Vegetation of Swamp Pockets near Plimmerton

C. Ogle, Pukerua Bay

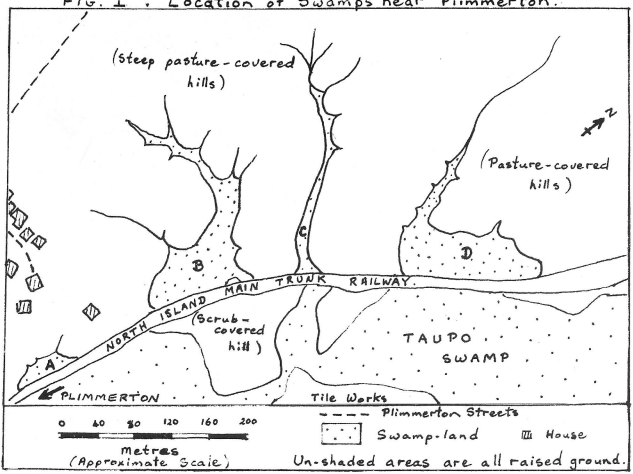
The rural landscape between Pukerua Bay and Plimmerton with its patches of indigenous vegetation is familiar to many travellers on road and rail to and from Wellington. Most striking of the plant associations is no doubt the Taupo Swamp, occupying much of the valley between the North Island Main Trunk Railway and State Highway 1. This area is currently (late 1977) the subject of a study by an extension studies group from Victoria University of Wellington.

The original construction of both highway and railway isolated smaller "pockets" of this swamp to the east and west respectively. When the Porirua City Corporation published a "Proposed District Scheme" for the Plimmerton area early in 1976, and on it designated both the Taupo Swamp and one of the swamp pockets as "proposed scientific reserves", my own literally passing acquaintance with this latter area from the windows of commuter trains was soon transformed into a ground reconnaisance. The City Corporation had no information on the vegetation of this pocket, and the area was not included in N. T. Moar's 1949 survey of the Taupo Swamp. The visual impression from the railway embankment was of less flax and more fine sedges than anything seen in the Taupo Swamp. A few paces forward, and a reason for the differences was evident: much of the vegetation is a floating mass of interlacing rhizomes and roots. This either gives a shaky support to the visitor, in a few centimetres of water, or gives way to immerse him in a metre or more of surprisingly clear water.

The railway, constructed in 1885 and widened to two tracks in 1940 (Hoy, 1970), seems to have restricted catchments lying to the west to different degrees. Fig. 1 shows the first four catchments encountered as one proceeds north from Plimmerton. Areas designated A, B, and D are impounded by the railway embankment, although "Swamp A" is a very small pocket of raupo *(Typha)* swamp almost over-topped by surrounding kanuka trees *(Leptospermum ericoides)*. Swamps "B" and "D", centred respectively on grid references 418475 and 422477 (N.Z.M.S.I:N.160) are the subject of this article and occupy perhaps 0.8 hectare each. Swamp "C" is not impounded and is little more than a narrow ribbon of flax *(Phormium tenax)* along the floor of a V-shaped valley which cattle from the surrounding pastureland have entered and modified by chewing and trampling.

It will be seen from the species list for indigenous plants that swamps "B" and "D" are relatively similar floristically, and have a considerable diversity of species of which at least eleven must be regarded as rare in the Wellington region. This leads to the conclusion that the railway embankment has maintained pre-existing com-

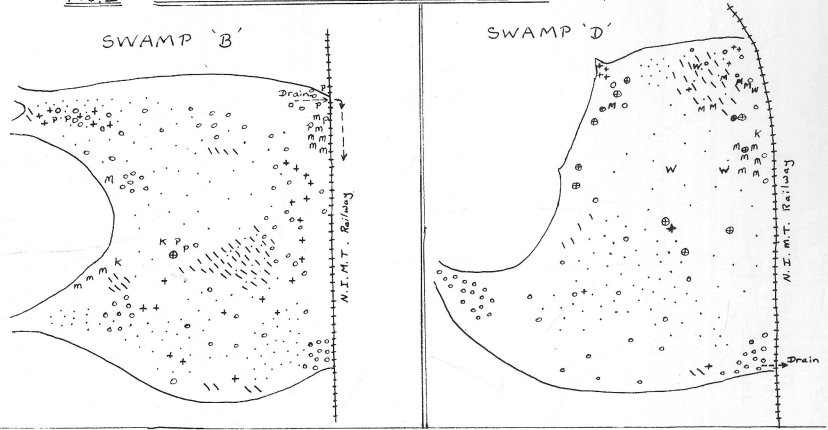
FIG. I. Location of Swamps near Plimmerton.



munities containing most or all of these species, rather than creating new habitats which the plants occupied from other sources. Only two of the plants with few or no recent records in the Wellington region are now known in the main Taupo Swamp, and both these in very small quantities. These are *Epilobium pallidiflorum* and *Ranunculus macropus*. The other nine uncommon plants are *Carex diandra, C. maorica, Epilobium chionanthum, Galium trilobum, Gratiola sexdentata, Hydrocotyle pterocarpa, Lachnagrostris filiformis, Polygonum* sp., and *Sparganium subglobosum*. Of these, only *Gratiola* and *Polygonum* are at all uncommon in the two swamp pockets.

Early records of such plants in the Wellington region may indicate possible wider distributions in unmodified swamps. Miss N. Adams of the National Museum informed me that Thomas Kirk spent his last years in Plimmerton, which prompted a search of his collection at the Museum. Unfortunately Kirk does not seem to have been an active collector from 1895-97, and only three Plimmerton specimens for this period could be located, none of them swamp plants. (For the record, they were *Carmichaelia hookeri* (1897), *Deyeuxia billardieri* (1895), and *Epilobium* sp. (1896), annotated by Raven (1976) as *E. billardierianum* subsp. *cinereum*.) There are early

FIG. II VEGETATION MAPS OF SWAMPS "B" and "D": (See Fig. I) Drawn Jan. 1976



KEY: Generalised Distributions
(sketched from vantage points on adjacent hills – not accurately mapped.)

- Baumea rubiginosa
- Cortaderia toetoe (Toi-toi)
- Phormium tenax (Flax)
- Typha orientalis (Raupo)

Individual Plants
(Mapped on ground survey)

- Coprosma tenuicaulis
- K Leptospermum ericoides (Kanuka)
- M L. scoparium (Manuka)
- P Pseudopanax arboreus (5-finger)
- W Willow (Salix sp or spp.)

collections in the National Museum for four of the eleven species by other collectors in the Wellington area. These are as follows:

Carex maorica: Wainuiomata; Mungaroa.
Epilobium chionanthum: Pencarrow Lagoon; Paraparaumu.
Sparganium subglobosum: Paraparaumu (Aston, 1912). (This species was also seen at L. Papaitonga near Levin on a Botanical Society trip in 1975.)
Ranunculus macropus: Lyall Bay; Evans Bay; L. Pencarrow.

Other herbaria have not been consulted, but Raven and Raven (1976) report *Epilobium chionanthum* and *E. pallidiflorum* in the Botany Division Herbarium, both collected from Gollan's Valley. My first collection of *Carex diandra* was identified by Botany Division as a hybrid with *C. secta,* but more typical *C. diandra* was collected subsequently. This hybrid and its parents were described by Edgar in 1964. All other collections indicated on the species list have been lodged at the National Museum Herbarium.

The preceding uncommon plants are probably highly specialised for high light intensities and an almost aquatic habitat. Their continued presence may be due to the relative paucity of flax, which dominates much other local wetland. The only exotic plant at all plentiful is *Juncus articulatus,* although four shrubby willows seen in swamp D may be the start of marked changes in the character of the swamp. Flax growth here may be limited by low oxygen levels in the still water, as stated by Cockayne (1967). Its distribution, as shown in Fig. 2, tends to support this, as it is most robust and plentiful on sloping inflow parts of the swamps, areas of silting where inflowing streams lose velocity, and shallower marginal sites. That small changes in the physical conditions could easily result in the loss of the less common plants was exemplified by silting early in 1976 from a slip and several new house sections high above "Swamp B" to the west. This silt spread as a muddy delta into the upper end and permitted cattle to wade in, where they ate or trampled the vegetation over an area of about 200m^2.

This churned mud is now occupied by *Juncus articulatus, J. effusus,* and *Carex secta.* As the bare earth of the house sections stabilised, silting diminished, and the rest of the swamp has a reprieve. The very fine nature of the loess soil (Stevens, 1974) underlying the pasture of the surrounding hills makes such damage inevitable should soil disturbance occur anywhere within the catchments of the swamps.

These two swamps contain unique assemblages of species, maintained by a critical balance of physical factors. It may not be too much to hope that with a full study of the processes involved a management programme could be devised to retard the effects of natural and man-made factors leading to succession. This would obviously include controls on water level and silting, and perhaps removal of willows.

Since these swamp pockets owe their continued existence to man's fortuitous "interference" — railway construction — surely with greater knowledge we can at least do as well for their future?

INDIGENOUS PLANTS OF SWAMP POCKETS "B" AND "D"

x = present in swamp
m = present only on margins
v = voucher deposited in National Museum

DICOTYLEDONS	Swamp B	Swamp D	Voucher Collected
Acaena sp. (? *A. novae-zelandiae*)	x	x	
Cardamine sp. (C. "narrow-petal" of Pritchard 1957)		x	
Cassinia leptophylla		m	
Centella uniflora	x		
Coprosma propinqua var.	m	m	
C. rhamnoides	m	m	
C. robusta	x	x	
C. tenuicaulis	x	x	v
Epilobium chionanthum	x	x	v
E. insulare		x	
E. pallidiflorum	x	x	v
Galium trilobum	x	x	v
Geranium microphyllum		m	
Gnaphalium gymnocephalum		x	
G. involucratum	x	x	
G. sp. (*G. luteo-album* agg.)		m	
Gratiola sexdentata	x		v
Hebe stricta var. *atkinsonii*			
Hydrocotyle pterocarpa	x	x	v
Leptospermum ericoides	x	m	
L. scoparium	x	x	
Melicytus ramiflorus	m		
Metrosideros perforata	m	m	
Muehlenbeckia complexa	x	x	
M. australis × *M. complexa*		x	
Nertera setulosa	m	m	
Olearia solandri	x		
*Pittosporum crassifolium**	x		
P. tenuifolium var. *tenuifolium*	m		
Polygonum sp. (un-named; *P. decipiens* in Allan, 1961)		x	v
Pseudopanax arboreus	x		
Ranunculus hirtus	x		
R. macropus	x	x	v
Senecio glomeratus		x	v
S. quadridentatus		x	v
Wahlenbergia marginata	m	m	
SEDGES			
Baumea rubiginosa	x	x	v
Carex diandra	x	x	v
C. geminata	x	x	
C. flagellifera		m	
C. lessoniana	x	x	
C. maorica	x	x	v
C. secta var. *secta*	x	x	
C. virgata	x	x	
C. diandra × *C. secta*	x		
Cyperus ustulatus	x	x	
Eleocharis acuta	x	x	
Gahnia xanthocarpa	x		
Scirpus prolifer	x	x	

	Swamp B	Swamp D	Voucher Collected
RUSHES			
Juncus australis	m		
J. caespiticius	x		
J. gregiflorus	m	m	
J. planifolius	x	x	
J. sarophorus	m	x	
GRASSES			
Cortaderia toetoe	x	x	
Lachnagrostis filiformis (sens. str.)	x		
Poa anceps	m		
OTHER MONOCOTYLEDONS			
Lemna minor	x	x	
Phormium tenax	x	x	
Sparganium subglobosum	x	x	v
Thelymitra longifolia	x	x	
Typha orientalis	x	x	
FERNS			
Blechnum sp. (*B. capense* agg. — swamp species)	x	x	
Cyathea dealbata		m	
Histiopteris incisa	m	x	
Hypolepis sp.	m		
Paesia scaberula	m	x	
Pellaea rotundifolia		m	
Polystichum richardii		m	
Pteridium aquilinum var. *esculentum*	m	x	

* Presumed adventive from a local garden — commonly used as a hedge plant in Plimmerton.

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REFERENCES

COCKAYNE, L. 1967: *N. Z. Plants and Their Story,* 4th edition, Government Printer, P. 160.

EDGAR, E. 1964: The natural sterile hybrid, *Carex diandra X secta. N.Z.J1 Bot. 2:* 279-385.

HOY, D. G. 1970: *Rails Out of the Capital.* N.Z. Railway and Locomotive Society, Wellington Branch Inc. Pp. 70, 93.

MOAR, N. T. 1949: *A Study of Some Mires in the South West Wellington Province.* Wellington, Victoria University, (unpublished M.Sc. thesis).

PRITCHARD G. G. 1957: Experimental taxonomic studies on species of *Cardamine* Linn. in New Zealand. *Trans. R. Soc. N.Z.* 85: 75-89.

RAVEN, P. H. & T. E. 1976: *The Genus Epilobium in Australasia,* N.Z. D.S.I.R. Bulletin 216. P. 98, 152.

STEVENS, G. R. 1974: *Rugged Landscape: the Geology of Central New Zealand.* A. H. and A. W. Reed, Wellington. P. 178.