

## DACRYDIUM.

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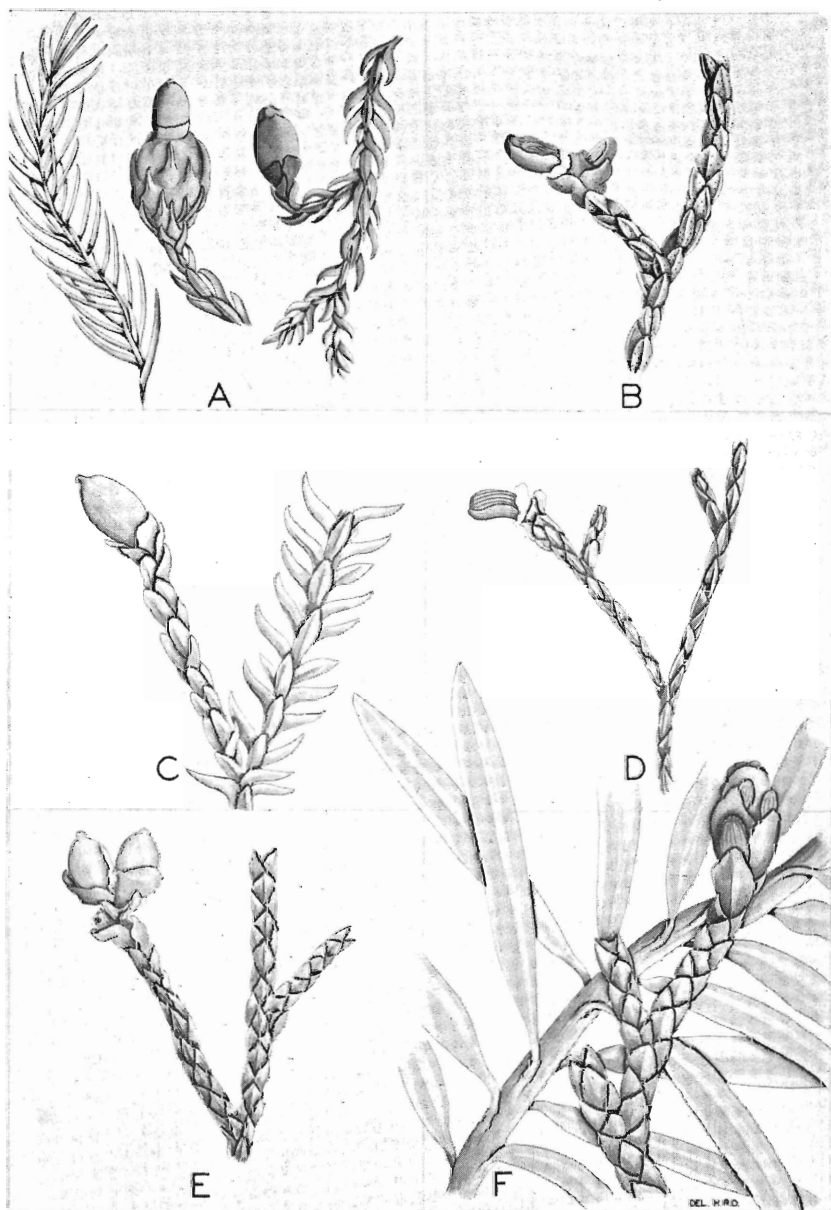
### 1. Distribution and Origin.

In Mesozoic times the area of the New Zealand land mass was extensive. Angiosperms had not appeared on earth at that time and the flora of New Zealand was of a fairly generalised world type. When we ascribe to ancient land masses in the Australian, Malayan, Antarctic and South American areas the honour of having given birth to several elements of the present New Zealand flora, is it not equally valid to presuppose an element originated here and spread to those other lands? Some part or other of the New Zealand land mass has been continuously above water to give continuity to the dry land flora. Engler assumed that such an element existed and Cockayne applies to it the term "Palaeozelandic"; it is reasonable to include the genera *Dacrydium* and *Phyllocladus* in this element.

In addition to the seven New Zealand *Dacrydium* species there are nine others distributed between Malay Peninsula, Borneo, Australia, Tasmania, New Caledonia and Chile. Generic characteristics include the differentiation of juvenile and adult foliage—leaves of juveniles or on lower branches of older trees are linear or awl-shaped, contrasting with the small, scale-like, closely-overlapping adult leaves. Female flowers are at or near the tips of branchlets and consist of a few small scales, one or several bearing a solitary reversed ovule seated in a cup-shaped aril. Male and female flowers are generally on different trees.

### 2. Some Diagnostic Features.

The seven New Zealand species are all endemic. From the easily differentiated juveniles of which the foliage of *D. cupressinum* and *D. kirkii* are included in the accompanying plate a very marked convergence is noted in the development of the cupressoid adult foliage. In the character of the juvenile foliage one remarks the first tendency towards grouping within the N.Z. group of *D. biforme*, *D. bidwillii* and *D. kirkii*. In this stage, as in most other respects, *D. cupressinum* is distinct. The other three species have several features in common in the lax spreading leaves of the juvenile and gradual transition through a number of leaf forms to the imbricate adult. *D. laxifolium*, which is not featured in the plate, frequently does not attain to the final imbricate stage and fruits may be borne on branchlets carrying leaves with a spreading habit; from the plate it will be seen that *D. intermedium* may also possess this type of foliage in an apparently adult fruit-bearing stage. This parallel development leads one to bracket the two last-mentioned species, a grouping which is partially justified by wood structural relationships to the exclusion of *D. colensoi*.



**Fruits and Foliage of Dacrydium spp.**

- A. *Dacrydium cupressinum* (juvenile foliage and adult foliage with fruit);  
 B. *D. biforme*; C. *D. intermedium*; D. *D. bidwillii*; E. *D. colensoi*;  
 F. *D. kirkii* (juvenile foliage and adult foliage with fruits).

Scale:—Each square represents one sq. inch.

The drawings, which are to scale, emphasise two important diagnostic features relating to the coarseness or otherwise of the adult branchlets, and the arrangement thereon of the leaves. As regards the fruits, the infrequency of good seed years is only too obvious when a comparative study is in progress. Consequently the well-formed rimu nuts with swollen receptacle and bracts of bright crimson collected in 1936 are usually sought in vain: the drawing A shows also the more frequent form.

*D. kirikii* is seldom felled, the material (F) generally accords with Cheeseman's conception of "terete fertile branchlets" each with "numerous striate nuts." The grouping of *D. biforme* and *D. bidwillii* with the above species is again justified on account of their striate nuts. *D. biforme* collected on two occasions, apparently mature, had an orange-coloured aril (B), but it is reported that the colour may occasionally be scarlet. A similar form of aril in *D. bidwillii* (D) is white.

The drawing of *D. colensoi* (E) illustrates the characteristic large lax aril and grouping of fruits at the branch tips. Of this group of three one has fallen and it is possible that one only of the remaining nuts may come to full maturity. In *D. intermedium* (C) the drawing shows a lax aril more or less of the *D. colensoi* type; under favourable conditions, it may be well-formed and brightly coloured. Attention should also focus upon the small apiculate point on the nuts of the last two species; *D. laxifolium* also possesses it.

It may perhaps be the accident of their size which makes the fruits of the shrubby *D. bidwillii* and prostrate *D. laxifolium* the most familiar of the whole group. The last mentioned has a swollen succulent crimson receptacle while the nut is not unlike that of *D. intermedium* (C).

The relationships shown to exist in characteristics of the fruits and foliage are further borne out by the microstructure of the secondary woods and within the limits of the material examined in the character of certain chemical inclusions of those woods, as will be shown in a subsequent article.