short stipe *(podetium)*, which is generally cylindrical in the lower part and sub-branched in the upper, each branchlet terminating in an apothecium.

Hab.—On sub-vertical clayey banks, in the forest ("Seventy-mile bush"), between Norsewsod and Daneverk, forming large patches, and growing with *B. rufus.*

I was much pleased in detecting this pretty little plant, especially in finding it growing together with its allied species *B. rufus;* the contrast between them was great, in the thallus as well as in apothecia, and showed advantageously. Hitherto, I believe, this species has only been found in Tasmania.

Art. XLVIII.—*The Ferns of Scinde Island* (Napier).

By W. Colenso, F.L.S.

[*Read before the Hawke's Bay Philosophical Institute, 11th October*, 1880.]

I have often thought that it would not be undesirable to bring to your notice the ferns of Scinde Island; that is, I regret to say, those which *were* here until lately, for many of them are no longer to be found within its limits.

And this fact of some of them having already become extinct (like much of the old, striking, and curious indigenous vegetation of the extensive flats and plains adjoining) is another reason, with me, for putting on record those ferns that formerly existed here, which I myself have often seen and, with one solitary exception, gathered. For, in times to come, it might well be doubted whether any ferns—save, of course, the common ubiquitous *Pteris esculenta*—could have ever inhabited this small high, dry, and isolated islet-like limestone mound, destitute of fresh-water.

And there is yet another valid reason, viz., that among them were two, if not three, peculiar ferns, which are also local and comparatively rare in New Zealand.

In the "Handbook of the New Zealand Flora," by Sir J. D. Hooker, 31 genera of ferns, containing 120 species (exclusive of varieties), are described; some of those however have not yet been detected within the area of New Zealand proper, but only in far-off outlying localities—as Chatham, Auckland, and Kermadec Islands. Here, within this small area of Scinde Island, containing only 660 acres (and now comprised within the Borough of Napier), there were no less than eleven of those 31 genera, or one-third of the whole; and of the said 120 species, fourteen, together with, at least, one new species, not known to Dr. Hooker, making a total of fifteen.

Those several genera I will take in the order in which they run in the "Handbook" of our New Zealand flora.

1. *Cyathea.* Of this fine genus of tree-ferns the beautiful new species, lately described by me *(C. polyneuron)*,* was first found in 1865, young and small, growing among the common fern *(Pteris esculenta)*, on my land on the hill-side. I removed it into my garden, where it has thriven remarkably well, although it suffered severely during those two very dry summers in succession of 1878 and 1879; it is now 7 feet high.

2. *Adiantum hispidulum.* This fern has been found growing sparingly in cliffy spots on the west side of the "Island." It is rather rare in all this district.

3. *Adiantum affine.* This pretty little fern formerly grew densely in beds on ledges of the clayey cliffs on the north side of Hyderabad road, at the south end of the "Island."

4. *Cheilanthes tenuifolia.* This fern I have often found in various parts of the hills growing among the common fern. Also, a very large and undescribed variety (or a distinct species of a fern of this genus) of diffuse rambling growth, of which I may have something more of say hereafter, as I fortunately possess specimens.

5. *Pteris esculenta*, formerly all over the "Island," in some parts attaining to a large size, 6–7 feet high.†

6. *Pteris tremula.* This elegant species also grew strongly here. I have still good thriving plants in my garden brought in from the adjoining hill.

7. *Lomaria procera*—a small common variety—grew sparsely scattered in damp shaded spots and gulches on the hill-side; also, a larger variety on the flat below.

8. *Doodia.* A very fine species or variety of this genus also grew sparingly here, which differed largely from the northern species. I have both known and cultivated this fine fern for upwards of thirty years, having in 1848 removed plants of it from this hill to my old residence at Waitangi, near West Clive. Did I not believe that the various plants of *Doodia* found at the north (where also they are very common) are all varieties of one species,‡ I should be inclined to consider our Scinde Island plant as form-

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* "Trans. N.Z. Inst.," Vol. XI., p. 429.

† I know that twenty years ago, before the place was cleared of fern, my mule (a tall animal) was often lost in it, and could only be detected by her big ears just peering above it!

‡ In a description of some (then) newly-discovered New Zealand ferns, published by me in 1843 (in the "Tasmanian Journal of Natural Science," Vol. II., p. 162), I said:—"The number of the species of New Zealand ferns published by A. Cunningham in his "Precursor" amounts to eighty-five, from which I venture to hazard an opinion at least

ing another and distinct species, inasmuch as it varies considerably from those northern plants (*D. media* and *D. caudata*, of Dr. Hooker's "Handbook"), and does not agree with their separately-published specific characters. It is much the finest of all our New Zealand varieties or species *Doodia*. I shall, however, in a separate paper* give a description of this plant, *D. squarrosa*, mihi.

9. *Asplenium flabellifolium.* I have formerly gathered fine specimens of this elegant little ferm among herbage in gravelly spots; even now it is to found in cliffy nooks on the west side of the "island,"

10. *Asplenium obtusatum.* This common sea-side fern grew on the cliffs near to the Bluff, on its north-east side.

11. *Aspidium richardi.*—This plant grew sparingly in fine tufts on the hill-sides among the common fern. I removed some plants into my garden a few years back, where they have grown very well.

12. *Polypodium billardieri.*—I have found this below at the base of the hill, growing well on, and among old drifted wood, above high water-mark, spring and flood tides, where it had become established.

13. *Polypodium serpens.*—This fern formerly grew in the groove or thicket of karaka trees *(Corynocarpus lævigata)*, which stood near the south end of the "island." I think that grove was originally a tabooed spot (probably a burial-place) of the old aborigines, who formerly dwelt here. On my arrival in 1843, and long after, the cormorants *(Graculus varius)* both roosted and built their nests thickly in those trees, so that the spot had the appearance of a small rookery. It was both a pleasing and a curious sight to see them attending assiduously to their young in the breeding season, the white breasts and bellies of the parent-birds contrasting so strongly with the dense dark green foliage of the trees. Very soon after the purchase, by the Government, of this block of land the few early white residents (and especially the military) cut down the whole grove! and also

two species—*Niphobolus bicolor*, and *Doodia caudata*—will have to be deducted, as I believe these will be found to be merely varieties of *N. rupestris* and of *D. aspera*." At that time I did not know the true *Doodia aspera*, which was then, on the authority of the two brothers Cunningham, and of the French botanist, A. Richard, all of whom had "gathered the plant in New Zealand," said to be a New Zealand fern, but which is now considered an endemic Australian one. Nearly twelve years after my publication, Sir W. J. Hooker, in his "Species Filicum," when writing on *D. aspera*, says:—"Our herbarium, though eminently rich in New Zealand plants (including Sir J. D. Hooker's collections formed there, mainly too in the same spot where those three botanists had formerly collected, viz., the Bay of Islands), does not possess a single specimen of *D. aspera* from that country; and I am hence led to believe that all writers on the botany of New Zealand have mistaken a state of *D. media* for it."—*L.C.*, Vol. III., p. 72.

* See paper "On some new and undescribed ferns" (Art. XLIX.)

nearly all the other small and few scattered trees* of the "Island," merely for the small poles, etc., for rude fencing and for tents. To some of those trees (Ngaio=*Myoporum lætum*) that grew, picturesquely fringing and overhanging the sea (of the inner harbour) at high water, I have known the Natives frequently to make fast their canoes, and, in the summer season, to bivouac under their shade. No Maori of the olden time would have cut down one of those ancient and useful trees! and, when the whites did so, they complained bitterly against it.

14. *Gymnogramme leptophylla.*—This sweet little annual fern still grows here in a few undisturbed spots on the hill-side, where, every spring, I have the pleasure of noticing and welcoming it. I first detected this fern in 1842, growing in sheltered grassy spots among scoria on the dry hills at the head of Manukau Bay, near Auckland, which is the only other locality of its habitat known to me in New Zealand.† Believing it to be a new species, I published it as *G. novæ-zealandiæ*,‡ but, according to Dr. Hooker, it is identical with a British (Jersey) species, which is also found in Australia and Tasmania. Nevertheless there are (as I view it) striking differences between our New Zealand plant and the British one, judging from the ample descriptions, and also the many botanical plates in my possession of that species.

15. *Botrychium cicutarium.*—Fine plants of this species of fern I formerly found here on the hills, but I have not noticed any for fifteen years.

ADDENDUM.

I WRITE this (the fruit of study and research), for the especial benefit of future New Zealand Pteridologists.

Gymnogramme leptophylla. Having the good fortune to possess several drawings and dissections of the European plant, *G. leptophilla*, with ample descriptions, (viz., in Hook and Greville, Ic. Filicum; Hook, British Ferns, Species Filicum, etc.; T. Moore, Index Filicum; Bentham's Brit. Flora; Beddome's Ferns, South India; with others by S. Hibberd, T. Moore, J. Smith, J. G. Baker, etc.) and having also received since writing the foregoing paper, some British specimens of *G. leptophyilla* from Jersey,—I am inclined to say a little more about our New Zealand plant bearing that name, and to point out wherein it differs from the British and European one.

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* As *Entelea arborescens*, *Coprosma bauriana*, *Myoporum lætum*, and *Cordyline australis*.

† During this year (1880) it has also been found, by a member of our Institute, growing inland, west from Hawke's Bay, on the hills near the River Mohaka.

‡ In "Tasmanian Journal of Natural Science," Vol. II., p. 165, I find that Sir J. Hooker, in his description of this fern in his "Handbook of the N.Z. Flora," p. 383, has quoted me as having published it as a *Grammittis*. This, however, is an error.

1. In all those drawings and dissections (except in the plate of *G. leptophylla* in Beddome's South India Ferns), though made by different persons. and at widely different times, and not being mere copies from each other, there is a great common likeness—as indeed there should be; but they all show a very much larger, stouter and more leafy and many-fronded plant than our New Zealand one. Sir W. J. Hooker says of the British fern, that "its fronds are *all* bi-tri-pinnate," with their "vachises winged above"; (in his large folio drawing, with dissections in the Icones Filicum, the rachis is largely winged *below* also); such, however is not the case in our New Zealand plant. I have collected scores—perhaps hundreds—of the New Zealand fern (the entire little tufted plant in all its stages) in its two localities *(supra)*, but I have never found one that approached in size or appearance the European one. In fact the New Zealand plant has no such outer ("barren") pinnated fronds as the British one possesses. The upright fronds of the New Zealand fern are commonly very small, often under 1 inch, and never exceeding 1½ inches, while those of the British plant generally run to 3–4 inches.

2. The New Zealand plant, including its first leaves or small early fronds, has rarely ever a barren one; its first fronds are very small, and often merely kidney-shaped with crenate edges, or small incised lobes, and when tri-lobed or parted, are simply once so, and are then differently lobed to those of the European plant, never being regularly pinnated like the barren fronds of that one; they are also generally all fertile, however small. The texture of its fronds is also more stout and herbaceous than that of the British one, which is always described as being "membranaceous."

3. The larger and more upright fronds of the New Zealand plant are not only very much smaller with fewer pinnæ, but their segments are all smaller and more acute and pointed, often sharply bifid; while those of the British plant are rounded and obtuse. Their stipes are also much longer in proportion to the size of their fronds. The stipe is also of a bright red colour, glossy and deeply channelled on the upper surface; while the stipe of the British plant is always described by all authors as being "black."

4. The sori in our New Zealand plant are much more diffuse and confluent, generally covering the whole of the undersurface of the segment, never disposed in clear lines on the veins as in the British one. The veinules, too, are longer approaching nearer to the margin, and not extending beyond the sori as in the British plant. Often on the small reniform first fronds the sori are regularly disposed in almost circular spots, free, and distinct at the apices of the venules just within the margin of the frond. The sporules also are more angular, black, glossy, and pitted, characters which are wanting in those of the British plant.

Dr. Hooker, in his "Handbook," says of our New Zealand plant,—"Fronds 1–8 inches, veins dichotomous;" and in his "Flora of New Zealand" (where it is more largely described), it is also said to possess a flexuose midrib ("Costa flexuosa"); characters, however, which I do not find pertaining to our New Zealand plant. In my first published description of it *(supra)* I said,—"Frond 6–20 lines long; veins simple, forked;" and I had plenty of specimens.

Curiously enough the first or smaller fronds of Beddome's South India plant *(l.c.*, tab. 270) more resemble some of our New Zealand ones, in simple outline and in being fertile; although the long flexuose stipe is altogether dissimilar being very much longer and more wiry. Beddome also remarks (in opposition to Sir W. J. Hooker's observation on the British plant), that,—"All my specimens have all their fronds fertile." From its appearance however, as shown in the drawing (by no means a good one), I should infer its being distinct from the European *G. leptophylla*, though nearly allied.

There are also two or three other well-known closely allied yet distinct annual species described by Sir W. J. Hooker in his "Species Filicum," as *G. chærophylla* (from South America) and *G. ascensionis* (only found in the small islet of Ascension); and it seems to me that the difference between those two allowed distinct species (of which I also have both drawings and dissections in the Botanical works above mentioned, and the European *G. leptophylla* is not greater than that between it and our New Zealand plant.

G. leptophylla is also said to be found in Australia and Tasmania (*vide* Hook. f., Fl., Tasmania, and Bentham's Fl. Australiensis), but I have not seen a specimen nor a drawing of either of them. They may more closely correspond with the European one than ours of New Zealand do; or they may be more closely allied with ours (which I am inclined to believe from the descriptions of them), or, as it were, be intermediate. I note that Bentham says of the Australian plant, "often under two inches high," etc., and Dr. Hooker, of the Tasmanian one, says, "Fronds an inch to a span high; pinnules 2–4 inches long; stipes and rachis usually red-brown," etc. All this agrees more with the New Zealand plant than with the British one, excepting the span high. It seems to be excessively rare in Tasmania, having been only found by one person, and that once only, and many years ago, and in a cave.

Evidently, however, by all those distinguished European botanists, who could only have seen the Australian, Tasmanian, and New Zealand plants in their dried state, and, I fear, without their characteristic first or early fronds, which soon wither (often before the large upright ones are fully developed) by them, one synthetic description, more particularly framed

from the handy living British plant, serves for all. I very much fear that this systematized amalgamation of ferns from all countries, however opposite in climate and geology (although a very good thing in itself, and when not pushed to extremes), will be hereafter found to have been injuriously carried too far with not a few of our New Zealand ferns. To this subject I hope to return anon.

Art. XLIX.—*On some new and undescribed New Zealand Ferns.*

By W. Colenso, F.L.S.

[*Read before the Hawke's Bay Philosophical Institute, 8th November*, 1880.]

Hymenophyllum pygmæum, n.s.

Rhizome capillary, creeping, spreading, much-branched and entangled, tomentose with fine red hairs; *plant* of densely matted growth; *stipe* 1–2 lines long, erect, solitary, 2–3 lines apart, sometimes two together springing from a node of the root-stock, filiform, terete, naked, sometimes bearing a few scattered minute weak reddish scales; *frond* 2 lines long including involucre, 2–4 lines broad, fan-shaped in outline, colour light green, glabrous, pinnate, generally one pair of pinnæ (very rarely two pairs, or three single ones, or a single pinna), which are petiolate, sub-opposite, and inclined upwards; *pinnæ* 1–2 lines long, membranaceous, broadly oblong, narrowest downwards, costa stout, not reaching to the margin, apex very obtuse and margin there entire, sides of pinnæ laciniated or slashed, teeth 3–5 on a side, long, acuminate, falcate, and only of the cellular substance of the pinnæ; *involucre* ob-conical, free on apex of short rhachis, 1½ lines long, 1 line broad at top, bearing a few scattered soft spinulose processes; *valves* scarcely rounded, divided less than half-way down, fimbriated with 14–17 translucent flexuose and subulate long green teeth or cilia wholly composed of cellular tissue (a truly beautiful object under a microscope); *receptacle* included, or slightly protruding in age.

Hab.—On cliffs, Preservation Inlet; on rocks, Resolution Island; and on rocks at the Bealey, *J. D. Enys;* hills round Lyttelton Harbour, Westland, coast south of Hokitika, etc.

This very minute fern (probably the smallest of the many small comforms of *Hymenophyllum*, and perhaps the smallest of all truly pinnate ferns) has been long known to me, but only through kind friends and correspondents; for, although I have received a copious supply of specimens both dried and living, I have never gathered it myself. It has always been