BOTANY OF SHOE ISLAND AND THE SLIPPER ISLAND GROUP – COROMANDEL PENINSULA

INTRODUCTION

Parts I – III of this paper are the results of observations and fieldwork carried out in the period 18 – 25th August 1973 during the Auckland University Field Club Scientific Camp at Shoe Island and the islands of the Slipper Group (Coromandel Peninsula – Auckland).

Hayward and Moore described these islands in this issue of Tane.

PART I: THE VEGETATION

by D.J. Court*

SUMMARY

The vegetation and flora of the islands varies according to their individual histories which includes, burning, clearing and introduction of rabbits. Penguin Is. and Rabbit Is. are equal in area, the former being grazed by rabbits with the latter free of herbivores. Regeneration after burning on Penguin Is. is therefore retarded but that on Rabbit Is. is good. Shoe Is. is also occupied by rabbits; nevertheless the present dense shrub cover should ensure that no severe effects will occur in the next decade. All these three islands are definitely worthy of preservation. Slipper Is., the largest of the group is farmed and indigenous vegetation remains only on the cliffs.

VEGETATION

A. Slipper Island Group

Penguin Island:

This small island is of interest as rabbits *(Oryctolagus cuniculus)* are present and the vegetation at ground level is modified but not necessarily for the worse. A pohutukawa *(Metrosideros excelsa)* canopy covers the island except on the north-eastern aspect where there is a rabbit maintained native grass pasture and of the south-western end where three small canopy gaps have enabled bracken *(Pteridium aquilinum* var. *esculentum)* to become established (Fig.1).

The vegetation appears similar to that drawn in 1954 by Cochrane[5] during a survey of the Slipper Island Group. Rabbits are present in good numbers (three were sighted and another trapped) but are almost certainly in balance with the food supply.

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Rabbit burrows are almost indistinguishable from those of the grey-faced petrels *(Pterodroma macroptera)* and some mixed usage may occur. It is likely that rabbits and petrels would be aggressive towards each other although no confrontations were observed.

Plant species sustaining visible rabbit damage and those plants apparently unpalatable are listed in Table I.

The whole island has been burnt at some time but most of the area has regenerated to pohutukawa 10m. in height. Before or soon after the last fire, rabbits may have been introduced so that the north-east pasture has resulted

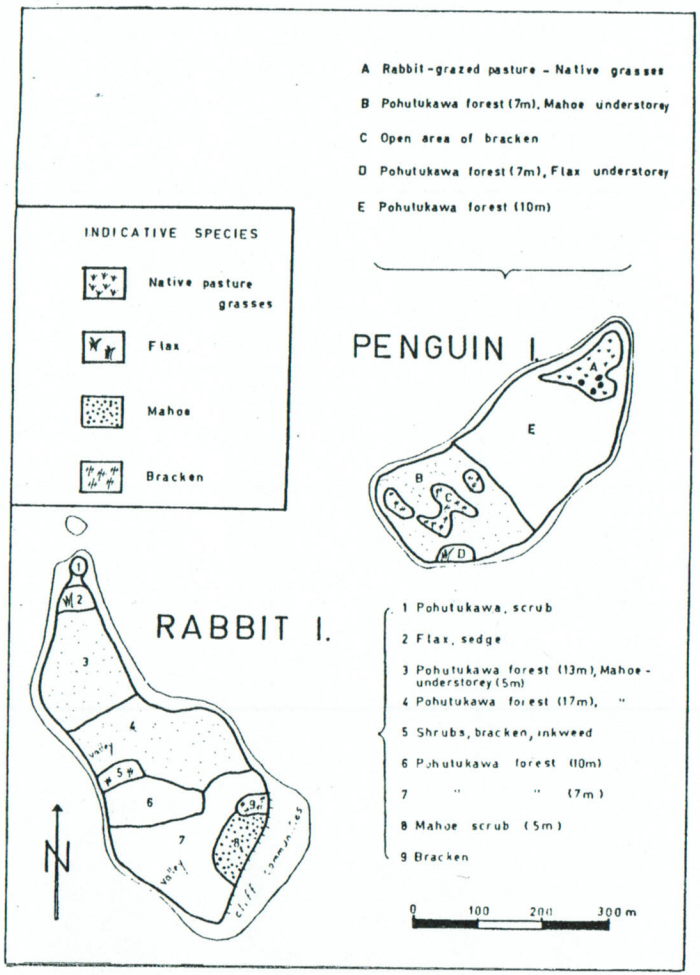

Fig. 1. Plant communities on Penguin and Rabbit Islands.

from the elimination of tree seedling regeneration by the rabbits. An expected result of the recent clearing or fire at the south west end would be maintenance of the area as pasture; instead, there is tall bracken, and mahoe *(Melicytus ramiflorus)* seedlings surrounding these areas.

Table 1: Plants palatable and unpalatable to rabbits on Penguin Island

Palatable	Unpalatable
Adventive grasses	*Cheilanthes sieberi*
Coprosma repens	*Cyathodes fraseri*
Carex inversa	*Euphorbia peplus*
C. testacea	*Oxalis* sp.
Doodia media	*Picris echioides*
Galinsoga sp.	
Lachnagrostis filiformis	
Melicytus ramiflorus	
Morelotia affinis	

Core samples were taken from the few surrounding trees of mahoe for obtaining their age from the annual rings. Unfortunately no rings were visible and steady year-round growth appears to be occurring. Little has changed in the six years since the 1967 Wildlife report. This island is certainly worthy of preservation (for the nesting petrel population) and further, the presence of rabbits does not detract from the interest of the plant covering; under the pohutukawa forest grow large numbers of the uncommon fern-ally, *Psilotum nudum.* The removal of rabbits, though feasible, might not be desirable as the development of an understorey of *Coprosma* and mahoe could shade out the *Psilotum* on the presently open forest floor. Similarly, the interesting fern *Cheilanthes sieberi* growing on the pasture area, would be lost. (It is fairly certain that an understorey would develop on rabbit removal. A 20 m. wide transect from the north-east to the south-west extremities of the island included 314 *Coprosma repens* seedlings less than 20 cm. high, yet only two plants larger than this were present).

Rabbit Island:

No sign of rabbits was found on the island. Forest vegetation is composed of mahoe, pohutukawa and mixed pohutukawa/mahoe communities; the only open area is a small patch of bracken on the northern-most point. Fig. 1.

The absence of rabbits and a different firing history have allowed the development of a very different vegetation to that on Penguin Island. The forest possesses a dense subcanopy of mahoe under which tree seedlings regeneration occurs rarely. The presence of tawapou *(Planchonella novo-zelandica)* reported in 1967 was confirmed and several seedlings of this species were found. Remnant, senescent manuka *(Leptospermum scoparium)* and *Cyathodes fasciculata* in the midst of the mahoe indicates the transition from scrub to forest. The diversity of forest communities seems to have been caused by an uneven onset of regeneration, i.e. staggered regeneration from area to area due to repeated or

later firing in some areas. This may be supported by a typical example; 17m. high pohutukawa abutted directly onto a sector of dense 5m. high mahoe. The vegetation appears to be in a state similar to that on Ruamahua-iti Is. of the Alderman Group.[6] Regeneration of the following species was noted: *Coprosma robusta, Macropiper excelsum, Planchonella nove-zelandica, Melicytus ramiflorus* and *Pseudopanax arboreus.*

When the depleted seed source is considered, regeneration could be classed as good. Rabbit Is. is a good example of a relatively unspoiled plant community and the comparison of Rabbit Is. (with no rabbits) with Penguin Is. (with rabbits) is of particular interest.

Slipper Island (Whakahau):

In contrast to the other islands, Slipper has been farmed for many years. Cochrane[5] gives a good description of the geography and vegetation and no great changes have since occurred. The dwarfed manuka covering some of the western slopes is now in poor condition and is being opened up by cattle. No manuka regeneration of significance is present and nearly all the island is in pasture.

The very steep cliffs preserve an intact cliff community dominated by pohutukawa. The only other vegetation remaining from the original coastal forest includes several senescent and exposed specimens of rewa rewa *(Knightia excelsa),* pohutukawa and mahoe. A red-crowned parakeet *(Cyanoramphus novaezelandiae)* eating mahoe seeds was observed on the ground for over half an hour. It scratched away leaves to expose the small shiny black seeds embedded in the earth.

B. Shoe Island. (Motuhoa Poka Ra).

The whole island has been burnt save for isolated trees (e.g. *Cordyline australis* and rewa rewa) and the single valley of coastal forest. The fires were probably lit by muttonbirders to improve access over the island. A remarkably dense scrub has resulted (despite the presence of rabbits) which includes several communities. (Fig. 2).

Many signs of rabbits were found but no dramatic or obvious effects of the browsing were noted (Table 2). Although the island is well covered in woody vegetation these animals could be significantly affecting the long term regeneration of coastal forest.

Table 2: Plants palatable to rabbits on Shoe Island

Acianthus fornicatus var. *sinclairii*
Coprosma
Carex sp.
Coprosma robusta
Doodia media
Geniostoma ligustrifolium
Hebe stricta var. *macroura*
Pterostylis trullifolia
Thelymitra sp.

Shore and cliff vegetation. An apparently intact but sparse vegetation grows around this exposed and steep sided island. The species include most of those already listed for islands of the Auckland province in past issues of TANE.

Mixed scrub (2-3 m.) Covering 70% of the area of the island, this scrub makes access extremely difficult. Densely interwoven manuka, bracken *Phormium tenax,* hangehange *(Geniostoma ligustrifolium)* and mingimingi *(Cyathodes fasciculata)* shade a thick carpet of ground lichens and herbs.

Pohutukawa light forest (7 m.) In this community the trees are tall enough to have formed a canopy an a distinctive ground cover (the ferns *Asplenium*

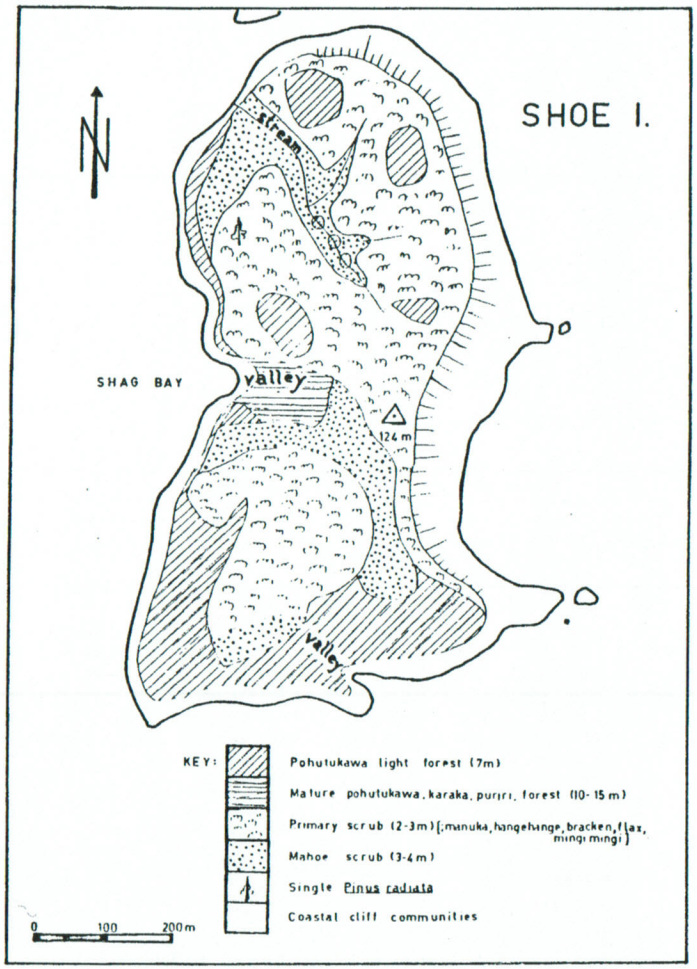

Fig. 2. Plant communities on Shoe Island.

lucidum, Pyrrosia serpens and the herbs *Haloragis* sp. and *Astelia banksii).*

Mahoe scrub (3-4m.) Almost a dwarf forest, the scrub covers extensive areas in the larger valleys. A superabundant *Asplenium lucidum* ground cover is present, but few other smaller plants can grow, due to smothering by the heavy leaf fall from the mahoe.

Tall coastal forest (15m.) Tall forest survives only in a single valley adjacent to Shag Bay. The species and size of plant present may indicate the nature of the original coastal forest. Large specimens of pohutukawa, karaka *(Corynocarpus laevigata)* and a single puriri *(Vitex lucens)* were the only sizeable trees remaining. The combination of few seed trees and the browsing of rabbits would explain the lack of tree seedlings (including the tawapou, *Planchonella novo-zelandica*) save for a few karaka seedlings.

Young pohutukawas are scattered throughout the scrub and indicate a degree of forest regeneration. Possibly at least a further twenty years will be required for the thinning out of the scrub cover under a tree canopy. The rate of forest regeneration is and will be dependent upon:

(a) Size of seed source (at present reduced).
(b) Effect of rabbits upon seedling establishment.

The small, though significant number of rabbits may in fact be 'maintaining' the scrub in its present condition by allowing few seedlings of large tree species to survive.

VASCULAR FLORA

The nomenclature of the plants listed, excepting grasses, follows Allan,[12] Clapham, *et al.,*[4] Healy[9] and Moore and Edgar.[11] Names of grasses follow Cheeseman[3] and Zotov.[13]

The flora listed for Slipper Island is incomplete. Few of the many introduced species were collected but an attempt has been made to note all native species remaining. All the adventive species found on the other three islands are noted. The fern flora is fully described in Part II by Wright,[12] and the lichens studied in Part III by Hayward and Hayward.[7]

Number of species inclusive of all islands = 165

†Account must be taken of the many adventives not recorded from Slipper Island.

KEY FOR SPECIES LIST:
SH : Shoe Island
SL : Slipper Island
PE : Penguin Island
RA : Rabbit Island
* : Adventive species

SPECIES	COMMON NAME	Island			
		SH	SL	PE	RA
Trees and Shrubs (38)					
Brachygkittus repanda	Rangiora	+	+		+
Carmichaelia sp.	N.Z. Broom		+		
Cassinia retorta		+	+	+	
Coprosma repens	Taupata	+	+	+	+
C. robusta		+	+		+
Cordyline australis	Cabbage Tree	+	+		+
Coriaria arborea	Tutu	+		+	
Coryynocarpus laevigata	Karaka	+			
Cyathodes fasciculata	Mingi mingi	+		+	+
Dodonea viscosa	Akeake	+			
Dysoxylum spectabile	Kohekohe	+			
Erica lusitanica *	Heather	+			
Entelea arborescens	Whau		+		
Geniostoma ligustrifolium	Hange hange	+	+	+	+
Hebe stricta var. *macroura*		+	+		+
Hymenanthera novaezelandiae			+	+	+
Knightia excelsa	Rewa rewa	+	+		
Leptospermum ericoides	Kanuka	+	+		
L. scoparium	Manuka	+	+		+
Macropiper excelsum	Kawakawa	+		+	+
Melicope ternata		+			
Melicytus ramiflorus	Mahoe	+	+	+	+
Metrosideros excelsa	Pohutukawa	+	+	+	+
Myoporum laetum	Ngaio		+		
Myrsine australis	Mapou	+		+	
Phormium tenax	N.Z. Flax	+	+	+	+
Pinus radiata *	Radiata pine	+	+		
P. pinaster *			+		
Pittosporum crassifolium	Karo		+		+
Planchonella novo-zelandica	Tawapou	+			+
Pomaderris phylicifolia var. *ericifolia*		+	+	+	
P. prunifolia var. *edgerlyi x P. rugosa*		+			
P. rugosa (erect and prostrate)			+	+	+
Pseudopanax arboreus					+
P. lessonii	Houpara	+	+		+
Rhabdothamnus solandri	Waiu-atua	+			
Solanum aviculare	Poroporo	+	+	+	+
Vitex lucens	Puriri	+			
Lianes (6)					
Clematis paniculata		+	+	+	
Metrosideros perforata	Rata		+		
Muehlenbeckia complexa	Pohuehue	+	+	+	+
Rubus fruticosus agg.*	Blackberry	+			
Sicyos angulata		+			
Tetragonia trigyna	Climbing N.Z. spinach.		+		+

		SH	SL	PE	RA
Grasses (9)					
Cortaderia toetoe	Toetoe	+			
C. sp.			+	+	
Glyceria sp. *	Floating Sweet Grass		+		
Holcus lanatus *	Yorkshire fog	+			
Lachnagrostis filiformis agg.				+	+
Oplismenus imbecillus		+	+	+	+
Paspalum sp. *			+		+
Stipa teretifolia			+		
Poa anceps		+		+	
Other herbaceous monocots (26)					
Acianthus fornicatus var. *sinclairii*		+			
Arthropodium cirratum	Renga lily	+	+	+	
Astelia banksii	Wharawhara	+			
A. solandri					+
A sp.			+		
Carex inversa				+	
C. testacea				+	
C. sp.		+	+		
Collospermum hastatum	Kahakaha				+
Cordyline banksii			+		
C. pumilio		+			
Cyperus ustulatus			+	+	
Dendrobium cunninghamii		+			
Dianella nigra		+	+		
Juncus gregifloris			+		
*J. microcephalus**			+		
Lepidosperma laterale					+
Luzula banksiana			+		
Morelotia affinis		+		+	
Potamogeton cheesemanii			+		
Pterostylis trullifolia		+			
Scirpus cernuus		+	+		
S. nodosus		+		+	+
Thelymitra sp.		+			
Typha orientalis	Raupo		+		
Zostera capricorni	Sea grass	+	+		
Small composites (10)					
Cirsium vulgare *	Scotch thistle	+			+
Cotula australis	Bachelors buttons			+	
Cotula coronopifolia			+		
Erigeron floribundus *	Fleabane	+	+		+
Gnaphalium collinum		+	+	+	
G. sp. *		+			+
Hypochoeris radicata *	Catsear	+	+	+	+
Picris echioides *	Oxtongue	+		+	
Senecio lautus		+	+	+	+
Sonchus oleraceus *	Sow thistle	+	+	+	+

Other herbaceous dicots (38)		SL	SH	PE	RA
Acaena anserinifolia			+	+	+
Anagallis arvensis *		+		+	+
Apium australe	N.Z. celery		+	+	+
Brassica oleracea *	Wild cabbage		+		
Centella uniflora			+		
Cyathodes fraseri		+	+	+	+
Dichondra repens	Mercury Bay Weed	+	+	+	+
Disphyma australe	N.Z. Ice Plant	+	+	+	+
Drosera auriculata	Sun dew	+	+	+	
Euphorbia glauca			+		
E. peplus *	Milkweed	+	+	+	+
Galinsoga sp. *				+	
Geranium homeanum		+		+	+
Haloragis erecta		+	+		
H. micranthus			+		
H. procumbens		+		+	
Hydrocotyle americana		+			
H. microphylla		+			
Linum monogynum	N.Z. Linen Flax		+		
Lobelia anceps	Shore lobelia	+	+	+	
Ludwigia palustris *	Water purslane		+		
Medicago arabica *	Spotted Bur Medick		+		
M. lupulina *	Black Medick		+		
Modiola caroliniana *			+		
Myriophyllum elatinoides			+		
Nicotiana tabaccum *	Wild Tobacco	+			
Oxalis sp.		+	+	+	
Pelargonium inodorum			+		
Peperomia urvilleana		+	+	+	
Pimelea prostrata	Native daphne	+	+		
Polycarpon tetraphyllum *			+		
Polygonum ? persicaria *	Willow weed		+		
Phytolacca octandra *	Inkweed	+	+	+	+
Ranunculus hirtus		+			
Rumex acetosella *	Sorrel		+		
Salicornia australis	Glasswort	+	+	+	+
Samolus repens	Sea primrose			+	+
Scleranthus biflorus			+		
Solanum nigrum *	Black nightshade	+	+		+
Total adventives		14	18†	7	10
Total indigenous		65	64	42	36
Total ferns (See Part II)		28	23	20	9
TOTAL SPECIES		107	105	69	55

ACKNOWLEDGEMENTS

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Note added in proof: The animals on Shoe Island may prove to be hares, not rabbits! (No specimens were seen during August 1973 and more-recent visitors to the island claim to have observed a hare-like animal. This does not affect our Penguin Island identification.)