Fig. 51A. *P. navicula*, Brébisson.
Fig. 52. *P. incrassatum*, n. sp. (?).
Fig. 53. *Docidium nodosum*, Bailey.

PLATE VI.

Fig. 54. *Docidium ovatum*, Nordstedt, var. *tumidum*, n. var.
Fig. 55. *Closterium dianæ*, Ehrenberg, var. *arcuatum*, Brébisson: the frond × 200; end and middle × 700.
Fig. 56. *C. venus*, Kutzing .. .. × 300
Fig. 57. *C. cynthia*, de Notaris, *forma*.
Fig. 58. *C. decorum*, Brébisson, *forma gracilior*.
Fig. 59. *C. prælongum*, Brébisson.
Fig. 60. *C. lineatum*, Ehrenberg, var. *sandvicense*, Nordstedt .. × 200
Fig. 61. *Closterium* (?) or *Raphidium* (?) .. .. .. × 200

ART. II.—*On the Botany of Te Moehau Mountain, Cape Colville.*

By JAMES ADAMS, B.A.

[*Read before the Auckland Institute, 22nd August, 1888.*]

CAPE COLVILLE PENINSULA terminates at its northern end in the high range called Te Moehau. This range may be said to commence on the saddle between Cabbage Bay on the west and Matamataharakeke on the east, from whence, rising gradually, it extends to the saddle between Waiaro Valley and Port Charles. Then it rises with a steep incline into the mountain Te Moehau, which has an altitude of 2,750ft.

All the approaches to this mountain are very steep, but especially at the northern end, where the spurs rise abruptly from the sea. The appearance of this end is the more forbidding from the high and rugged rocks that stand in the sea at a little distance from the shore. There is a weird look about the mountain, from whatever point it is seen, which is greatly owing to two bare peaks that tower up to form the summit. The Maoris, who are rather numerous on the coast at Otautu, Waiaro, and Port Charles, have a great dread of the upper parts of the mountain. They say that long ago their numbers were much greater than at present, and that every port from Cabbage Bay on the west to Matamataharakeke on the east was thickly peopled by the powerful and warlike tribe of Ngatirongo. In those good old times the interior was occupied, they say, by Turehu or Patupaiarehe, a race short in stature and of fair skin. The Turehu only ventured to the sea-shore at night, when large parties could be seen busily engaged in fishing. As soon as the Maoris attempted to approach, the Turehu fled to the hills, leaving the refuse of the fish and the scales. These Turehu could often be heard—voices of men, and women, and children were

audible in the dense bush on misty days and on dark nights. Their favourite fishing-place was Ongohi, near Port Jackson, and their home was near the summit of the mountain. This story of the dimly-seen Turehu is told with regard to other lofty mountains in the North Island, such as Pirongia, and may refer to the war to the knife that always existed in barbarous times between the inhabitants of the shore and those of the mountain, and that still exists in some of the islands of the Pacific. It is the inexpiable war between the conquerors and the conquered, whether we read of it in Ancient Greece or in Ancient Britain.

Hoping to gain further information on the dread the Maoris have of the interior, I obtained, through the kindness of Mr. Lee, of the survey party, one of the Maori *tapu* legends. This legend shows that the Ngapuhi occupied Barrier Island and the Ngatirongo the Moehau district, and recounts a raid made by the latter on the former; but, as it does not bear directly on the dread that the Maoris have always had of the interior, it need not be further mentioned.

The dread of the Turehu no doubt hindered the natives from ascending the mountain; but it is surprising that the natural indomitable curiosity of some colonists did not urge them to the summit. Several, as I have heard, made the attempt, but for one reason or another gave it up; and a successful ascent was not made until January last, when my son and I succeeded in accomplishing it.

I must, however, confess my belief that, if a suspicion existed among botanists that the top of Te Moehau was a veritable garden of rare plants that could not be found nearer than the Ruahine Range, in Hawke's Bay District, this would have been sufficient inducement to have had the mountain-top explored long ago. There was no ground for such a suspicion. The botany of the other high peaks on the main range of Cape Colville Peninsula is very well known, and, although there may be a slight variation in some of the plants, yet the vegetation on all the peaks is strikingly similar. A catalogue of the plants on Kaitarakihi, east of Puriri, and of Maruaepuke, east of Tapu, differs very slightly.

One or two of the Ruahine plants appear on Castle Rock, east of Coromandel; but this would not warrant a guess at the riches of Te Moehau in this respect.

For some years I had been hoping to explore the Moehau Range in order to complete what had been done on the rest of the peninsula, and an opportunity offered in January last, when my son was carrying on a survey in the Moehau district. The survey camp was at Torehina, in the neighbourhood of Cabbage Bay, and, as I spent a few days there before I made the ascent of the main range, I was enabled to devote some time

to the botany of the lowlands. No situation could appear more suitable for studying the botany of the district, as there is along the coast at Torehina a great variety of land-formation. A broad band of blue and green slate is succeeded by a projecting headland of breccia, and this again by beds of marly limestone that show in the streams blocks of immense fossil oysters (*Ostræa wullerstorfii*). This formation is again succeeded by excellent crystalline limestone, which in some places forms cubical masses built up, as it were, of immense slabs. These slabs are frequently almost entirely composed of echinodermatous fossils.

There is a large area of open fern-land, extending from Torehina to Paparoa, a distance of four miles southward, which is surrounded inland by well-wooded steep ridges.

This open country was formerly occupied by Maoris, but at present there remain only two Maori enclosures, that had at the time of my visit each a few square yards of kumara and hue (*Cucurbita*).

The streams on the sea side either flow over the slate in a succession of waterfalls, or cut through the marly beds, or force their way through rounded boulders of trachyte. The outlet of each stream when it reaches the shore is banked up by sand.

The beach is in many places adorned by pohutukawa (*Metrosideros tomentosa*), that grows in great profusion, and frequently forms large clumps that are very conspicuous when the tree is in flower. It is not only on the beach that this tree is found, but it extends inland, and grows at a considerable height on the ridges.

The trees growing with the pohutukawa are karo, horoeka (*Pittosporum crassifolium, P. umbellatum*), ngaio (*Myoporum lætum*), karaka (*Corynocarpus lævigata*), kowhai (*Sophora tetraptera*), and oho (*Panax lessoni*).

In sandy places, near the pohutukawa, *Isolepis nodosa*, intertwined with *Calystegia soldanella*, quite covered the ground; and in rocky places *Sicyos angulatus* and *Bidens pilosa* are sometimes very abundant.

The cliffs that rise above the breccia on the beach are covered with *Mesembryanthemum, Linum, Sonchus, Astelia banksii*, patches of *Paspalum scrobiculatum, Bromus arenarius, Oxalis corniculata*, and *Arthropodium cirrhatum*. *Cassinia leptophylla* and *Veronica pubescens* are not uncommon, and on the islet-rocks at some distance from the shore *Coprosma baueriana* is very conspicuous.

The islets near the shore are worthy of some remarks, as they extend, at various distances from the mainland, along the coast from Coromandel Harbour to Cabbage Bay. They can be observed in every stage of formation. In the first

stage the end of a projecting spur has a passage between it and the mainland, then there are islands that are left high and dry at low water; and lastly there are in some places, as at Paparoa, a long line of small islands parallel to the shore and distant from it perhaps two miles. This all tends to show the inroads that the sea has been making for ages on the peninsula. The pohutukawa is sure to be found on any of these islands, no matter how small it may be. The most interesting plants that I found on the beach were *Fuchsia procumbens*, *Veronica pubescens*, *Pimelea urvilleana*, and *Pisonia brunoniana*. These plants, though now rare, were gathered by the first botanists that landed on the shores of New Zealand, as their collections were, for the sake of safety, confined to the sea-shore, and they appear to have done their work very thoroughly. The adjectival form of the name of Banks, Solander, Forster, D'Urville, Lesson, and Cunningham is the attribute of many a plant that still flourishes on the beach in unfrequented places. The fact that *Salsola australis*, common at Torehina, is omitted from their collections appears to be a good reason for regarding it as a naturalised plant.

The open land is covered with the usual ericetal plants, *Pomaderris*, *Leptospermum*, *Leucopogon*, and *Pteris;* and in sheltered places kowhai (*Sophora tetraptera*), akeake (*Dodonæa viscosa*), tupaki (*Coriaria ruscifolia*), karioi (*Rhipogonum scandens*), wharangi (*Melicope ternata*), and titoki (*Alectryon excelsum*), form pretty groves. There is an abundant but apparently second growth of trees over part of the limestone formation, where *Clematis*, *Parsonsia*, *Passiflora*, and *Lygodium* are hanging from and interlacing mahoe (*Melicytus ramiflorus*), titoki (*Alectryon excelsum*), makomako (*Aristotelia racemosa*), and miro (*Podocarpus ferruginea*). The slabs of limestone are often covered with *Peperomia*.

This open land, as I have said before, is surrounded by steep ridges that rise abruptly from streams that flow at their base. Both sides and summit are clothed with forest that on the steep inclines appears little disturbed by man or beast. And the effect is often very pleasing, of a widespread mantle of green of ever-varying shade, extending from the stream at the base to the blue sky above. Along the streams at the base the plants most frequently seen were mahoe (*Melicytus ramiflorus*), wharangi (*Melicope ternata*), *Fuchsia excorticata*, *Carpodetus serratus*, hangehange (*Geniostoma ligustrifolia*), nikau (*Areca sapida*), whau (*Entelea arborescens*), and korau (*Cyathea dealbata*). On the steep incline the following formed the greatest part of the vegetation: *Metrosideros robusta*, *M. hypericifolia*, *M. scandens*, *Myrtus bullata*, *Panax edgerleyi*, *P. arboreum*, *Coprosma robusta*, *Brachyglottis repanda*, *Myrsine*

salicina, M. urvillei, Olea cunninghami, Veronica salicifolia, V. macrocarpa, Vitex littoralis, Hedycarya dentata, Laurelia novæ-zelandiæ, Bulschmeidia tawa, Litsæa calicaris, Pimelea virgata, P. prostrata, Dacrydium cupressinum, Agathis australis.

The size and beauty of the puriri (*Vitex littoralis*), kohekohe (*Dysoxylum spectabile*), nikau (*Areca sapida*), and ponga (*Cyathea medullaris*) are worthy of notice. I found the tawa was by no means plentiful, and I looked in vain for tawhero (*Weinmannia*).

On the highest peak, Te Matau a Maui, 1,018ft., there was a fine specimen of *Veronica pubescens* fully 7ft. high and symmetrically grown. Other plants, as *Panax arboreum, Rhabdothamnus solandri, Astelia trinervia,* were also very large. The grasses *Microlæna avenacea, M. polynoda, Poa anceps,* and the sedges *Uncinia australis* and *Carex dissita* formed quite a sward. On the top there is a castellated mass of porphyry trachyte, and over it *Adiantum hispidulum* grows in the same profusion as the *Peperomia* over the limestone slabs.

From the top there is a fine view of the inlets and islets along the west coast, but on the east the view is into Cabbage Bay. The streams from the hill-side into this bay end abruptly in a large swamp called the Pakorero. As this swamp appeared to offer a favourable locality for plants other than those I had seen, I spent a day in exploring it. The plants in it are few in the number of species and very common. Raupo (*Typha angustifolia*) forms a large part of it; then *Cladium glomeratum, Juncus planifolius, Cyperus ustulatus, Sparganium simplex, Hydrocotyle asiatica, Haloragis micrantha, Drosera binata, Eleocharis acuta,* and *Lobelia anceps* are the ordinary plants. There is an abundant growth of *Isachne australis* and *Deyeuxia billardieri.* In dry places in the swamp I observed *Pittosporum tenuifolium, Aristotelia racemosa, Coriaria ruscifolia, Rubus australis, Myrtus bullata,* and *Coprosma spathulata.*

Native grasses are plentiful about Torehina, and this will account for the number of wild cattle of which the ownership is very doubtful. The grasses I have catalogued are *Microlæna avenacea, M. polynoda, Paspalum scrobiculatum, P. distichum, Isachne australis, Zoysia pungens, Dichelachne crinita, D. sciurea, Deyeuxia forsteri, D. billardieri, Arundo conspicua, Danthonia semiannularis, Trisetum antarcticum, Poa anceps, Bromus arenarius, Triticum multiflorum.*

During the time I was making a catalogue of the lower ground I often looked with anxiety to the distant peak of Moehau, that sometimes appeared in bright sunshine, and at other times under a dense cloud. The distance I had calcu-

lated to be about nine miles in a straight line; but, as no European had been to the top, and as the Maoris believe that the mountain is the abode of Turehu, there was only the imagination to be relied upon for the difficulties to be encountered. On Friday, 13th January, my son was able to arrange that the survey work could go on for a couple of days in his absence, and so, by making an early start, we got to the south side of Cabbage Bay at 6 a.m. This bay we could have walked across if the tide had been out, but unluckily it was high water. A boat was at hand, and a good-hearted settler might have put us over, but such good luck is not experienced by amateur botanists. There was nothing for it but to walk round the bay, where roads and tracks are in the most primitive condition. Near the ford where the bay is crossed there is the house of a settler, who is also postmaster. This house is cut off from the other part of the settlement by an arm of the bay. Over this inlet a crossing is made by a succession of nine-inch planks, that are supported by a number of embankments. Where the water is not very deep the traveller wades through it. Now, as this is the only means of communication between the settlement and the post-office, it appears very judicious on the settlers' part to prohibit in the district the use of intoxicating drinks, as it saves the expense of a resident coroner. After crossing the planks, the next obstacle in going round the bay was to wade a tidal stream, and then, after a little dry walking, to cross a swamp. The next stream in our course was so deep that some Maoris put a boat across to ferry us over. There is a good track then to Waiaro, which appears to be an important native settlement, as the whares form a good-sized village near the sea, and there is a wide stretch of level ground. Along the Waiaro stream and in the lower part of the valley the soil is very light over the clay-slate, so that the cultivations are on the slope of the hills.

The district must have supplied a large quantity of kauri, as there is about a mile of railway and a steam locomotive. There are still some logs to be removed, but the supply from the hills seems to be exhausted. Along the valley there is no devastation of native trees. The mahoe, manuka, ngaio, puriri, kohekohe, akeake, kowhai, karaka, rewarewa, and raukawa grow well, and look all the better on account of the abundance of climbing-plants and epiphytes that overspread them. The kohia (*Passiflora tetrandra*) is very abundant, and hangs down in graceful festoons over the stream, while karioi, mangemange, clematis, and tataramoa twine and intertwine as they unite tree to tree. The karo (*Pittosporum cornifolium*), broadleaf (*Griselinia lucida*), and kahakaha (*Astelia solandri*) grow luxuriantly in the upper parts of the branches.

After ascending the valley the top of Moehau and the undulating ridges that lead to it came into view. All the high ground is densely covered with forest, but on the lower part of the range, where the kauri formerly grew, a fire had been raging for some days before our arrival. The steep spurs were black and smoking, and some large trees were still burning; but the rain that had fallen the previous night and also during the morning had cooled the ground. My son, who was leader of the expedition and carrier of the swag, took a leading spur on the right bank of what had been a driving-creek for kauri logs, and after a steep climb of about 1,000ft. we reached the bush that had not been touched by the fire. My first impression of the ridge that we were now to follow was that it was impassable—kiekie, mangemange, and karioi twined and intertwined in the wildest confusion. Any opening between these intertwining creepers was occupied by *Gahnia lacera* and *Astelia grandis*. My guide, however, took no notice of these obstacles. Where there was no way over, a passage could be made under, and, by crawling sometimes very close to the ground, and sometimes by walking on partly-fallen trees some distance above the ground, progress was made. I was more than once advised to crawl on my hands and toes, and not on my hands and knees; but, although I have no doubt the former is the correct way, yet I feel sure that it is acquired by long practice only, so that I had to do as well as I could on hands and knees. We advanced for a couple of hours in this way, when we reached the main range. The way was now more open, and there were signs of a survey party, at some distant time, having been on the ridge, and shortly afterwards we reached the trig. station, that has an elevation of 2,054ft. The plants I observed here were those that occurred with more or less frequency afterwards on the ridge as we advanced towards the summit. They are *Drimys axillaris*, *Melicytus ramiflorus*, *M. lanceolatus*, *Elæocarpus hookerianus*, *Quintinia serrata*, *Ixerba brexioides*, *Weinmannia sylvicola*, *Myrtus bullata*, *Fuchsia excorticata*, *Alseuosmia macrophylla*, *Coprosma robusta*, *C. fœtidissima*, *Senecio gladifolius*, *S. myrianthos*, *Dracophyllum latifolium*, *Rhipogonum scandens*, *Astelia grandis*, *A. trinervia*, *Pteris incisa*, and *Polypodium rugulosum*. The two last-named had no doubt arrived since the trees at the trig. station had been levelled. The largest trees on the range are tawhero (*Weinmannia sylvicola*) and pukatea (*Laurelia novæ-zelandiæ*.)

The ridge leading to the peaks, though it appears from a distance to undulate gracefully, was found to be very irregular. A steep ascent was followed by a steep descent, and then succeeded a broad saddle on which supple-jack, kiekie, and mangemange grow in surprising luxuriance. On these saddles

it was often doubtful what was the real summit of the ridge until another ascent and a favourable opening revealed the highest peak looming in the distance.

When sunset was near we followed down a dry water-course for a couple of hundred yards, and found a water-hole. We camped near it for the two nights we were on the mountain, and I was surprised to notice, as we left the place, that the mere requirements for beds and fuel had so exhausted the number of trees and ferns that the camping-place looked like a clearing. The *Gahnia*, *Freycinetia*, and *Rhipogonum* that grow so densely on the ridge do not flourish on the clay-slate that is in loose shingle on the sides. The scanty bush covers what had for ages been extensive shingle-slopes.

The ordinary plants are *Melicytus ramiflorus*, *Schefflera digitata*, *Brachyglottis repanda*, *Areca sapida*, *Hemitelia smithii*, and *Aspidium aculeatum*. *Polypodium pennigerum* grows very large and stalked. I saw *Lomaria nigra* in two places, but I looked in vain for *Loxsoma cunninghami* and *Lomaria elongata*.

The next morning we followed up the dry bed of another watercourse, that brought us nearer to the peak, and on reaching the summit our work began. In addition to the undergrowth that was experienced before, *Alseuosmia* and *Coprosma fœtidissima* formed dense thickets on the ridge, and of course there was no such thing as walking. We had literally to thread our way. If the explorer be regarded as a long needle, his progress past the vegetation will closely resemble darning. The dense tangle appeared to get worse and worse, when we suddenly struggled on to a mass of *Metrosideros albiflora*, and there close at hand was open ground and the rounded peak covered with stunted vegetation. Several large flat rocks hoary with *Racomitrium* moss were close to the dense bush, and on these were growing in great profusion *Celmisia incana* in full flower. Every step in the open ground not only showed that the vegetation was a contrast to that on the ridge, but also that it was unlike that of any other high peak on the main range throughout the peninsula. I could scarcely believe my eyes as each fresh plant that I saw seemed to show that I was on the top of one of the mountains in Nelson Province. There are patches of *Oreobolus* and *Carpha alpina*, studded with the mountain form of *Ourisia macrophylla*. Tufts of *Pentachondra* and *Cyathodes empetrifolia* are conspicuous on the little mounds of peat, and then the largest part of the surface of the ground is carpeted with lycopods, the alpine forms of *Gleichenia dicarpa* and of *Danthonia semiannularis*.

The Moehau peak is a rounded mass of augitic andesite intruded between the slate formation of which the mountain

is composed. It runs about 200ft. above the ridge in a gradual slope, and there is no part of the sides or summit bare. The open land around it may be about a hundred acres, and it is distant from the lower peak about a mile.

On the flat and rounded top the tallest plants are stunted neinei (*Dracophyllum latifolium*) and clumps of *Phormium colensoi;* while *Gaultheria antipoda, Corokia buddleoides,* and *Coprosma colensoi* are very stunted, and grow little higher than *Gleichenia dicarpa, Lycopodium varium,* and *L. scariosum.* In a sheltered part near the summit *Dacrydium bidwillii, Phyllocladus glauca, P. alpina, P. trichomanoides, and Podocarpus nivalis* grow well.

The following is the list of plants that I observed on the peak: *Fuchsia excorticata, Panax sinclairi, P. colensoi, P. edgerleyi, Corokia buddleoides, Coprosma lucida, C. colensoi, Celmisia incana, Gaultheria antipoda, Cyathodes empetrifolia, Pentachondra pumila, Dracophyllum latifolium, Myrsine salicina, Ourisia macrophylla, Phyllocladus glauca, P. alpina, P. trichomanoides, Dacrydium bidwillii, Podocarpus nivalis, Dendrobium cunninghami, Thelymitra longifolia, Astelia linearis, Arthropodium cirrhatum, Danthonia semiannularis* var. *alpina, Gleichenia dicarpa* var. *alpina, Hymenophyllum multifidum, Trichomanes reniforme, T. venosum, T. rigidum, Lomaria lanceolata, Schizæa fistulosa, Lycopodium varium, L. volubile, L. densum, L. billardieri, L. cernuum, L. scariosum.*

Some of these plants are not found nearer than the top of Hikurangi, in the Ruahine Range—viz., *Celmisia incana, Pentachondra pumila, Ourisia macrophylla, Phyllocladus alpina, Dacrydium bidwillii, Podocarpus nivalis, Danthonia semiannularis* var. *alpina, Oreobolus australis, Carpha alpina, Gleichenia dicarpa* var. *alpina.*

At the base of the peak, on the borders of the thick forest, *Panax sinclairi, Corokia buddleoides,* and *Metrosideros albiflora* are very abundant, but I did not see them anywhere else on the range. The *Metrosideros albiflora* was the only rata I saw on the mountain. On the day we reached the top there was no wind, but, as all the shrubs had the ground hollowed out at the base of the stem, it is evident that a calm is a very unusual thing at the summit. The appearance of Ruahine plants on the summit is the more remarkable, as Maruaepuke, Kaitarakihi, and Te Aroha are respectively two or three hundred feet higher; and it appears to me to prove that Moehau is the oldest land-formation on the Cape Colville peninsula.

From the top of the elevated dome, with its dwarfed vegetation, the view over the forest that covers the mountain is quite unimpeded. The sharp ridges and deep valleys are clearly visible.

There is no open line or even break in the vegetation, but

the eye wanders over an ever-varying prospect of sombre green. From the outline of the ridge by which we ascended other ridges constantly diverged to the right and to the left, showing plainly that the return to our camp was no simple matter. Looking to the south, the whole main range was visible to Maruaepuke, which appeared just on the horizon. The deep gulf forming Coromandel Harbour, with the islands and islets near it, were distinctly visible. Then the eye could follow the irregularities of the coast to the survey camp at Torehina, and could look into Cabbage Bay, the Otautu settlement, and the Waiaro Valley, through which we had ascended. On the east coast a large portion of Port Charles was visible, while farther south Mercury Island and the islets near it were quite distinct. To the north, Barrier Island was clearly defined, and away to the west every island and islet in Auckland Harbour was distinctly outlined.

We did not reach our camp that night, but, sorely against our will, were forced to explore the eastern ridges and deep mountain-gullies. We lost and found the main ridge over and over again; but soon it became too dark to move, and, after a frugal supper of nikau and water, we sat uneasily on the loose shingle by a fire and waited for daylight. Not a sound was heard in that lonely forest, except at long intervals the sharp noise produced by the *weta* and the continuous muffled sound in the distance of falling water.

There is nothing upon the mountain to support life—neither bird nor beast—so that there was no inducement for the ancient Maori to ascend it; and, as no kauri grows there above the level of 1,000ft., there is no attraction for the gum-digger: so that, after a few expeditions have been made to fully explore the summit for plants, Te Moehau will probably be left undisturbed except by the wind.

ART. III.—*A Description of a Species of* Orobanche *(supposed to be new) parasitical on a Plant of* Hydrocotyle.

By WILLIAM COLENSO, F.R.S., F.L.S., &c.

[*Read before the Hawke's Bay Philosophical Institute, 12th November, 1888.*]

Orobanche hydrocotylei, Col.

PLANT erect, simple, 12in.–18in. high, cylindrical, rather stout, as thick at base as a large-size common lead-pencil, darkish purple-red; whole plant thickly glandular-pubescent; hairs short, patent, whitish, their globular tips yellow. Bracts scattered, few at base, very distant below on stem, ¾in.–1in.