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The Alderman Islands: A Remnant of Primaeval New Zealand

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Abstract

THE results of a survey of the vegetation of the Alderman Islands are given. The Aldermans, a remote, inhospitable and inaccessible, small island group in the Bay of Plenty, have a primaeval flora. Examination of the vegetation shows it to be unique in New Zealand. This unspoiled natural vegetation contrasts greatly with the modified vegetation of other outlying islands off the northern coast of New Zealand. Similarities with some of the vegetation of island sanctuaries are present. These formerly unmapped islands have been mapped, the distribution of the vegetation mapped, and the flora present compared with that observed 32 years earlier.

INTRODUCTION

FEW parts of New Zealand are as unchanged either by man or by his introduced animals and plants as the Alderman Islands in the Bay of Plenty. These islands, first discovered by Captain Cook on November 3, 1769, are one of the many small island groups that occur along the east coast of the North Island. The Alderman Islands group (Fig. 1), although only thirteen to fifteen miles east from the small harbour of Tairua on the mainland is, however, one of the most inaccessible and one of the most remote of these island groups. Chiefly owing to its inaccessibility, its dangerous, poorly charted, reef-studded waters, its general inhospitable appearance, and its lack of landing places this island group has been largely left alone by man. The vegetation of these volcanic islands is essentially unchanged from its pre-European state: it is virtually the same today as when the islands were visited in 1838 by the Rev. W. R. Wade (1842), and much later by Sladden and Falla (Sladden and Falla, 1927, 1928).

Throughout this entire group cultural modification of both the flora and the fauna has been virtually completely absent. This fact in itself serves to differentiate the Alderman Islands from all the other island groups and indeed from all New Zealand, of which they have remained a primaeval part.

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Physical Setting

The Alderman Islands, totalling only 112 acres in area, are mostly conspicuous, steeply-cliffed islands (Plate 1, fig. 1). Extremely irregular shorelines are typical of this island group. The very numerous reefs and steep high stacks are probably remnants of an earlier and considerably larger land mass. Selective wave erosion on the different types of exposed rocks has given rise to a markedly irregular shoreline on the central chain of islands (Middle Island). Viewed from either the north or the south, at a distance of several miles, these islands appear as a long row of grey, jagged, abruptly-rising and sharply pointed peaks extending for about three miles across the Bay of Plenty, but viewed from the west and the east this is not so readily apparent until they are approached more closely.

Scattered over an area of approximately five square miles of ocean, the four main islands and numerous rocky stacks are arranged in the form of a cross. The west-east arm of this cross, from the 254ft high, easy sloping Hongiora through the broken, irregularly peaked, central island chain to the 584ft high, club-shaped Ruamahua-nui, is three miles across. North-south distance through the other axis of this cross, from the small rocky stacks in the north through the western portions of the central island to the highest island, Ruamahua-iti (610ft), is also approximately three miles. Two and a-half miles north-east of Hongiora the bare rocky stacks of the Sugar Loaf Rocks rise abruptly from deep water. The northern stack is only 30ft high and is quite devoid of life, whereas the 80ft high stack half a mile further south, serves as a home for a small colony of gannets (*Sula serrator*).

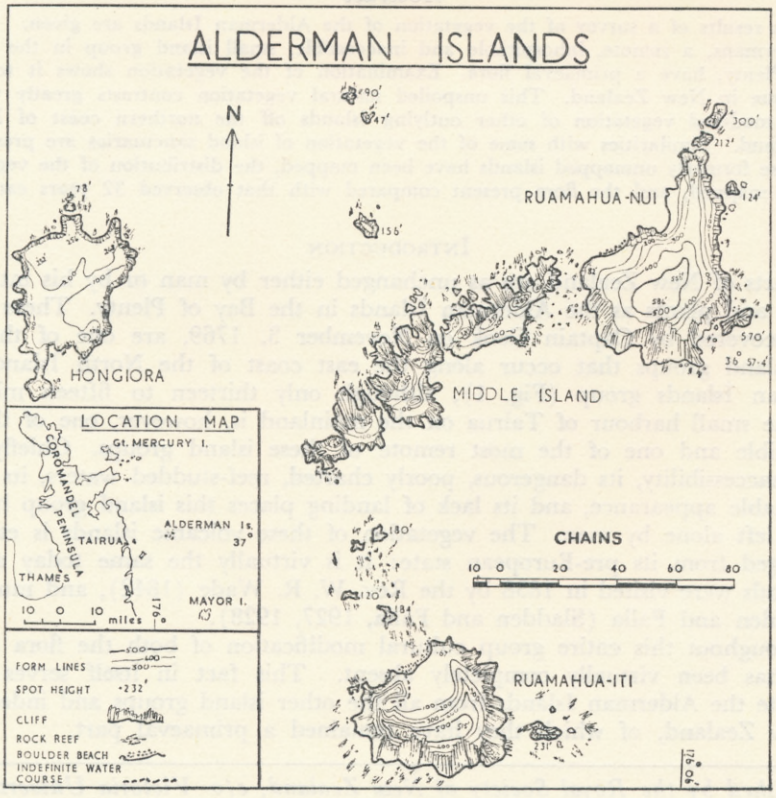


Fig. 1.—The Alderman Islands.

Ruamuhua-nui, the most eastern Alderman Island, is forty acres in extent, whilst Ruamahua-iti, one and a-half miles to the south-west, has a total area of about thirty acres. Both these islands have steep but rapidly erroding breccia cliffs on all sides except to the north-west. Above these grey, rhyolitic cliffs a low, windswept vegetation covers moderately steep to steep slopes. On Ruamahua-iti steep, bare, southern cliffs reach almost to the very summit of the island, whilst similar cliffs extend to within a hundred feet of the maximum elevation of Ruamahua-nui. These cliffs, rising in places to 600ft, are readily visible from points on the mainland over fifteen miles distant.

RUAMAHUA-ITI

Beyond the steep and at times nearly perpendicular cliffs that almost encircle the horseshoe-shaped Ruamahua-iti the land slopes downwards more gently towards the north-west. Here, on the north-west, the cliffs are lower, less precipitous, and finally peter out in a boulder beach. The fringing high cliffs on the west, south and east enclose a basin that is densely clothed in vegetation and also shelter it from most of the severe westerly, southerly and easterly winds. As a consequence the plant cover is considerably less wind-shorn than on the other, less-sheltered islands. The favourable aspect of this sloping basin has allowed

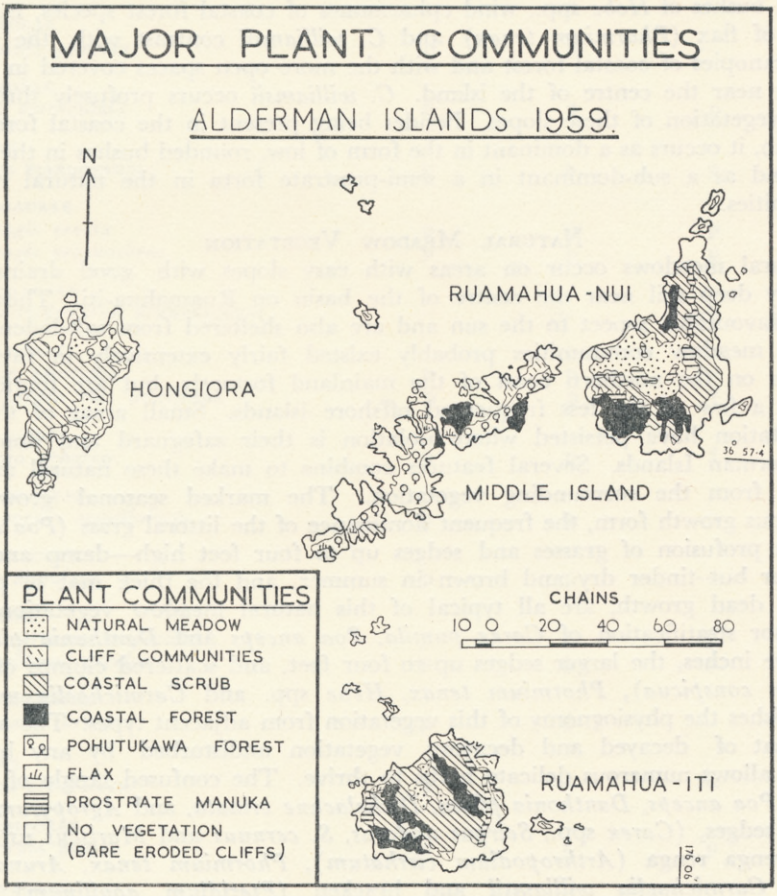


FIG. 2.—Vegetation of the Alderman Islands, 1959.

a vigorous coastal scrub and low coastal forest vegetation to develop. Profusely growing pohutukawa (*Metrosideros excelsa*) is prominent over a small area—too small to be shown on the map at the scale used—of the easier slopes of the high south-western cliffs of this island.

Coastal Forest Vegetation

Narrow tongues of coastal forest cover two gully areas on the eastern and western fringes of the basin slopes of Ruamahua-iti (Fig. 2). Shrubby, 12ft to 15ft high trees of karo (*Pittosporum crassifolium*), hangehange (*Geniostoma ligustrifolium*), ngaio (*Myoporum laetum*), *Coprosma* spp., *Hymenanthera novae-zelandiae* and *Paratrophis banksii* form a moderately dense but uneven-canopied bush. The rare East Cape *Carmichaelia* (*C. williamsii*) occurs frequently in these gullies along with the tree species. It is often as tall as the low shrubby trees but is much lower and in more compact bushes on the more open slopes covered in windswept coastal scrub.

Coastal Scrub Vegetation

By far the greatest area of this island, however, is covered in low coastal scrub. This is only two to four feet high and has numerous open patches. Scrubby rounded bushes of *Hebe* spp., wind epharmones of coastal forest species, numerous clumps of flax (*Phormium tenax*) and *C. williamsii* contrast with the higher, denser canopies of coastal forest and with the more open spaces covered in natural meadow near the centre of the island. *C. williamsii* occurs profusely throughout all the vegetation of these slopes. Besides being present in the coastal forest as a tall shrub, it occurs as a dominant in the form of low, rounded bushes in the coastal scrub and as a sub-dominant in a semi-prostrate form in the natural meadow communities.

Natural Meadow Vegetation

Natural meadows occur on areas with easy slopes with good drainage on relatively deep soil near the centre of the basin on Ruamahua-iti. These areas have a favourable aspect to the sun and are also sheltered from salt-laden winds. Natural meadow communities probably existed fairly extensively in favourable localities on the northern coast of the mainland formerly, but are found today on only a few of the less frequented offshore islands. Small areas of this type of vegetation have persisted where isolation is their safeguard and flourish on the Alderman Islands. Several features combine to make these natural meadows distinct from the surrounding vegetation. The marked seasonal growth, the herbaceous growth form, the frequent dominance of the littoral grass (*Poa anceps*) the rich profusion of grasses and sedges up to four feet high—damp and green in winter but tinder dry and brown in summer, and the thick mat of partially decayed dead growth, are all typical of this natural meadow vegetation. Also the minor stratification of *Carex pumila, Poa anceps* and *Danthonia pilosa* up to twelve inches, the larger sedges up to four feet, and scattered clumps of toetoe (*Arundo conspicua*), *Phormium tenax, Hebe* spp. and *Carmichaelia williamsii* distinguishes the physiognomy of this vegetation from adjacent types. The accumulated mat of decayed and decaying vegetation undisturbed by any browsing animals allows numerous delicate herbs to thrive. The confused tangle of grasses, notably *Poa anceps, Danthonia pilosa, Dichelachne crinata,* and *Agropyrum multiflorum,* sedges, (*Carex* spp., *Scirpus nodosus, S. cernuus* and *Mariscus ustulatus*), herbs, renga renga (*Arthropodium cirrhatum*), *Phormium tenax, Arundo conspicua, Carmichaelia williamsii* and bracken (*Pteridium aquilinum*) render movement through this dense, profuse growth difficult.

On other islands and mainland localities such vegetation was burned repeatedly by Maori mutton-birding parties since the third decade of the nineteenth century to facilitate movement and the more easily to see mutton bird (*Pterodroma macroptera* and *Puffinus griseus*) burrows. Such procedures rapidly modified the natural meadow communities: new micro-climatic and micro-edaphic conditions developed that favoured the establishment of manuka (*Leptospermum scoparium*), bracken, and other hardy coastal scrub species, rather than the grasses and sedges of the natural meadow communities. The marked inability of these meadow communities to regenerate after several consecutive firings is a notable feature. Consequently such vegetation has disappeared from many localities. Fortunately the Alderman Islands escaped such firing. The dense mats of *Poa anceps* and other grasses do not allow coastal scrub species to become established. On Ruamahua-iti on the drier and higher margins of natural meadow there is a greater variety of species present. On rocky habitats mats of pohuehue (*Muehlenbeckia complexa*), rusty-coloured *Haloragis procumbens* and the crucifier *Lepidium oleraceum* are conspicuous among the grasses and the sedge *Scirpus nodosus*.

CLIFF VEGETATION

Cliff communities comprised of occasional precariously perched pohutukawa (*Metrosideros excelsa*), scattered renga renga (*Arthropodium cirrhatum*), occasional *Asplenium lucidum, Phormium tenax, Coprosma repens* and *Leptospermum scoparium* are found in a narrow fringe along the north-eastern cliffs and a portion of the southern cliffs of Ruamahua-iti. Elsewhere the cliffs are too steep and rapidly eroding so that vegetation is absent.

On the exposed western slopes and along the crest of the eastern cliffs of Ruamahua-iti prostrate manuka (*Leptospermum scoparium*) has been flattened by the force of the wind. A similar prostrate form of vegetation cover is found along the crest of the medial range running from north to south through Ruamahua-nui. Similar small patches of prostrate *Leptospermum scoparium* occur along other exposed ridges on this island.

RUAMAHUA-NUI

In the broad, central portion of Ruamahua-nui, slopes with a north-westerly aspect are largely covered in natural meadow. Coastal scrub, in which mahoe (*Melicytus ramiflorus*) occurs frequently and in which, by contrast to Ruamahua-iti, *Carmichaelia williamsii* is totally absent, covers most of the remaining slopes of the island.

Coastal forest of pohutukawa (*Metrosideros excelsa*) as well as the other species found on Ruamahua-iti, along with *Aristotelia serrata, Melicytus ramiflorus,* and shrubby rangiora (*Brachyglottis repanda*) covers the steep southern slopes of this island. A similar though smaller area occurs above the shoreline at a sweeping bay in the northwest. In places this is 25ft to 30ft high, but on the more exposed slopes it is rarely over 15ft high.

MIDDLE ISLAND

The Middle Island—in reality an elongated series of steep, jagged peaks in places separated by boulder spits or narrow, razor-backed isthmuses and in others by reef-studded, narrow sea-channels—differs in several respects from the other islands of the Alderman group. Most of the fourteen acres of this chain of peaks, where slopes are not too precipitous, is densely covered in *Metrosideros excelsa* forest, between 20ft and 35ft in height. Undergrowth is fairly limited, although *Phormium tenax,* naupata (*Coprosma repens*) and *Asplenium lucidum* are common. This is especially true for the southern peaks of Middle Island.

Natural meadow communities are absent and coastal scrub is limited in its distribution to a single small area in the south-east. Except in two places, coincident with easier slopes and low cliffs, where coastal forest reaches to the shoreline, it is impossible to land on or to climb the steeply rising series of peaks (100ft to 300ft high) that characterize this central island chain. Along some of the cliffs the rhyolitic breccias so typical of the Alderman Islands are replaced by an intrusion of columnar, weather-pitted rhyolite. These rock columns are closely adjacent to each other and appear to be precariously perched. Similar columnar rhyolite occurs on the high western cliffs of Ohena, Mercury Islands, to the north. These columnar cliffs, even more than the weathered breccia so typical of all the islands except Hongiora, are generally completely devoid of vegetation.

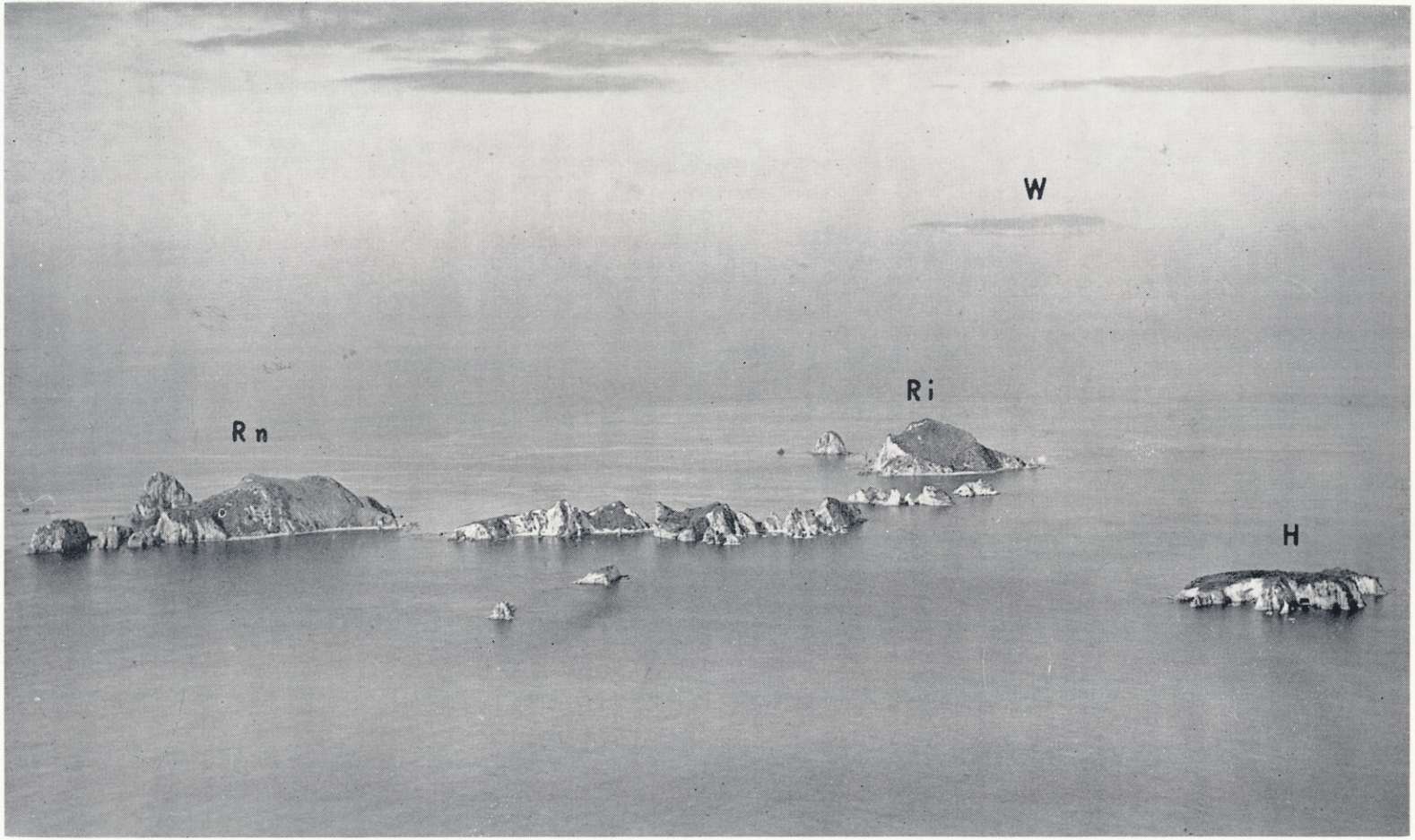
The coastal forest pockets on the "Middle Island" are very similar to unmodified coastal forest found on the southern and eastern shores of Hauturu or Little Barrier Island (Kirk, 1868; Hamilton, 1961). Groves of the "bird-catcher tree", parapara (*Heimerliodendron brunonianum*), karaka (*Corynocarpus laevigata*), *Metrosideros excelsa* and profusely growing *Brachyglottis repanda* occur along with a variety of other species. Amongst the latter are tall *Paratrophis banksii*, shrubby waiatua (*Rhabdothamnus solandri*), hangehange (*Geniostoma ligustrifolium*) and most of the shrubby trees found on the other islands of the group. *Coprosma repens, C. robusta, Hymenanthera novae-zelandiae, Pittosporum crassifolium* and *Myoporum laetum* along with kawakawa (*Macropiper excelsum*), *Peperomia urvilleana* and *Asplenium lucidum* form a fairly dense undergrowth. This contrasts with the relatively less dense undergrowth beneath the areas of pohutukawa (*Metrosideros excelsa*) forest that covers much of this island chain. Whau (*Entelia arborescens*) occurs on the northern portions of Middle Island as an active initial colonizer of moist slip faces. This species is later replaced by vigorously growing *Brachyglottis repanda* and *Coprosma* spp.

HONGIORA

Hongiora, a lower, gently sloping island, is at complete variance with the precipitous peaks of the "Middle Island" and is by contrast the antithesis of the steep slopes of the two larger islands, Ruamahua-nui and Ruamahua-iti. Though rising in near vertical but irregularly turreted cliffs from the sea most of the twenty-eight acres of Hongiora are gently undulating. This island is formed of rocks from a lava flow in which breccias appear absent. Hongiora is much lower than the other Alderman Islands and slopes gradually down to the east and to the south. In the south the irregularly rectangular island terminates in a narrow fishtail peninsula that is approximately a quarter of a mile long (Fig. 1).

Apart from pohutukawa (*Metrosideros excelsa*) forest at the higher cliff edges and two small areas of natural meadow in the north and east of the island a dense and in places an almost impenetrable coastal scrub covers the greater part of the entire island (Fig. 2). *Hebe* spp. occur frequently, but the shiny-leaved naupata (*Coprosma repens*) and *Hymenanthera novae-zelandiae* are conspicuously dominant. Breaking the otherwise even, windshorn canopy of the coastal scrub are occasional karo (*Pittosporum crassifolium*), *Paratrophis banksii, Myoporum laetum* and *Metrosideros excelsa* trees.

Although the Alderman Islands still support very heavy bird and tuatara (*Sphenodon punctatus*) populations, they reach a maximum on Hongiora. Near cliff margins in positions favoured by sea birds the ground is often devoid of undergrowth apart from occasional *Phormium tenax* bushes and clumps of *Asplenium lucidum*. Seedling establishment is difficult, but the heavily manured, well aerated and often loose soils do, however, allow a very vigorous and luxuriant mature vegetation to flourish. Many intersecting passages through the dank



The Alderman Islands, Bay of Plenty. (Rn, Ruamahua-nui; Ri, Ruamahua-iti; and H, Hongiora). Note the steep weathered cliffs of rhyolitic agglomerates, the jagged inhospitable islands and the low windswept vegetation. Whakahau (W) or Slipper Island can be seen eleven miles closer to the mainland. *Photo: Whites Aviation.*

growth of the natural meadows also lead to burrows of nesting petrels. It is difficult to walk far near the cliffs on Hongiora without stepping into petrel burrows. Although petrel burrows are common near cliffs on other rarely visited east coast islands (notably Red Mercury Islands, Motukino of the Moko Hinau group, Taranga and Maro Tiri or Hen and Chicken Islands, and Poor Knights Island) only on Ohena Island of the Mercury Islands is there a comparable bird density to that occurring on Hongiora (Cochrane, 1954b: 237–8).

CONCLUSIONS

The isolated, uninhabited Alderman Islands are characterized by their rugged, frequently precipitous landforms, with the single exception of Hongiora, and by virtually unmodified vegetation cover. The vegetation, mapped by the author in 1959, appears unchanged from that described by Sladden and Falla in 1927. Two minor modifications to the primaeval flora are present: 1, the rare occurrence of two introduced weeds of cultivation *Solanum nigrum* and *Sonchus oleraceus*—the former possibly introduced by migratory flocks of starlings from Slipper Island and the mainland and the latter probably windborne from Slipper Island—and 2, the presence of two species of doubtful status, *Calystegia sepium* and *Siegsbeckia orientalis*. These might be Maori weeds introduced by birding parties. Apart from these relatively insignificant modifications these islands have a pristine flora and fauna. There are close similarities between the vegetation communities of the Alderman Islands and the *culturally unmodified vegetation* of similar locations on Taranga or Hen Island (Cranwell and Moore, 1935; Cochrane, 1954a), Hauturu (Hamilton, 1961), Motukino of Moko Hinau Islands (Cochrane, 1954b), Tawhiti Rahi of the Poor Knights Islands (Oliver, 1925; Cochrane, 1954b), and the Three Kings Islands (Baylis, 1948, 1951; Buddle, 1948; Oliver, 1948). Species of flora and fauna that have become rare or extinct on the mainland are found in their natural state on the Alderman Islands. These alone, of all the numerous islands off the northern and eastern coasts of the North Island have escaped unscathed from modification by cultural agencies.

Although Captain Cook reported that some of the Alderman Islands were inhabited when he sighted and named them on November 3, 1769 (Wharton, 1893: 147), there are no visible evidences of former Maori occupation. There are no signs of old earthworks of fortifications, nor of former *kianga* sites. Even when visited by Sladden and Falla over thirty-five years ago there were no evidences. The author has seen many evidences of former Maori occupation on the other outlying islands (Cochrane, 1954a, 1954b, 1957: 36-8), but none on the Alderman Islands. Sladden and Falla (1927) noted that conditions for landing and for living on this island group even for a short period militated against their being inhabited by a Maori population. Again the essentially unchanged natural vegetation still remaining on these islands suggests much the same. The "inhabitants" observed by Cook were probably a visiting Maori mutton-birding party. The time of the year (early November) would coincide with such an expedition. Furthermore, Cook made no mention of fortified villages or of cultivated areas. He generally mentioned these features—e.g. (Wharton, 1893: 108–233). Naiterangi Maori, from Tauranga, carried out birding parties to the Alderman Islands but apparently these ceased before the policy of firing the coastal scrub was adopted (Sladden and Falla, 1927: 196).

Although cliff erosion is severe, active colonization of lesser slips on frequently very steep slopes is rapid. Whau (*Entelia arborescens*) on Middle Island and *Coprosma* spp. and rangiora (*Brachyglottis repanda*) on the other Alderman Islands, completely undisturbed by firing or by browsing animals, are able to reclaim slips rapidly, thus facilitating normal succession. This type of uninter-

rupted sequence does not take place on most of the other island groups or on the mainland due to fires, or the depredations of feral goats, pigs, deer, opossums, and wallabies, or from browsing by livestock (Cochrane, 1954b, 1957; Wodzicki, 1950). The Alderman Islands stand apart as a remnant of primaeval New Zealand.

Plant List

Comparative floristic lists are given for the four main islands of the Alderman Group. No indication is given as to the percentage frequency of each plant, the symbol "p" only indicating the presence of that species on the island. Nomenclature follows Allan (1961), except for Monocotyledons which are based on Cheeseman (1906).

Species	Ruamahua-nui	Ruamahua-iti	Hongiora	Middle Island
Filicales				
Pyrrosia serpens	p	p	—	p
Polypodium diversifolium	p	p	p	p
Pteridium aquilinum	p	p	p	p
Pteris comans	p	p	—	p
Asplenium lucidum	p	p	p	p
Asplenium flaccidum	—	—	—	p
Doodia media	p	p	—	p
Polystichum richardi	p	p	—	p
Ctenitis decomposita	p	p	?	p
Adiantum aethiopicum	p	p	—	p
Adiantum hispidulum	p	—	—	p
Adiantum cunninghamii	p	p	p	p
Cheilanthes seiberi	p	p	—	p
Pellaea rotundifolia	p	p	—	—
Graminae				
Oplismenus undulatifolius	p	p	p	—
Deyeuxia billardieri	p	p	p	—
Dichelachne crinata	p	p	p	p
Danthonia pilosa	p	p	p	—
Arundo conspicua	p	p	p	p
Poa anceps	p	p	p	—
Bromus arenarius	p	p	p	—
Agropyrum multiflorum	p	p	p	—
Cyperaceae				
Mariscus ustulatus	p	p	p	p
Scirpus cernuus	p	p	p	p
Scirpus nodosus	p	p	p	p
Carex lucida	p	p	p	p
Carex forsteri	—	—	—	p
Liliaceae				
Astelia banksii	p	p	p	p
Dianella intermedia	p	p	—	p
Phormium tenax	p	p	p	p
Arthropodium cirrhatum	p	p	p	p
Orchidaceae				
Thelymitra longifolia	p	p	p	—
Piperaceae				
Macropiper excelsum	p	p	—	p
Peperomia urvilleana	p	p	—	p
Ranunculaceae				
Ranunculus acaulis	p	p	—	—

Species	Ruamahua-nui	Ruamahua-iti	Hongiora	Middle Island
CRUCIFERAE				
Lepidium oleraceum	p	p	p	—
L. oleraceum var. *frondosum*	p	p	p	—
L. oleraceum var. *acutidentatum*	p	p	p	—
VIOLACEAE				
Melicytus ramiflorus	p	—	—	p
Hymenanthera novae-zelandiae	p	p	p	p
CRASSULACEAE				
Tillaea sieberiana	p	p	p	—
AIZOACEAE				
Disphyma australe	p	p	p	p
Tetragonia trigyna	p	p	p	p
CARYOPHYLLACEAE				
Spergularia marginata	p	p	p	p
POLYGONACEAE				
Muehlenbeckia complexa	p	p	p	—
CHENOPODIACEAE				
Rhagodia triandra	p	p	p	p
Salicornia australis	p	p	p	p
GERANIACEAE				
Geranium pilosum	p	p	—	—
OXALIDACEAE				
Oxalis corniculata	p	p	p	—
LINACEAE				
Linium monogynum	p	p	p	—
HALORAGACEAE				
Haloragis erecta	p	p	p	—
Haloragis procumbens	p	p	p	—
NYCTAGINACEAE				
Heimerliodendron brunonianum	—	—	—	p
THYMELACEAE				
Pimelia prostrata	p	p	—	—
P. prostrata var. *urvilleana*	p	p	?	—
CORIARIACEAE				
Coriaria arborea	p	p	?	p
PITTOSPORACEAE				
Pittosporum crassifolium	p	p	p	p
CURCUBITACEAE				
Sicyos angulata	p	p	—	—
MYRTACEAE				
Leptospermum scoparium	p	p	p	p
Metrosideros excelsa	p	p	p	p
ELAEOCARPACEAE				
Aristotelia serrata	p	p	—	p
TILIACEAE				
Entelea arborescens	p	—	—	—
EUPHORBIACEAE				
Euphorbia glauca	p	p	p	p
PAPILIONACEAE				
Carmichaelia williamsii	—	p	p	p

Species	Ruamahua-nui	Ruamahua-iti	Hongiora	Middle Island
MORACEAE				
Paratrophis banksii	p	p	—	p
CORYNOCARPACEAE				
Corynocarpus laevigata	—	—	—	p
RHAMNACEAE				
Pomaderris ericifolia	p	p	—	—
RUTACEAE				
Melicope ternata	p	p	—	p
ARALIACEAE				
Pseudopanax lessonii	p	p	—	p
UMBELLIFERAE				
Apium australe	p	p	—	p
SAPOTACEAE				
Planchonella novo-zelandica	p	—	—	p
LOGANIACEAE				
Geniostoma ligustrifolium	p	p	—	p
RUBIACEAE				
Coprosma robusta	p	p	p	p
Coprosma repens	p	p	—	p
Nertera dichondraefolia	p	—	—	p
COMPOSITAE				
Siegesbeckia orientalis	p	p	—	—
Lagenophora pumila	p	p	—	—
Olearia furfuracea	p	—	—	—
Gnaphalium involucratum	p	p	—	—
Erechtites arguta	p	p	—	—
Senecio lautus	p	p	—	—
Brachyglottis repanda	p	p	—	p
Sonchus oleraceus	p	p	—	—
PRIMULACEAE				
Samolus repens	p	p	p	—
CAMPANULACEAE				
Wahlenbergia gracilis	p	p	p	—
LOBELIACEAE				
Lobelia anceps	p	p	p	—
SOLANACEAE				
Solanum nigrum	p	p	—	—
Solanum aviculare	p	p	—	p
CONVOLVULACEAE				
Calystegia soldanella	p	p	p	p
Calystegia sepium	p	p	—	—
Dichondra repens	p	p	p	—
SCROPHULARIACEAE				
Hebe stricta var. *macroura*	p	p	p	p
Hebe stricta var. *stricta*	p	p	p	—
GESNERIACEAE				
Rhabdothamnus solandri	—	—	—	p
MYOPORACEAE				
Myoporum laetum	p	p	—	p

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