914) "Wourruk." I gave the spelling "Wurruk" under *E. salmonophloia* (Part XVII, p. 217). In other words, different people record differently, in English letters, the same name. Furthermore, as the years roll on, variants arise in the pronunciation. We have agreed as to the official spelling in the case of a number of native names, but, as regards the vast majority of them, every man seems to spell as he chooses.
A similar case is “Yangoora,” “Yangoura,” and “Yanggura” in use in Gippsland and eastern New South Wales for *E. capitellata* and *E. numerose*, different trees furnishing the aborigines with tying material. “Urar” of the late T. Petrie and “Uraa” or “Orara” of A. Meston, the aboriginal name for *E. maculata*, the Spotted Gum, said to give its name to the Orara River of northern New South Wales, is another case.

I think that the vast majority of ascertained aboriginal names, believed to be capable of identification, will be found in the indexes of the various volumes of the present work, and need not be separately set out here. Also that there is good work to be done in ascertaining aboriginal names for Eucalypts arranged in districts and as given below; clues to the amplification of such groups of names can be ascertained from the indexes. No doubt someone will take up the subject as a self-imposed task.

One of our earliest Eucalyptus aboriginal name lists will be found in “Discoveries in Australia in H.M.S. ‘Beagle,’” 1837-43, by Captain Lort Stokes, II, 132 (1846), as follows:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahogany</td>
<td>Jarrail</td>
<td>...</td>
<td><em>E. marginata</em> ?</td>
<td>Grows on white sandy land.</td>
</tr>
<tr>
<td>Red Gum</td>
<td>Kardan</td>
<td>...</td>
<td><em>E. calophylla</em></td>
<td>On loamy land.</td>
</tr>
<tr>
<td>Blue Gum</td>
<td>Co-lort</td>
<td>...</td>
<td><em>E. diversicolor</em></td>
<td>On river banks and flooded lands, a sure indication of the vicinity of water.</td>
</tr>
<tr>
<td>White Gum</td>
<td>Wando</td>
<td>...</td>
<td><em>E. redunca var. elata.</em></td>
<td>On stiff, clay lands, sometimes tapped for water contained in hollow trunk.</td>
</tr>
<tr>
<td>York Gum</td>
<td>To-art</td>
<td>...</td>
<td><em>E. facunda.</em></td>
<td>Abundant in York—on good soil.</td>
</tr>
<tr>
<td>Cable Gum</td>
<td>Gnardarup</td>
<td>...</td>
<td><em>E. salubris.</em></td>
<td>Like several stems twisted together abundant in interior.</td>
</tr>
<tr>
<td>Wooroo</td>
<td>...</td>
<td><em>E. salmonophloia.</em></td>
<td>Brown, glossy stem, smooth.</td>
<td></td>
</tr>
<tr>
<td>Gnlaru</td>
<td>...</td>
<td></td>
<td><em>E. astringens.</em></td>
<td>Tall, straight, rough bark.</td>
</tr>
<tr>
<td>Mallat</td>
<td>...</td>
<td><em>E. longicorns.</em></td>
<td>Nearly similar.</td>
<td></td>
</tr>
<tr>
<td>Morrail</td>
<td>...</td>
<td></td>
<td><em>E. longicornis.</em></td>
<td></td>
</tr>
<tr>
<td>Balwungar</td>
<td>...</td>
<td></td>
<td><em>E. calophylla.</em></td>
<td></td>
</tr>
</tbody>
</table>

In the above, “Jarrail” may have been simply a mistake in writing for “Jarrah”; “Mallat” is “Mallet” (although the term “rough-bark” puzzles me), and “Morrail” is “Morrel.” The names “Gnlarue” and “Balwungar” are unknown to me.

Columns 1, 2, and 4 are in the original. Column 3 has been supplied by me. Column 4 is the first soil report as regards Western Australian species with which I am acquainted.

*E. gomphocephala* DC., which is mainly coastal in Western Australia, goes by the name “Tuart,” which is, as far as I am aware, exclusive at the present time. Old spellings are “Tewart” and “Too-art.” Captain Lort Stokes, as quoted above, speaks of the York Gum (the usual name for *E. facunda* Schauer) as abundant on good soil, and adds that the native name is “To-art.” Just about the same time, that is to say, at the end of the thirties, Drummond writes to Sir J. D. Hooker in the London Journal of Botany
II, 359, as follows:—“The Eucalyptus, found on the sandy loam, is called by the settlers York Gum, by the natives “Doatta”; they use the bark of the root as food in the dry season, chewing it along with the gum of the Manna (the Manna is an Acacia which produces a large quantity of gum in the dry season. Common in the valley of the Avon, *Acacia microcarpa*).” I suggest that “Doatta,” “To-art,” and “Tuart” were intended by the blacks for the same class of tree. Perhaps they gave the name originally to the York Gum, and afterwards the white man fitted it on the modern “Tuart.”

Mr. Bruce W. Leake, of Cardonia, Woolundra, Western Australia, in the *Western Mail* for 30th December, 1920, says that the aborigines of the district give the following names:

“York Gum, Dwiddar; Gimlet Gum, Narderup; White Gum, Gwiddar. South of Quairading the name Ward is used for White Gum. While on the subject of native names, the blacks years ago must have named some of their different camps and watering places after the trees, e.g., Dwiddercanning, where there is a thick patch of York Gums (Dwiddar). A rock-hole called Wurrukkutting must have derived its name from some big clumps of Salmon Gum (Wurruk) in the vicinity.”

*E. macrocarpa* Hook., is the “Mottlecar” of the aborigines of the Bollart district (C. E. Lane-Poole).

The original reports of scientific (I include those of surveyors, of course), exploratory expeditions may still be profitably gone through for interpretation of native names in view of our more accurate knowledge of species. I extracted most of the names as this work proceeded. Take the expeditions of Mitchell, the Horn and Elder and the Tietkens Expeditions, for example.

Mr. John Allan, Forest Ranger, communicated to the *Moruya Examiner*, New South Wales, in 1890, the following list of native names of indigenous trees in use in the South Coast of New South Wales:—“Spotted Gum, Thurrancy; Blackbutt, Yarrawarrah; Ironbark, Goondera or Yarre; Woollybut, Mudione; Peppermint, Bururr Burra; Messmate, Pandaworda; Stringy bark, Goba; Apple Tree, Ediade; Mountain Ash, Undawrea; White Box, Berre Berre; Box, Curowar; Bloodwood, Culoul; Red or Grey Gum, Yaala; Swamp Mahogany, Berrera.”

In 1889 Forest Ranger G. R. Brown, for many years of Port Macquarie, gave me the following names of trees on the Manning River, New South Wales. The suffix “barng” meant a single tree, and “beit” more than one. “Spotted Gun (E. maculata), Karoobarng; Blackbutt (E. pilularis) Goolerbarng; Bloodwood (E. corymbosa), Koorebarng; Tallow-wood (E. microcorys), Wombebarng; Forest Box, Birringbarng; White Mahogany (E. acmeniodes), Bunnargbarng; Red Mahogany (E. resinifera), Bullaralbarng.”

Some names will be found in O’Shanesy’s pamphlet “Contributions to Flora of Queensland,” pp. 36, 37, et. seq.
Dr. H. Basedow gives the name "Aparra" as current for *E. microtheca* on the Diamantina River.

The following names were in use by the Koolaburra, Taromeo tribe, South Queensland (J. Shirley). *E. crebra* F. v.M., "Bil"; *E. hemiphloia* F. v.M., "Woorgun"; *E. melanophloia* F. v.M., "Gaygar"; *E. tereticornis* Sm. "Moonburrie." The name for *E. Cloeziana* on the Upper May River is "Jandour," according to Mr. Herbert A. Bloxsome.

The following aboriginal names for Eucalypts have been extracted from the writings of the late R. H. Matthews:

<table>
<thead>
<tr>
<th>Yualei Tribe (South Queensland)</th>
<th>Yota-yota Tribe (Murray River both New South Wales and Victoria)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Gum (<em>E. rostrata</em>)</td>
<td>Gurana</td>
</tr>
<tr>
<td>White Box (<em>E. albens</em>)</td>
<td></td>
</tr>
<tr>
<td>Yellow Box (<em>E. melliodora</em>)</td>
<td></td>
</tr>
<tr>
<td>Box (<em>E. microcarpa</em>)</td>
<td></td>
</tr>
<tr>
<td>Stringybark (<em>E. capitellata</em>)</td>
<td></td>
</tr>
<tr>
<td>Ironbark (<em>E. sideroxylon</em>)</td>
<td></td>
</tr>
<tr>
<td>Mahogany (<em>E. botryoides</em>)</td>
<td></td>
</tr>
<tr>
<td>Red Gum (<em>E. rostrata</em>)</td>
<td></td>
</tr>
<tr>
<td>Mountain Ash (<em>E. Sieberiana</em>)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dharnya</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baima.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beruga.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tyattulla Tribe (W. Victoria).</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Buluty</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dulkan</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yauggura.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Burru.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Binnak</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bial.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yauoty.</td>
</tr>
</tbody>
</table>
EXPLANATION OF PLATES, 284-287.

PLATE 284.

_E. Baxteri_ (Benth.) Maiden and Blakely, _n.sp._

1a, 1b, abbreviated broad adult leaves; 2, twig with buds and flowers, reproduced from a drawing of the type, _E. santalifolia_ F.v.M. var. (?) _Baxteri_. "Mr. William Baxter (received 1828), probably South Coast, perhaps Kangaroo Island or possibly Van Dieman's Land, R. Brown." 3a, mature leaf; 3b, buds; 3c, anther; 3d, cluster of fruits, all from Kangaroo Island, South Australia, (W. J. Spafford, No. 7, May, 1916); 4, seeds from 3d.

_E. Baxteri_ (Benth). Maiden and Blakely, var. _pedicellata_ Maiden and Blakely, _n. var._

5a, 5b, mature leaves; 5c, 5d, anther; 5e, fruits, all from Maynook, Latrobe Valley, Victoria (Rev. J. H. Simmonds, 18th June, 1921), Co-type; 6, fruits of var. _pedicellata_, south-west corner of Victoria (A. D. Hardy, November, 1922), Co-type.

_E. Blaxlandi_ Maiden and Cambage.

7, juvenile leaf; 8, mature leaf; 9, buds; 10, fruit; Type of _E. Blaxlandi_, Blackheath (J.H.M., 1905).

PLATE 285.

_E. orgadophila_ Maiden and Blakely, _n. sp._

1a, juvenile leaf, which is somewhat broad and retuse; 1b, a broad lanceolate juvenile leaf; 2, mature leaf; 3a, buds; 3b, type of anthers, front and back view; 4, mature leaf and cluster of fruits, all from Cooranga North, Darling Downs (C. T. White, No. 2484, 21st April, 1925).

_E. acmenioides_ Schauer, var. _tenuipes_ Maiden and Blakely, _n. var._

5a, 5b, 5c, mature leaves; 6a, cluster of fruits; 6b, fruit, to show the long pedicel; 6c, plan of the top of the fruit.. Meteor Creek, South Central Queensland (Dr. H. I. Jensen, July, 1921, per C. T. White).

_E. Murphyi_ Maiden and Blakely, _n. sp._

7a, 7b, 7c, types of juvenile leaves, but not in the earliest stages; 8a, buds; 8b, anthers; 9, twig showing mature leaves and fruit. All from Wongoni near Merrygoen (Andrew and Percy Murphy, January, 1919 and November, 1921).
Types of Cotyledons, natural size. Figures 1–4 belong to Reniformae. Section I. Large Cotyledons. Series (1a) Corymbosae-Peltatae. They have the largest cotyledons of all the species, and the advanced seedlings are characterised by minute stellate hairs or seta.

1a, 1b, *E. calophylla*. Hypocotyl moderately short; cotyledons large, sometimes slightly undulate, with 3–5 faint radiating nerves, and more or less setose; 1a, 30 x 22mm. (Perth, Western Australia, Woods and Forests Department). (See also Coloured Plate No. 2).

2. *E. feafolia*. Hypocotyl short; cotyledons nearly orbicular with a prominent midrib and faint lateral nerves, setose above the hypocotyl, 30 x 25mm. This and the preceding are the largest cotyledons of all the species. (Botanic Gardens, Sydney). (See also Coloured Plate No. 2).

3. *E. hamatoxy lon*. Hypocotyl short, as in the preceding, but slightly smaller with 3–5 faint radiating nerves; setose above the hypocotyl. (See also Coloured Plate No. 3).

4. *E. eximia* (Berow, A. Murphy). Cotyledons smaller than the preceding, but sometimes as large; venation often indistinct; densely setose above the hypocotyl. (See also Coloured Plate No. 3).

Figs. 5–12, except 7 and 8, belong to Section 2, Medium Cotyledons, Series (2a), Corymbosae-Peltatae. The cotyledons depicted vary from 9 x 5 mm. to 11 x 8 mm., and are moderately uniform in shape. (See Coloured Plate No. 4).

5. *E. maculata*, Wyong N.S.W. (Andrew Murphy, 1913). Reniformae, Medium Cotyledons, Series 2a, Corymbosae-Peltatae. (See Coloured Plate No. 4).


10. *E. trachyphloia*, Gungal, N.S.W. (J. L. Boorman). This species appears to have the smallest cotyledons of any of the Corymbosae; its fruit are also small. Series 2a. (See Coloured Plate No. 4, No. 5)


12. *E. Bloxsomei*, Hippong, Queensland (H. S. Bloxsome). Note the first pair of leaves above the orbicular cotyledons are alternate. Series 2a.

Figs. 7, 8, 14, 15, 19, 25, illustrate members of Section 2, Medium Cotyledons Series 2b, Non-Peltatae. The cotyledons do not show a great deal of variation. They range from 13 x 10 mm. to 20 x 13 mm., and like other species of the Corymbosae, the more advanced seedlings are furnished with stellate hairs or seta.

13. *E. tetrodonta*, Darwin, Northern Territory (G.F. Hill). This is a member of the Reniformae, Series 2c. Eudesmeae. The Cotyledons are more oblong than those of the Corymbosae, but they resemble the latter in the setose vestiture of the more advanced seedlings, and are readily distinguished from Series 2a in being non-peltate. (See Coloured Plate No. 5).

15, *E. setosa*, Woolgi, Northern Territory (Dr. H. I. Jensen). Series 2b. (See Coloured Plate No. 4).

16, *E. Fobscheana*, Edith Creek, Northern Territory (Baldwin Spencer). Section. Large Cotyledons. Series 1b, Corymbosum-Non-peltate. (See also Coloured Plate No. 2).

17, *E. pycnorcarpa*, Edith Creek, Northern Territory (Baldwin Spencer). Series 1b. (See Coloured Plate No. 2).

18, *E. miniata*, Northern Territory (per H. Steedman). In this species the hypocotyl is either very short or entirely submerged like that of *E. marginata*, figures 40a, 40b, 40c, Series 1b. (See Coloured Plate No. 2).


23a, 23b, *E. patens*, Busselton, Western Australia (Dr. F. Stoward). Series 2e.

Figs: 13, 24, 26, 27, 28, depict members of Section 2, Series 2e, Eudesmea. The cotyledons are all reniform, and range from 8 x 5 mm. to 15 x 10 mm. This series in the early stages is distinguished from Series 2d, Angophoroides by the filiform, elongated hypocotyl.

24a, 24b, *E. tetrogonia*, Western Australia. Series 2b, Eudesmea.


27, *E. erythrocorys*, Arrowsmith, Western Australia (W. D. Campbell). Series 2c, Eudesmea.

28a, 28b, *E. eudesmioides*, Minginew, Western Australia (W. V. Fitzgerald). Series 2c, Eudesmea. See also figures 13, 24, 26, and 27. (See Coloured Plate No. 5).

Figs. 29a, 29b, 30, 32, 33a, 33b, depict types of Reniformae, Section 3, Small Cotyledons Series 3, Fuchsia-like, so named because the more advanced seedlings remind one of the foliage of the common garden Fuchsia. The cotyledons are all reniform and range from 7 x 6 mm. to 12 x 10 mm.


34. *E. patellaris*, Mataranka Station, Northern Territory (C. E. F. Allen). The trinerved venation of the cotyledone did not print out. See figure 30 for comparison. This species is placed tentatively with the Reniformae, 2d, Angophoroideae. See 39a, 39b, *E. grandifolia*, another tropical species, for comparison. Both species have the abbreviated hypocotyl.


39a, 39b. *E. grandifolia*, Stapleton, Northern Territory (G. F. Hill). Series 2d. Angophoroideae. This and other members of this series seem to be a connecting link with those species with a submerged hypocotyl, i.e., *E. miniatia*, Figure 18; *E. marginata*.

40a, 40b, 40c. *E. marginata*, Western Australia. See remarks under 39. Large cotyledons, Series 1c. Non-Corymbosae. They connect with Series 1a in size, but differ somewhat in shape. (See Coloured Plate No. 3).

41. *E. sepulcralis*, Bremer Bay, Western Australia (J. Wellstead). Series 1c. (See Coloured Plate No. 3).

42. *E. Planchnoniana*, Eight-mile Plain, Queensland (Andrew Murphy, 1918). Series 1c. (See Coloured Plate No. 3).


44. *E. tetraptera*, Western Australia. This is the only member of the Series 2f. Rigid, semi-angular. In the later stage it approaches *E. angulosa* and other members of the Series 1f. Bilobaes. See next Plate for additional examples.

45. *E. biprostium*, Kalgan Plains, Western Australia (J. H. M.). Series 1c. For other allied species see figures 40-43. (See also Coloured Plate No. 3).

PLATE 287.

Types of Eucalyptus Cotyledons (continued from Plate 286).

Figs. 1 to 22 illustrate the Division Reniformae, Series 3. Small cotyledons. They range from 5 to 15 mm. long, and from 4 to 12 mm. broad, and are very variable within the section.


2a. 2b. *E. pilularis*, Woy Woy, New South Wales (Andrew Murphy, 1913). The trinerved venation of the cotyledons did not print out; which in some seedlings is more conspicuous than in others. Series 8, Sieberiana, after a well known species of the Series.


6a, 6b. *E. eugenioides*, Wingello, New South Wales (Andrew Murphy). The cotyledons are usually more or less imperfectly trinerved, but the venation is not shown. They are the smallest of the series to which this species belongs, i.e., Series 1. Crinkled. See figure 9, *E. Baxteri*, for comparison. (See also Coloured Plate No. 1).


9. *E. Baxteri*, Kangaroo Island, South Australia. The trinerved venation of the cotyledons did not print out. A description of this species appears in Part LXX. Its cotyledons are the largest of the Series 1.


11. *E. Baxteri* var. *pedicellata*, South-West corner of Victoria (A. D. Hardy, November, 1922). Like 9, the cotyledons are usually minutely trinerved. Series 1.

12a, 12b. *E. Preissiana*, Kalgan Plains, Western Australia (J. H. M.). The cotyledons are almost identical with those of *E. Baxteri*, figure 9. The affinity is most interesting, as both species are totally different in a much later stage, as well as in other botanical characters. *E. Preissiana* is one of the few Reniformae found in Western Australia. Series 2.

13. *E. acmenioides*, 30 miles east of Stanthorpe, Queensland (R. H. Cambage). In the first stage its affinity is with *E. eugenioides*, but later on it differs to such an extent as to warrant a separate series, i.e., Series 5. Acmenioides; in which is included *E. umbra*, a geminate species.


15a, 15b. *E. alpina*, Tetanga, Victoria (P. R. H. St. John). It is a small Alpine Stringybark, and is allied to *E. Baxteri*, figure 9. in the buds and fruits, as well as in the cotyledons. Series 2.

16. *E. coriacea*, Wingello, New South Wales (J. L. Boorman, 1909). The hypocotyl is very short, and the first two leaves are broad. Series 14. Broad, longitudinal (i.e., elliptical to cordate). The venation of this series in a later stage is longitudinal.


Figs. 23 to 48 represent members of the Division Bilobae. In this section we may have cotyledons ranging from 4 to 13 mm. long and from 3 to 7 mm. broad, and are minute to distinctly bilobed; on the one hand they blend into the Bilobae, and on the other into the Division Bisectae. It is a large group and requires further investigation to clearly define it.

23a, 23b. *E. dumosa*, Wyalong (J. L. Boorman). The cotyledons are small, and the hypocotyl is thread-like. It is a member of the Division Bilobae, and belongs to Series 11. Small, oblong, etc. In a later stage the young seedlings of this series are somewhat rigid, with small, oblong to lanceolate leaves.

24. *E. melioidora*, Dubbo, New South Wales (J. L. Boorman, 1913), with small cotyledons. Series 4. Brevi-lanceolate, tripinnerved. In reference to shape and venation of the leaves in the advanced seedlings (See also Coloured Plate No. 8).


27a, 27b. *E. odorata*, Port Lincoln, South Australia (J. H. M., 1907). Almost identical with the two preceding species, Series 4. (See Coloured Plate No. 9.)


29. *E. siderophloia* A Cunn. 5 miles from Morisset, New South Wales (Andrew Murphy, 1902). Series 3. Linear to narrow-lanceolate. (See Coloured Plate No. 7).


32. *E. fasciculosa*, Woods and Forests Department, Adelaide, South Australia. Cotyledons rather broad, slightly lobed. This is a gum usually found in the dry interior of the continent. Series 5. Broad, glaucous, tripinnerved.

33. *E. acaciaeformis*, Moona Plains, Walcha, New South Wales (A. R. Crawford, 1898). The cotyledons are very small, and the hypocotyl exceedingly short. Bilobae. Series 20. Narrow, semi-rigid. The seedlings are distinct from those of *E. acaciaeformis var. linearis* in the fewer opposite leaves, and in the alternate leaves being more rigid and somewhat glaucous. (See Coloured Plate No. 7).

34a, 34b. *E. unialata*, Hobart, Tasmania (J.H.M., 1918). Note the very long hypocotyl and the minute seta above the moderately large cotyledons. Series 17. Sesile, narrow-lanceolate to elliptical, stem-clasping.

35a, 35b. *E. striaticalyx*, Milly’s Soak, near Cue, Western Australia (J.H.M., October, 1909). It has the filiform hypocotyl of 34a, b, but is dissimilar in other characters. Series 11. Small, oblong to lanceolate.


38. *E. tereticornis*, Port Macquarie, New South Wales (J. L. Boorman, March, 1900). The hypocotyl is rather short and the cotyledons are small. Series 23. Semi-terete to quadrangular. In the advanced stages the stems of the seedlings are more or less angular.

39. *E. alba*, Department of Agriculture, Buitenzorg, Java. This is a tropical species, and in the north of the continent it is often found associated with No. 38, *E. tereticornis*, from which it differs considerably in other characters. Series 23.

40. *E. meana*, Grafton, New South Wales (J.H.M. and J. L. Boorman). The cotyledons are slightly larger than those of *E. tereticornis*, with which it is closely allied in other characters. Series 23.


42. *E. diversicolor*, Western Australia (Andrew Murphy, January, 1918). This western species shows a remarkable similarity in its cotyledons with two well-known eastern species, viz., *E. globulus*, fig. 46, and *E. saligna*, fig. 48; but as the young plant develops it changes considerably, and is non-glaucous, with smallish petiolar leaves, until the intermediate-leaved stage is reached, when it becomes broad and markedly undulate. Series 24. Stem quadrangular.


44. *E. edocotylus*, South Australia (Andrew Murphy, 1917). The cotyledons are large and usually deeply lobed, while the hypocotyl is long and slender. Bisectae. Series 8. Petiolate.


46. *E. globulus*, Forest Reserve No. 22, 699, Parish Kunderang, County Vernon, New South Wales. (J. J. Wilshire, July, 1912). The cotyledons are not unlike those of the two preceding species, but in a later stage the seedling becomes quite different. Division Bilobae. Series 18. Sessile, etc. (See also Coloured Plate No. 1).

47a, 47b. *E. Maidenii*, Barber’s Creek, New South Wales (H. J. Rumsey, 1904). Like the preceding, in the early stages, but slightly smaller and often less glaucous. Series 18.

48. *E. saligna*, Gosford, New South Wales (Andrew Murphy, 1913). The cotyledons are large, not so deeply lobed as in *E. globulus*, but the hypocotyl is somewhat similar, and also the first pair of leaves but from then on there is a rapid change. Series 26. Fine parallel venation.

Figs. 44, 45, 49 to 69 illustrate the section Bisectae. The cotyledons are nearly all deeply divided to the base into two nearly equal lobes, and are Y or V-shaped. They vary considerably in size, the smallest being 4 mm. long and 1 mm. broad, and the largest 20 mm. long and 2 mm. broad.

49. *E. salminophloia*, Western Australia (Andrew Murphy, January, 1918). The cotyledons are small and equally divided into two linear lobes. Bisectae. Series 2. Narrow. (See also Coloured Plate No. 11).

50. *E. longicorvus*, Government Dam, Moojebening, Western Australia (Dr. F. Stoward). The linear bisected cotyledons are frail and flexuose. Series 2. Narrow,

52. *E. transcontinentalis*, Hugh Road, Northern Territory (G. F. Hill). With moderately large cotyledons and a long slender hypocotyl. Series 3. Linear. (See Coloured Plate No. 11).


54. *E. micranthera*, Lynburn, Western Australia (H. P. Turnbull, November, 1917). The very narrow cotyledons are more spreading than in most species. Series 1. Narrow throughout.

55a, 55b. *E. crucis*, Southern Cross, Western Australia (H. Steedman, August, 1922). 55a and 55b are the same plant; 55a is two months old, 55b, four months old, hence the difference in size of the cotyledons. Series 7. Sessile.


60. *E. foecunda*, Western Australia (Andrew Murphy, January, 1918). The hypocotyl is very short and the cotyledons very small and broad. Series 11. Broad-elliptical.


63a, 63b. *E. salubris*, Coolgardie, Western Australia (per Forest Department, Perth, Western Australia, November, 1915). The variation in size of the cotyledons of 63a and 63b is due to the age of the seedlings. Series 2. (See Coloured Plate No. 11).

64. *E. Campaspe*, Coolgardie, Western Australian (per Forest Department, Perth, Western Australia, November, 1915). Cotyledons rather large and broad. Series 9.

65. *E. squamosa*, Mount Penang, Gosford, New South Wales (Andrew Murphy). One of the very few eastern species belonging to the Bisectae. It is mainly confined to a small coastal area near Sydney, New South Wales. Series 9.

66a, 66b. *E. decurrea*, Kalgan Plains, Western Australia (J.H.M., November, 1909). Hypocotyl thick, cotyledons at first oblong, then changing to broadly crutch-shaped. Although placed in the Bisectae, it seems to have the spreading lobes of the Bilobae. Take for example Fig. 44, *E. cladocalyx*, and Fig. 46, *E. globulus*. Series 7.
67. *E. pyriformis*, Western Australia. The hypocotyl is very short, while the cotyledons are large and V-shaped; the largest of the Bisectae. It is a dwarf ornamental species with large showy flowers and very large, thick capsules. Series 10.

68. *E. Stowardi*, Uberin Hill, Dowerin, Western Australia (C. A. Fauntleroy). Hypocotyl long and slender; cotyledons broad, with broad lobes. Series 13.

69. *E. macrocarpa*, Western Australia (O. H. Sargent). Hypocotyl very long, cotyledons large V-shaped, the lobes broad. Series 10.
The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales" with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets:—

<table>
<thead>
<tr>
<th>Species</th>
<th>Plate Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>acacioides A. Cunn. (xlviii).</td>
<td></td>
</tr>
<tr>
<td>aementioides Schauer (xxxii).</td>
<td></td>
</tr>
<tr>
<td>affinis Deane and Maiden (lvi).</td>
<td></td>
</tr>
<tr>
<td>amygdalina Labill. (xvi).</td>
<td></td>
</tr>
<tr>
<td>Andreusi Maiden (xxi).</td>
<td></td>
</tr>
<tr>
<td>Bakeri Maiden (lxx).</td>
<td></td>
</tr>
<tr>
<td>Baueriana Schauer (lvii).</td>
<td></td>
</tr>
<tr>
<td>Baueriana Schauer var. conica Maiden (lvii).</td>
<td></td>
</tr>
<tr>
<td>bicolor A. Cunn. (xlv).</td>
<td></td>
</tr>
<tr>
<td>Boorman Deane and Maiden (xlv).</td>
<td></td>
</tr>
<tr>
<td>Caleyi Maiden (lv).</td>
<td></td>
</tr>
<tr>
<td>capillata Sm. (xxviii).</td>
<td></td>
</tr>
<tr>
<td>conica Deane and Maiden (lvii).</td>
<td></td>
</tr>
<tr>
<td>Consideriana Maiden (xxxvi).</td>
<td></td>
</tr>
<tr>
<td>coriacea A. Cunn. (xv).</td>
<td></td>
</tr>
<tr>
<td>corymbosa Sm. (xii).</td>
<td></td>
</tr>
<tr>
<td>Dalrympleana Maiden (lxv).</td>
<td></td>
</tr>
<tr>
<td>dives Schauer (xix).</td>
<td></td>
</tr>
<tr>
<td>dumosa A. Cunn. (lxv).</td>
<td></td>
</tr>
<tr>
<td>eugenioides Sieber (xxix).</td>
<td></td>
</tr>
<tr>
<td>gigantea Hook. f. (ii).</td>
<td></td>
</tr>
<tr>
<td>globulus Labill. (lxvii).</td>
<td></td>
</tr>
<tr>
<td>gonioalyx F.v.M. (vi).</td>
<td></td>
</tr>
<tr>
<td>hemastoma Sm. (xxxvii).</td>
<td></td>
</tr>
<tr>
<td>hemiphloia F.v.M. (vi).</td>
<td></td>
</tr>
<tr>
<td>longifolia Link and Otto (ii).</td>
<td></td>
</tr>
<tr>
<td>maculata Hook. (vii).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>melliodora A. Cunn. (ix).</td>
<td></td>
</tr>
<tr>
<td>microcorys F.v.M. (xxxviii).</td>
<td></td>
</tr>
<tr>
<td>Muelleriana Howitt (xxx).</td>
<td></td>
</tr>
<tr>
<td>numerosa Maiden (xvii).</td>
<td></td>
</tr>
<tr>
<td>obliqua L'Hérit. (xxii).</td>
<td></td>
</tr>
<tr>
<td>ochrophylia F.v.M. (i).</td>
<td></td>
</tr>
<tr>
<td>odorata Behr and Schlectendal (xli).</td>
<td></td>
</tr>
<tr>
<td>paniculata Sm. (viii).</td>
<td></td>
</tr>
<tr>
<td>pilularis Sm. (xxxi).</td>
<td></td>
</tr>
<tr>
<td>piperita Sm. (xiii).</td>
<td></td>
</tr>
<tr>
<td>polyanthemos Schauer (lix).</td>
<td></td>
</tr>
<tr>
<td>populifolia Hook. (xlvii).</td>
<td></td>
</tr>
<tr>
<td>propinqua Deane and Maiden (ixi).</td>
<td></td>
</tr>
<tr>
<td>punctata DC. (x).</td>
<td></td>
</tr>
<tr>
<td>radiata Sieb. as amygdalina (xvi).</td>
<td></td>
</tr>
<tr>
<td>resinifera Sm. (iii).</td>
<td></td>
</tr>
<tr>
<td>rubusta Sm. (lxvii).</td>
<td></td>
</tr>
<tr>
<td>rostrata Schlecht. (lxii).</td>
<td></td>
</tr>
<tr>
<td>rubida Deane and Maiden (xliii).</td>
<td></td>
</tr>
<tr>
<td>saligna Sm. (iv).</td>
<td></td>
</tr>
<tr>
<td>siderophloia Bentham. (xxxix).</td>
<td></td>
</tr>
<tr>
<td>siderozyton A. Cunn. (xiii).</td>
<td></td>
</tr>
<tr>
<td>Sieberiana F.v.M. (xxxiv).</td>
<td></td>
</tr>
<tr>
<td>Smithii R. T. Baker (lx).</td>
<td></td>
</tr>
<tr>
<td>stellulata Sieb. (xiv).</td>
<td></td>
</tr>
<tr>
<td>tereticornis Sm. (xi).</td>
<td></td>
</tr>
<tr>
<td>viminalis Labill. (lix)</td>
<td></td>
</tr>
<tr>
<td>virgata Sieb. (xxv).</td>
<td></td>
</tr>
<tr>
<td>vitrea R. T. Baker (xxiii).</td>
<td></td>
</tr>
</tbody>
</table>

* Government Printer, Sydney. 4to. Each part contains 4 plates and other illustrations.

Note by Government Printer.

Financial conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, i.e., from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For the Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 35s. for 15 parts, will come into effect as from the 1st July, 1921.

INDEX OF PARTS PUBLISHED
(continued from last page of cover).

PART LXVII.
362. E. Bloxsomii Maiden, n.sp.
   Papers on Range or Distribution.
   1. Australia in General.
   2. Western Australia.
   3. South Australia.
   4. Tasmania.
   5. Victoria.
   7. Queensland.
   8. Northern Territory.

Factors which Influence Range or
Distribution.

Introductory.

Altitude.

Geological Formations, Soils—
Victoria.

South Australia.

New South Wales.

Queensland.

Northern Territory.

Effect of Drought Conditions.

Note on Species of apparently anomalous Range.

Age and Area.

The Leaf.

(Continued from Part LXVI, p. 313.)

Mature Leaves.

Plates 272-275. (Issued December, 1926.)

PART LXVIII.
363. Eucalyptus Dwyeri Maiden and Blakely.
364. E. Burrawangensis Maiden and Blakely.
365. E. Whitei Maiden and Blakely.
366. E. Dongarwensis Maiden and Blakely.
367. E. Staelii Maiden.
368. E. Bedjinae de Bussville and Welsh.
369. x E. Kallangadooensis Maiden and Blakely.
370. E. albida Maiden and Blakely.
371. E. biangularis Simmonds.

A.—The Desirability of Studying Eucalyptus in
the Bush.

E.—The Value of the Study of Eucalyptus in a
Scheme of Education.

Plates 276-279. (Issued July, 1927.)

PART LXIX.
351. E. cruceo Maiden.
333. E. rigidula, n.sp.
372. E. Kondininensis Maiden and Blakely.
315. E. terminalis F.v.M. longipedata Maiden and
Blakely.
307. E. patellaris F.v.M.
87. E. Pimpliniana Maiden.
373. E. cylindricalis Maiden and Blakely.
374. E. Westoni Maiden and Blakely.
375. E. ulicifolia Maiden and Blakely.
170. E. Dunbari Maiden.
81. E. oiviera de Andrews.
376. E. ovulata Maiden and Blakely.
377. E. Kesselli Maiden and Blakely.
378. E. Desmondensis Maiden and Blakely.
84. E. aggregate Deane and Maiden.
72. E. Forrestiana Diesl.
379. E. Merrickii Maiden and Blakely.
189. E. olivigera A. Cunn var. Gilbertensis
Maiden and Blakely n. var.

The Species Question—
1. What do we mean by a species?
2. Variety of species?
3. Inequality of species-values.
4. No fixed line of demarcation between
    species.
5. Jordan's species.
6. A classical case of “splitting.”
7. Application of zoological tests to botani-
    cal species.
8. Variation of the genus.

The Struggle for Taxonomic Definiteness—

The Ideal of the type.
2. How to designate the type.
3. Model descriptions.
4. Labels and schedules.

Some aphorisms.

Plates 280-283. (Issued August, 1928.)
**Eucalyptus Baxteri** (Benth) Maiden and Blakely, n. sp. (1-4).

**E. Baxteri** (Benth) Maiden and Blakely, var. Pedicellata Maiden and Blakely. (5-6).

**E. Blaxlandi** Maiden and Cambage. (7-10).
EUCALYPTUS ORGADOPHILA Maiden and Blakely, n. sp. (1-4).
E. ACMENOIDES Schau., var. TENUIPES Maiden and Blakely, n. var. (5-6).
E. MURPHYI Maiden and Blakely, n. sp. (7-10)
TYPES OF EUCALYPTUS COTYLEDONS.
(See explanation of Plates.)
TYPES OF EUCALYPTUS COTYLEDONS. (Continued from Plate 286.)

(See explanation of Plates.)
INDEX OF PARTS PUBLISHED—continued.

III. Timber—concluded.

Microscopic Structure. Crystals (Calcium Oxalate).


Plates, 220-223. (Issued July, 1922.)

PART LV.


IV. The Root.

Adventitious Roots.

V. Exudates.


Plates, 224-227. (Issued August, 1922.)

PART LVI.

330. E. jakensii n.sp.
331. E. umbrosa Ser. n.sp.

VI. The Leaf.


Plates, 228-231. (Issued September, 1922.)

PART LVII.

336. E. agglomerata Maiden.
387. E. simulansii n.sp.
328. E. spiculata F.v.M.
329. E. longifolia Luehmann.
338. E. kal العلم ams.n.sp.
339. E. malacocarpa, n.sp.

VI. The Leaf—continued.


Plates, 232-235. (Issued January, 1923.)

PART LVIII.

341. E. collina W. V. Fitzgerald, n.sp.
312. E. Flexicaulis Maiden.
342. E. simulansii n.sp.
345. E. comites-chappa lillia var. major n. var. 107. E. longifolia Link and Otto.
346. E. citrulina Hooker.
343. E. hemiploca F.v.M.
347. E. microptera Heer.
348. E. arborea Maiden.

PART LX.

54. E. praehistorica Schauer.
53. E. microptera F.v.M.
135. E. Sunnii Hook, f.
171. E. longicornis, F.v.M.
152. E. propinqua, Deane and Maiden, var. major n. var.
36. E. hancockiana Sm.
340. E. microptera Deane.
350. E. macrolepis DC.
356. E. Spiculae Maiden and Blakely, n.sp.
357. E. crassifolia Maiden.
212. E. Superb Maiden.

VII. Inflorescence (in part)—continued.

D—Androecium. Anther. Gynoeceum. Ovary, etc.

Plates, 240-273. (Issued April, 1923.)

PART LXI.

393. E. spiculata Deane and Maiden.
354. E. stenophylla Trouessinowski.
364. E. Schlichteriana Hills.
29. E. spitziata Baker and Smith.
33. E. sieberiana F.v.M.
32. E. virgata Sieb.
49. E. acuminata A. Cam.
56. E. sudanica F.v.M.
59. E. Candida Maiden.
48. E. tenuifolia Maiden.
75. E. falcata Schauer.
194. E. Spenceriana Maiden.
201. E. radiata Sieb.
263. E. nitidula Hook, f.
229. E. enervata Maiden, var. grandiflora n. var.

ENEMIES OF EUCALYPTUS.

PART LXII.

355. E. gardneri n.sp.
356. E. eugeniae n.sp.
357. E. orgondi, n.sp.
11. E. radiata Hook, f. var. elata Beath.
358. E. Chisholmi Maiden and Blakely, n.sp.
359. E. Taylori Baker.
347. E. gigantea F.v.M.
308. E. Novocrassata Maiden.

PART LXIII.

211. E. laurentii F.v.M.
175. E. Websteriana Maiden.
361. E. nutans F.v.M.

IX.—The Seed.

1. Historical.
2. Danger of Collecting Seed of Inferior Species.
4. Seeds For Ornaments.
7. The Wing.
8. Hilum.
10. Tests.
12. Size.
13. Species of Species not seen by me.
14. Description of Seeds—

Series Stipulata.

Plates, 260-269 (Issued February, 1923.)

PART LXIV.

The Seed.

(Continued from Part LXIII, page 121.)

Series Stipulata (continued):—

Series Leiophylla.
Series Foroidea.
Series Alloidea.
Series Rudolphiana.
Series Leiospila-Fimbriata.
Series Calyptrata.
Series Nucleata.
Series Marginata.
Series Pyramidalis—shaped.

Plates, 260-265. (Issued December, 1923.)

PART LXV.

VI. The Leaf.

(With Special Reference to Evolution.)

(Continued from Parts LVI and LVII, and the plates of Part LXX.)

1. Introduction.
3. Angles of secondary veins with midrib.
4. Juvenile leaves (note only).
5. Mature leaves (note only).
6. Correlation of Seedlings and Juvenile Leaves (adventitious shoots):—
    (a) Terminology of Juvenile Leaves.
    (b) Coloured Plates.

Juvenile Leaves.

7. Additional descriptions.

Plates, 266-267. (Issued March, 1926.)

PART LXVI.

Range.

1. Definitions of Climates.
2. Species arranged according to Climates.
3. Species arranged according to States.
4. Tropical Species—North-Western Australia. Timor, the “Pindan.” Northern Territory. Use of the term “Northern Australia.”

Northern Queensland.

5. Extra Australian Species. E. Nudiflorens and some synonyms, doubtful and otherwise.

Philippines and New Britain, Papua, Timor, etc.

6. Australian Species cultivated abroad.

7. Addition to Range of Individual Species (as already given under each Species).

The Leaf.

(Continued from Part LXV, page 230.)

The Intermediate Leaf.

1. Preliminary.
2. The “Sapling” of Howitt.

Plates, 268-271. (Issued June, 1926.)

(For continuation see last page.)