



Dacrydium Franklinii

subovatis, ad basin latis confertis, superne repandis, faciebus superioribus polyëdris cum inferioribus rotundatis, obscure viridibus et versus apicem rubris; areolis apicem mamillarum positis, albo-lanatis mox nudis; aculeis exterioribus sub 9 (3^{'''} longis) subæqualibus irregulariter patentibus incurvatis eburneis 4 inferioribus nec non longioribus, centralibus 1-2 duplo longioribus, nascentibus brunneis deinde etiam eburneis brunneo-sphacelatis rectis erectis, omnibus rigidis subulatis.

Patria Guatimala. Flores nondum vidi.

Altitudo Plantæ 2^{''}.

Diameter 1^¼^{''}.

A *Mamillariá versicolore* (Scheid. Bulletin de l'Acad. de Berl. V. 494) omnino præter colorem differt.

On the HUON PINE, and on MICROCACHRYS, a New Genus of CONIFERÆ from Tasmania; together with Remarks upon the Geographical Distribution of that Order in the Southern Hemisphere; by JOSEPH DALTON HOOKER, M.D. R.N., Botanist to the Antarctic Expedition.

(With a Plate. TAB. VI.)

Long as the Island of Tasmania has been colonized by Europeans, its noblest trees, and those too belonging to that most readily recognized and important Natural Order (the "Pines"), have, until quite lately, been little understood by Botanists. Whilst the continent of Australia was known to possess numerous species of *Callitris* and *Podocarpus*, and New Zealand has been celebrated as yielding a remarkable proportion of *Coniferæ*, Tasmania was generally supposed to produce much fewer of these most useful trees. Such, however, is not in reality the case; for the island in question is now proved to contain a greater number of species in proportion to its area, and these of more peculiar forms, than any other country. The fact of their having so long remained unknown, or at least unrecorded, is mainly owing to the individuals of each species being either very few in number, or

else remarkably local, and consequently confined within narrow areas; and further, to the want of an intelligent class of natives, such as inhabit New Zealand, who may direct the man of science, or the settler, to what tradition and experience have taught the aboriginal inhabitant to value in his savage state. Many of the species, also, are limited to the more remote and almost inaccessible parts of the island; only bearing flowers after attaining a considerable size, and they are not easily procured in a state fit for examination. Such is eminently the case with the *Huon Pine*: it is confined to the western and southern parts of the colony, growing in dense forests, or amongst mountains covered with a vegetation the most difficult to penetrate. It has been seen by few Europeans, save the wood-cutter or the convict; itself being the only inducement for a Botanist to visit that tempestuous and rainy quarter of Tasmania. Mr. Gunn, to whom the botany of this part of the globe is so greatly indebted, and to whose zeal and perseverance we owe the discovery of nearly one half of its *Coniferæ*, never found the *Huon Pine* in its native state; and of the three men of science who have done so, Sir J. Franklin, Mr. Backhouse, and Mr. A. Cunningham, the latter alone has been able to procure fructification, and that but imperfect.

Next to the *Huon Pine*, the species called the *Celery-topped* or *Adventure-Bay Pine*, is the best known to the colonists, as well as the most widely diffused; and until these very few years, none other was described by Botanists. It is the *Podocarpus aspleniifolia* of its discoverer, Labillardière, the distinguished naturalist and historiographer of D'Entrecasteaux's Voyage.

The *Oyster-Bay Pine*, a species of the widely distributed Australian genus, *Callitris*, is the only other coniferous plant commonly known amongst the colonists of Tasmania. It is true that a large district in the interior is called the *Pine-marshes*; and a river given off from it bears the same name; but, unless a species of *Arthrotaxis* which I procured in its bed, at a considerable distance from its source, and

far from the locality of the Pines themselves, can be considered as a voucher for the vegetation of the marshes in question, we must confess ourselves still ignorant of any plant so abundant as to have suggested an appellation for an area perhaps as large as Middlesex, though in an island smaller than Ireland.

In 1825, Mirbel's Paper on the *Geographical Distribution of the Coniferæ* appeared, in which Mr. Brown enumerated, besides many other new individuals of this Order, two from Tasmania: the *Podocarpus alpina*, Br., which inhabits the summit of Mount Wellington, and *Callitris Australis*, Br., or the *Oyster-Bay Pine*. These, with the *Podocarpus asplenifolia* of Labillardière, were the only *Coniferæ* known to grow in this island, until the collections of the late lamented Mr. Lawrence arrived, containing a species of *Podocarpus*? which has been seen by no subsequent Botanist. In 1810 Mr. Cunningham gathered the *Huon-Bay Pine* in an imperfect state, and from his specimens the fructification will be here described. Lastly, in 1836, Mr. Gunn discovered no fewer than three species of the genus *Arthrotaxis*, and another *Pine* belonging to a new genus to be here described (*Microcachrys*, nob.); since which he has added a second *Callitris*, increasing the number of *Coniferæ* from four to ten. *Arthrotaxis* was founded by the late Professor Don,* on two of Mr. Gunn's plants contained in Dr. Lindley's herbarium.

Before proceeding to an enumeration of the Tasmanian *Coniferæ*, I may be allowed to offer a few remarks on the distribution of that Order in the southern portion of our globe, seeing it has been so greatly augmented since the publication of Mirbel's valuable Memoir.†

One of the most striking features of the *Coniferæ* in the Southern Hemisphere is their general dissimilarity to those of the Northern. Yet, although the genera be fewer in number, they have an equally wide range; while their species, though bearing a larger proportion to the genera, are confined

* Don in Linn. Trans. v. 18, p. 171.

† Vide Mirbel, in Mémoires du Muséum. v. 13, p. 38.

within much narrower limits. Thus, out of the ten genera, and between fifty and sixty species, scattered over the surface of the globe south of the Equator, *Arthrotaxis* and *Microcachrys* (Hook. fil.) are the only two that are restricted to a single locality. Of the first of these there are but three species, all limited to an area not greater than Yorkshire. *Araucaria*, on the other hand, of which there are five known species, has them very widely dispersed, only one country, Australia, presenting two of them.

Although some uncertainty still exists respecting the kinds of *Coniferæ* inhabiting the vast tracts of the Cape Colony, and the rarely visited mountains of Chili and Patagonia, those of Australia and New Zealand are now so well understood, that the following notices may be considered as probable approximations to their actual distribution.

I. ARAUCARIA,* *Juss.* This genus includes five known species, each with a remarkably narrow range, though together they form a widely diffused genus: 1. *A. excelsa*, Aiton, the *Norfolk Island Pine*, is probably confined to that island; one of the Australian species (*A. Cunninghamsi*) which had been supposed the same, having proved very distinct from it, and the New Caledonian one not being fully authenticated. 2. *A. Bidwilli*, Hook. (in *Lond. Journ. of Bot.* v. 1, p. 503, t. X.) is a noble and recently discovered tree of the Brisbane Mountains, near Moreton Bay, New Holland. 3. *A. Cunninghamsi*, Aiton, the *Moreton Bay Pine* grows on the shores of the waters of the same country. 4. *A. imbricata*, Pavon, the "*Banksian*" or "*Chili Pine*," is confined to the Chilian Andes, between the parallels of 37° and 46°. 5. *A. Brasiliensis*, the *Brazilian Pine*, is indigenous on the mountains of South Brazil, in the neigh-

* This genus has lately been broken up into two; the first containing the Brazilian and the Chilian species, for which the name *Araucaria* has been reserved; to the other, which includes the *A. Cunninghamsi* and *A. excelsa*, Salisbury's name of *Eutassa* is given. The *A. Bidwilli* would belong to *Araucaria*, as thus limited. The validity of these genera has hardly been acknowledged by Botanists.

bourhood of Rio de Janeiro, and is more abundant in the province of St. Paul's (as I was informed in that country). It is not improbable that the species, stated to have been found in New Caledonia by Cook, may prove distinct from any of the above.

II. DAMMARA, *Lam.* 1. *D. australis*, Lamb. the *Kaudi*, *Cowdie*, or *Kauri Pine* of New Zealand, grows on the mountainous regions in the Northern Island of that group. Mr. Hinds, in his description of the vegetation of the Fejee Islands, mentions a species said to exist there. (vide *Lond. Journ. Bot.* v. 1, p. 671.)

? III. JUNIPERUS, *L.* 1. *J. uvifera*, is described by Don as a native of Cape Horn; this, however, must be considered a very doubtful species. A second is mentioned by Mirbel, *J. Capensis*, *Lam.*

IV. THUJA, *L.* This genus, in the Southern Hemisphere, belongs almost exclusively to South America. 1. *T. Chilensis*, Hook, (*T. cuneata*, Dombey mss. ? *T. Andina*, Pœppig,) grows on the mountains of S. Chili, Valdivia, &c. 2. *T. tetragona*, Hook. is the famous "Alerse" of Chili and of the Island of Chiloe.* 4. *T. Doniana*, Hook. is a native of the northern island of New Zealand.

? V. CUPRESSUS, *L.* 1. *C. Africana*, Mill. mentioned also by Mirbel, is probably a species of the following genus.

VI. PACHYLEPIS, *Brongn.* Three species are enumerated by Brongniart, who founded this genus.† 1. *P. Commersoni*, from Mauritius. 2. *P. cupressoides*, and 3. *P. juniperoides*, both from the Cape; the latter is doubtful, and perhaps not distinct from the former. Besides these there is another Cape plant in the Hookerian Herbarium, named *Calitris stricta*, Schlect. mss. (Drège); but as the scales of this genus vary much in form with age, I could not pronounce the imperfect specimens distinct. Dr. Wallich has sent

* London Journal of Botany, v. 3. p. 144. t. III.

† Ann. Sc. Nat. v. 30, p. 176.

another *Pachylepis* from South Africa certainly distinct from *P. cupressoides*, which may however be the *C. stricta*.

VII. *CALLITRIS*, *Vent.* Of this genus there are probably at least twelve or fifteen individuals in Australia. The North African *C. quadrivalvis*, is still retained in *Callitris* by M. Brongniart, who removes the S. African species to *Pachylepis*. I am, however, inclined to think that the forms from these three widely separated localities will eventually prove to belong to one and the same genus. Spach more recently breaks up *Callitris* into three genera, confining that name to the original N. African plant, and applying Mirbel's name of *Frenela* to the Australian species.

VIII. *ARTHROTAXIS*, *Don.* Founded on two Tasmanian plants, 1. *A. selaginoides*, and 2. *A. cupressoides*; to these another has been added, 3. *A. laxifolia*, Hook. (Ic. Plant. t. 573).

IX. *MICROCACHRYS*, *Hook. fil.* vid. infra, comprising a single species, discovered by Mr. Gunn in the interior of Tasmania.

X. *PODOCARPUS*, *L'Hér.* The most extensive of all the southern genera of *Coniferæ*, upon which Mr. Bennett has published an excellent dissertation.* There are three species from Australia, 1. *P. elata*, Br. 2. *P. spinulosa*, Br. 3. *P. ensifolia*, Br.;—and two from Tasmania, 4. *P. alpina*, Br., 5. *P. Laurencii* (vid. infra). Six inhabit the New Zealand Islands. 6. *P. spicata*, the *Mai* or *Matai*. 7. *P. ferruginea*, Don, the *Miro* or *Maira*. 8. *P. Totarra*, Don, the *Totarra*. 9. *P. dacydioides*, A. Rich., the most abundant of the New Zealand species in the neighbourhood of the Bay of Islands, "*Kaikatia*" of the natives. 10. *P.?* *biformis*, Hook. 11. *P. nivalis*, Hook. (Ic. Plant. t. 582), this is possibly a variety or alpine state of the *P. Totarra*. In Chili there are also several species, perhaps not less than three: 12. *P. Chilina*, Rich.; this, and two others, are in the Hookerian Herbarium.

* *Plantæ Javanicæ rariores*, p. 40.

There are two Brazilian, and lastly, three Cape species of this genus, making about thirty southern species in all.

XI. DACRYDIUM, *Banks*; a much rarer genus than the former. 1. *D. cupressinum*, Sol. the *Dimou Pine* of New Zealand. 2. *D. Colensoi*, Hook. (Ic. Plant. t. 548) from the same island. 3. *D. laxifolium*,* n. sp.; also from New Zealand. 4. *D. Franklinii*, Hook. fil., the *Huon Pine*; vide infra.

XII. PHYLLOCLADUS, *Rich.* 1. *P. aspleniifolia*, Rich. "Celery-topped Pine" of Tasmania, and 2. *P. trichomanoides*, Don, the "Tauehaha" of the New Zealanders.

From the above list it will be seen that four genera are peculiar to the Southern Hemisphere, *Araucaria*, *Phyllocladus*, *Microcachrys*, and *Arthrotaxis*. Three others have their maximum to the south of the tropics, *Callitris*, *Podocarpus*, and *Dacrydium*. *Dammara* has one species in each hemisphere. *Thuja* is equally divided between the two; whilst *Juniperus* and *Cupressus* are barely, if at all, represented, except perhaps the latter by *Arthrotaxis*.

* DACRYDIUM *laxifolium*, Hook. fil.; caule humili fruticoso, ramis prostratis laxe ramosis gracilibus, foliis undique insertis sparsis patentibus linearibus obtusis coriaceis supra concavis supremis imbricatis ovatis multo brevioribus dorso carinatis, fructibus terminalibus solitariis erectis.

HAB. New Zealand, near the summit of Tongariro. *Mr. Bidwill* (No. 5), *Colenso* (No. 60.)

Whether or not the present be an alpine form of some larger species, I am unable to say. It is marked by Mr. Bidwill as "Rima," from which I suppose that gentleman considered this plant to be a state of the *D. cupressinum*; but it is a wholly different species from that, in no way resembling what might from analogy be assumed as the mountain form of that tree. I am indeed more inclined to suppose it a strictly alpine species, like the *Podocarpus alpina*, Br. of Tasmania, which is only known as a small mountain plant. The leaves of the present are very lax on the stem, like those of a *Sedum*, patent and more flaccid than is usual amongst the *Coniferae*; the largest are not above two lines in length, convex or keeled below, and more or less concave above; they are contracted at the base and not decurrent on the branches: those at the apices are much smaller and closely imbricated. The whole length of our specimens of the entire plant, which are very good, does not exceed a span. The fruits are abundant, terminal, and erect.

If we divide the regions which these *Coniferæ* inhabit into four, namely Australia, New Zealand, South America and South Africa, it will appear that they are very unequally diffused, and that their relative abundance is not regulated by the extent of surface, which might be expected to be the case with a group composed of peculiarly local species. Only one of the genera is common to them all, *Podocarpus*, it is in all respects the most widely diffused genus of *Coniferæ*, as it is one of the most extensive. *Araucaria* comes next, being found in three of the regions, Australia, New Zealand,* S. America. *Thuja* has been detected in two only, America and New Zealand; *Callitris*, including *Pachylepis*, in Australia and Africa; *Dacrydium* and *Phyllocladus* in Australia and New Zealand. *Juniperus* is confined to America, if indeed it really exists in the Southern Hemisphere, and *Arthrotaxis* and *Microcachrys* to Tasmania.

In conclusion, I shall arrange the genera in the order of their relative abundance in the countries specified above.

I. AUSTRALIA is by far the richest, containing as it does seven genera and probably twenty-six species, thus: *Callitris* 12, *Podocarpus* 6, *Arthrotaxis* 3, *Araucaria* 2, *Microcachrys* 1, *Dacrydium* 1, *Phyllocladus* 1. It also exhibits the most striking coniferous vegetation, and is the only country possessing any two peculiar genera.

II. NEW ZEALAND contains of *Podocarpus* 6, *Dacrydium* 3, *Thuja* 1, *Phyllocladus* 1, *Dammara* 1, *Araucaria* 1; six genera and thirteen species. In *Phyllocladus* and *Dacrydium* it partakes of the Flora of Australia, and in *Thuja* that of America.

III. AMERICA; *Podocarpus* 4, *Thuja* 2, *Araucaria* 2, *Juniperus* 1; ? four genera and eight or perhaps nine species.

IV. AFRICA; *Podocarpus* 2, *Callitris* (*Pachylepis*) perhaps 3, *Juniperus* 1? three genera and six species; the affinity to the *Coniferæ* of Australia, through *Callitris*, is manifest.

From this it appears that the number of species

* I include Norfolk Island in the New Zealand division.

increases in proceeding to the westward from the African continent in the southern hemisphere; and in another point of view, Australia may be considered the centre of their development, as they are not only most abundant there, but the forms of New Zealand on one side, and of Africa on the other, resemble more those of Australia than those of America, or one another.

The Tasmanian species of *Coniferæ*, so far as is at present known, are peculiar to that island, and more local there than in any other part of the globe. If *Pachylepis* be regarded as a subgenus only of *Callitris*, then this island has representatives of all the genera peculiar to the southern hemisphere, except *Araucaria*; besides possessing the only two that are not common to two of the regions enumerated above. I have before considered Tasmania as part of the Australian region; but if we go on to compare it with the vast country lying to the north, it will be found still more peculiar in its Coniferous vegetation, as a part of that tract, than the latter as a whole was shown to be; for whilst Australia has only three of the genera, Tasmania has six.

Although, in a measure, anticipating the "*Flora of Tasmania*," for which ample materials are in my possession for publication, under the authority of the British Government, I shall here offer a few remarks on the different species of that island, before proceeding to describe the noblest of them all, the *Dacrydium Franklinii*, or *Huon Pine*.

1. CALLITRIS, Vent.

This genus, which was divided by Mr. Brongniart into two, has been further modified by Spach, who separates from both the North African *C. quadrivalvis*, for which alone Ventenat's name of *Callitris* is retained. The differences between these are excellently displayed by Spach in the "*Suites à Buffon*" (*Hist. Nat. des Végét.*, v. 11, p. 345), though I should not attach the same importance to them as does that acute observer. The numerous scales of the Australian group are certainly a remarkable character.

Yet that number and their relative size are so variable as considerably to diminish their value as a diagnostic mark. The ternary arrangement of the seeds, much dwelt upon by Brongniart, as typical of the Australian form, is a striking and prominent character in our *Cape* species, whose seeds are hardly winged. The tuberculated receptacle is not constant in the Australian species, nor are the scales of the cones always alternately smaller. The wings of the seeds differ much in size, some being quite as broad as those of *Callitris* or *Pachylepis*; the seeds themselves are not always osseous; one species of the latter genus having the seed much more osseous than any Australian *Callitris*, and almost wingless. I have not been able hitherto to detect any difference, except that they bear three anthers or pollen-thecæ, between the male amenta of *Callitris* and *Pachylepis*, though Brongniart suggests that such may exist. The leaves of the Cape species are sometimes decussately opposite, and regularly so throughout a great part of the branches; those of the northern plant are arranged in fours, and of the Australian in threes. The latter is the most remarkable number amongst *Coniferæ*, and is accompanied with two cotyledons, which is also the case in one species of the Cape *Pachylepis*. The pollen grains in *Callitris*, *Frenela*, and *Pachylepis*, are small, spherical, transparent, perfectly smooth spheres, with an irregular, darker nucleus; in a young state they appear more flattened, resembling disks, and are larger. The two Tasmanian species belong to Brongniart's genus *Frenela*, its most evident character lies in the ternary arrangement of the leaves. Spach rightly supposes that these, in a young state, are acicular, like those of *Thuja*, &c.

1. *C. australis*, Br.; strobilis glomeratis solitariisve breviter pedunculatis globosis (magnitudine coryli avellanæ), valvis lignosis crassis late ovatis valde obtusis v. sub-acutis lævibus v. longitudinaliter rugosis, receptaculo vix rugoso, columna centrali brevi tricruri vel nulla, seminibus osseis late ovatis alarum marginibus membranaceis.

“Oyster-Bay Pine,” *incolarum*.

HAB. Tasmania, on the east coast; *Mr. Backhouse*; *Gunn*, n. 543. Flinders's Island, Bass' Straits; *Backhouse*.

Were it not for the noble suite of specimens sent by Mr. Gunn, under the same number, I should certainly have been led to make at least two species of this, so different is the character of its extremes. The cones when mature are either smooth or much corrugated, their angles acute or blunt, the colour pale grey and shining, or brown and opaque; in the centre of the cone there is generally an elevated woody body, with three divergent arms, one opposite each of the smaller scales, these sometimes fork again; in other cases this is reduced to a single short style, or may be wholly wanting; it appears formed of three abortive, confluent ovaria. The seeds vary much in size, and in the shape and breadth of their wings.

This species forms a large tree (according to Mr. Backhouse) 50-70 feet high, and 6-9 in girth, sometimes giving a peculiar feature to the landscape from its pyramidal form. Mr. Gunn states its height to be 25-30 feet, and its trunk a foot in diameter, whence there may be another species yet undescribed.* I have never seen much use made of the wood, which is alleged not to be durable. It is very fragrant; and according to Mr. Backhouse, obnoxious to bugs.

2. *C. Gunnii*, Hook. fil.; strobilis subsolitariis v. glomeratis breviter pedunculatis ovatis, valvis lignosis linearibus obtusis v. subacutis dorso convexis lævibus v. longitudinaliter rugosis, receptaculo lævi, columna centrali brevi simplici v. tricruri v. nulla, seminibus late ovatis osseis ala plerumque brevissima.

“Native Cypress,” *incolarum*.

HAB. Tasmania, South Esk River, *Mr. Gunn* (n. 542).

* In Mr. Backhouse's "Narrative of a Visit to the Australian Colonies," in mentioning the vegetation of Oyster Bay, he enumerates the *Oyster Bay Pine* and also the *Callitris pyramidalis* among the native trees of that locality; from which remark, and the discrepancy between his own and Mr. Gunn's dimensions of the timber, it is more than probable that there are three Tasmanian species of *Callitris*.