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Preliminary Survey of the Vegetation near New Harbour, South-West Tasmania

By

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PLATES I-IV

Little has been written about the plant ecology of Tasmania, even from the purely descriptive viewpoint, and the south-west parts of the island, accessible only with difficulty, have been almost entirely neglected in the matter of vegetational studies. The paucity of existing information will, it is hoped, excuse the publication of the present rather meagre details of this interesting region.

The area studied (Text fig. 1) extends from Cox's Bight and New Harbour, bays near the western end of the south coast of Tasmania, northward to the head of Bathurst Channel and its extension Melaleuca Creek, which comprise the south-eastern arm of Port Davey, the large harbour on the southern part of the West Coast. Studies were also made of the vegetation near the mouth of Bathurst Channel, on its north side (Bramble Cove, Roaring Beach, and the slopes of Mt. Berry). For comparison, other comparable districts of Tasmania (Central Plateau, Central West Coast) were cursorily examined at other times.

The details given in this paper were recorded during two short visits, in January, 1937, and February, 1938. Although no record has been taken of the appearance of the vegetation at other seasons, the months of January and February happen to be beneficial for the recording of floristics, as most plants are conspicuous at this season, nearly all being in flower.

No exact records of the climate of the New Harbour district are available, but general data indicate that the district possesses at and near sea-level a climate which would be regarded elsewhere in Australia as a high mountain climate, representing a combination of extreme cold and high rainfall, the latter being estimated to be of the order of 100 inches per annum. The prevailing cold south-westerly winds are probably effective in conditioning vegetational distribution, and the high excess of precipitation over evaporation favours the development of swamps.

Three formations occur in the district, viz., temperate rain-forest, wet sclerophyll forest, and high moor (*Gymnoschoenus sphaerocephalus* community),

of which the last-named is by far the most important as regards total area covered. Climatically and edaphically, the area presents an environment transitional between that required for sclerophyll forest and that for high moor; the inter-relationship of these formations, and of the post-climax rain forest, renders the district extremely interesting, although it makes difficult and even arbitrary any classification in terms of the climax.

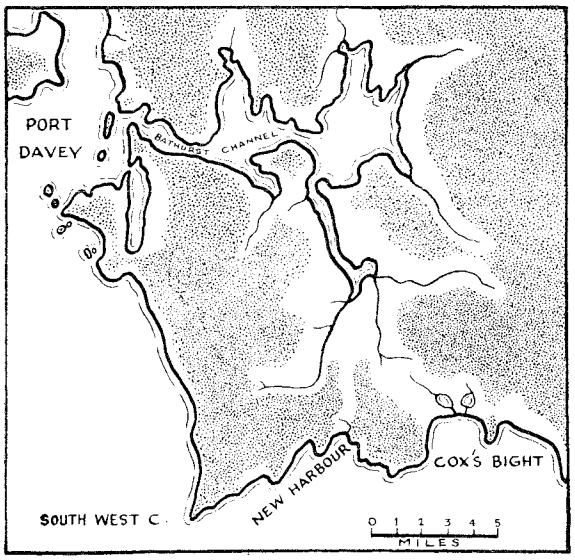

FIGURE 1.—Sketch-map of the New Harbour District. Stippling indicates approximately the distribution of high land.

THE GYMNOSCHOENUS SPHAEROCEPHALUS COMMUNITY

The community recognized under this name (Davis, 1941) in New South Wales, where it occurs as rather localized moors on the uplands of the South Coast, reaches its full development in Tasmania, where it is known generally by the appropriate name, 'Button-Grass Plains'. It covers a greater area in Tasmania than any other single plant community, and is particularly well developed in the New Harbour district and throughout South-West Tasmania generally.

The community covers practically the whole of the flat area between the head of Bathurst Channel on the one hand and Cox's Bight and New Harbour on the other. It also extends from the flats up the sides of the surrounding hills, until the tops or upper slopes, which are devoid of vegetation, are reached. On the western slopes (with easterly aspect), the community is much interrupted by forest. Almost the entire area investigated between Bramble Cove and Roaring Beach is also covered by the *Gymnoschoenus sphaerocephalus* community.

In facies and floristic content, the communities near New Harbour seem to be typical of those elsewhere in Tasmania, e.g., the more localized patches near Lake St. Clair on the Central Plateau (at 2500 feet approximately); in the least disturbed parts of the Queenstown district; along the Pieman River; and around Strahan, where, however, some of the expressions are rather atypical, with more shrubs. In all these cases, the community is much richer floristically than in its expressions in New South Wales.

The dominant, *Gymnoschoenus sphaerocephalus* (R.Br.) Hook.f. (Plate III, fig. 1), is a tussocky hemicryptophyte, reaching 2-4 feet in height in the New Harbour area. The community is predominantly chamaephytic, hemicryptophytic, and cryptophytic, the cryptophytes being referred to the helophyte class in view of the usually wet nature of the soil. On the upper slopes of the hills, *Gymnoschoenus* becomes less prominent in the shallower soil, and other sedges such as *Elynanthus capillaceus* tend to displace it as dominant. The shrub element is not prominent, although even in the most typical parts of the community species technically classed as nanophanerophytes are present; many of these, however, are slender and weak in growth, and in some cases are classed as nanophanerophytes although a good proportion of the specimens of the species just fail to reach the required height. In the drier parts of the community, woody shrubs increase in abundance.

The floristics of the community, as recorded at New Harbour and in the surrounding district, are as follows (1):

Nanophanerophytes:

Common: *Boronia pilosa, Baeckea leptocaulis, Epacris obtusifolia, Sprengelia incarnata, Euphrasia Brownii.*

Occasional: *Casuarina distyla, Agastachys odorata* (2), *Hakea epiglottis* (2), *Boronia pinnata* (2), *Leptospermum myrtifolium* Sieb. (3), *Melaleuca squamea* (3), *M. squarrosa* (3), *Epacris impressa* (3).

Rare: *Cenarrhenes nitida* (2), *Lomatia polymorpha* (2), *Dillwynia cinerascens* (2), *D. ericifolia* (2), *Pultenaea subumbellata.*

Chamaephytes:

Common: *Drosera binata, Bauera rubioides* (3), *Azorella saxifraga, Utricularia dichotoma, U. lateriflora, Helichrysum pumilum.*

Occasional: *Drosera Arcturi, Sphaerolobium vimineum, Mitrasacme montana, Stylidium graminifolium.*

Rare: *Cassytha glabella* (4), *Pultenaea Gunnii, Comesperma defoliatum, Ampera spartioides* (2), *Coprosma ? repens.*

Hemicryptophytes:

Common: *Elynanthus capillaceus, Gymnoschoenus sphaerocephalus* (R.Br.) Hook.f., *Hypolaena lateriflora, Restio tetraphyllus, Xyris gracilis.*

Occasional: *Restio oligocephalus, Blandfordia marginata, Haemodorum distichophyllum, Campynema lineare, Hewardia tasmanica, Patersonia glauca.*

Rare: *Poa caespitosa* (2), *Schoenus nitens, Diplarrhena latifolia, D. moraea.*

Helophytes:

Common: *Lycopodium densum, Leptocarpus tenax.*

Occasional: *Lycopodium laterale, Cryptostylis longifolia.*

Rare: *Lycopodium diffusum* R.Br., *Prasophyllum brachystachyum, P. fuscum, P. patens, Pterostylis ? parviflora, Thelymitra aristata, T. venosa.*

In addition to these vascular plants, species of *Sphagnum* are locally common in the wetter parts of the community.

(1) Names used are those given by Rodway (1903) in the Tasmanian Flora. Where names not adopted in this work are used, authors' names are appended.

(2) Drier parts of community only.

(3) Chiefly in the neighbourhood of running water.

(4) Low-growing rooted hemiparasite.

For the 59 species of vascular plants listed, the life-forms are in the proportions: N 31, Ch 25, H 25, HH 19. Omitting species not quite characteristic (chiefly shrubs, most of which are restricted to dry places), the 45 remaining species give: N 16, Ch 29, H 31, HH 24. Even this does not adequately represent the facies and life-form characteristics of the community, as the nanophanerophytes are nearly all tending towards the chamaephyte class, and the cryptophytic species are mostly rare.

Properties of a few soil samples from this community are given in Table 1 (*). Factors influencing the distribution of this community, and in particular those inhibiting forest development, are discussed in a later section.

Sclerophyll Forest, Psammoseres, and Shrub Subclimax

The sample of Eucalyptus forest (wet sclerophyll forest) studied most fully was that behind New Harbour beach. This is interpreted as the culmination of a psammosere, the stages of which are accordingly first dealt with.

Festuca litoralis Stage: Beyond the limit of wave action, the sand of New Harbour beach is clothed over a narrow zone with an almost pure stand of *Festuca litoralis*. The same species, together with *Carex pumila*, occurs in a comparable situation at Cox's Bight. In both places, plants of *Scirpus nodosus* occur occasionally in this zone, while *Poa caespitosa* occurs rather rarely at New Harbour. All these may be classed as hemicryptophytes. Soil properties for a sample from this community are listed in Table 1.

This stage is scarcely represented at Roaring Beach, where the dune, beyond the limit of wave action, rises steeply, and is covered with shrubs. This is a common configuration on West Tasmanian beaches, e.g., near the mouth of the Henty River. The few situations at Roaring Beach where vegetation is developed at a level lower than the shrubs carry the chamaephyte *Mesembryanthemum aequilaterale*, or occasionally, in small sand accumulations, the following species:

Chamaephytes: *Scirpus cartilagineus* (incl. var. *propinquus*), *Salicornia australis*, *Plantago Brownii*, *Cotula filicula*.

Hemicryptophytes: *Schoenus nitens*, *Oxalis corniculata*.

Shrub Dune: At New Harbour, the community noted above passes into a zone containing rather widely scattered shrubs, the following being the floristic composition:

Nanophanerophytes:
Common: *Leucopogon Richei*, *Ozothamnus cinereus*.
Occasional: *Correa Laurenciana*.
Rare: *Hakea epiglottis*, *Persoonia juniperina*, *Leptospermum lanigerum*, *Ozothamnus scutellifolius*, *Senecio dryadeus* Sieb., *S. lautus*.

Chamaephytes:
Common: *Acaena sanguisorbae*.
Occasional: *Colobanthus Billardieri*, *Epilobium confertifolium H.*, *E. junceum*, *Mentha serpyllifolia*.
Rare: *Ampera spartioides*, *Stackhousia linariifolia*, *Helichrysum apiculatum*.

Therophytes:
Common: *Helichrysum scorpioides*.
Rare: *Leontodon hirtus L.* (introd.).

(*) For methods used in the estimation of soil properties see Davis, 1941. Of the loss on ignition figures listed in Table 1 for this and other communities, over 50 per cent, sometimes nearly 100 per cent, represents humus, as indicated by the hydrogen peroxide method.

In addition to these, species of the preceding stage occasionally occur. Properties of a sample of the soil of this community are given in Table 1.

At Roaring Beach, a dense growth of shrubs is developed on the steep dune behind the beach, but, since it has neither the pioneer community developed in front, nor forest (climax?) behind, it is difficult to regard it as a seral stage. In most places, it passes on the landward side into the *Gymnoschoenus sphaerocephalus* community. The floristic composition is listed as an indication of the potential species of the shrub stage of a psammosere, as the similar conditions at New Harbour for some reason fail to give rise to such a variety of shrubs:

Nanophanerophytes:
Common: *Banksia marginata, Persoonia Gunnii, Acacia verticillata* var. *latifolia, Correa Lawrenciana, Leucopogon Richei, Westringia rigida, Ozothamnus cinereus.*
Occasional: *Exocarpus stricta, Leptospermum myrtifolium* Sieb., *Cyathodes acerrosa, Olearia stellulata* DC.
Rare: *Persoonia juniperina, Bedfordia salicina.*

Geophytes:
Occasional: *Lepidosperma gladiata.*
Rare: *Pteridium aquilinum* (L.) Kuhn.

Some of the larger of the shrubs actually pass into the microphanerophyte class.

SCLEROPHYLL FOREST: At Roaring Beach, and in most places on the foreshores of Cox's Bight, the communities behind the beach pass into the *Gymnoschoenus sphaerocephalus* community without any development of forest. At New Harbour, however, Eucalyptus forest (wet sclerophyll forest) is well developed on former beach sand, in the zone behind the communities listed above. (See Plates I, II, and IV, fig. 2.) The trees reach about fifty feet in height, with closed canopy; low trees (and tall shrubs) form a discontinuous but quite marked layer. The lower shrub and ground strata are seldom continuous, but, with fallen timber, are dense enough to impede passage on foot.

Soil properties for this community are listed in Table 1. The following species are recorded:

Mega- and mesophanerophytes:
Common: *Eucalyptus ovata, E. (?) Sieberiana.*
Rare: *Phyllocladus rhomboidalis.*

Microphanerophytes:
Common: *Banksia marginata, Drimys lanceolata* Baill.
Occasional: *Cenarrhenes nitida, Pomaderris apetala.*

Nanophanerophytes:
Common: *Cyathodes acerrosa, Zieria macrophylla* Bonpl.
Occasional: *Persoonia Gunnii, Correa Laurenciana, Pimelea drupacea.*

Nanophanerophyte (climber):
Occasional: *Billardiera longiflora.*

Chamaephytes:
Common: *Dianella revoluta.*
Occasional: *Urtica incisa, Stackhousia linariifolia, Brachycome* sp.

Therophytes:
Occasional: *Helichrysum scorpioides.*
Rare: *Galium australe.*

This community extends to a depth of only a few hundred yards, giving place on the inner side to the *Gymnoschoenus sphaerocephalus* community. In aerial views of this part of the latter community, lines running as arcs of circles more or less concentric to that of the beach and present sea limit are clearly visible. If these are interpreted as former strand-lines, we must assume that they have at some time carried Eucalyptus forest, which has been displaced by the moor community, the forest maintaining itself only near the beach, where drainage through the porous sand, unimpeded by humus, is more efficient, and where the lateral course of the water draining through the soil is in any case shorter. The apparent ease with which moor is thus able to replace forest must be borne in mind in considerations as to which formation is the natural climax of the region.

Eucalyptus forest is also developed in many other places in addition to that behind New Harbour Beach. On the drier slopes surmounting the moors behind Cox's Bight and New Harbour, and especially those with easterly aspect, forest similar to that behind New Harbour beach occurs. It also occurs on some of the small hillocks within the *Gymnoschoenus sphaerocephalus* community; the species on one such local rise, on the plain north of New Harbour, proved to agree fairly closely with the hind-dune forest, the following additional species being recorded as fairly common: Chamaephyte, *Haloŕrhagis teucrioides;* hemicryptophytes, *Lomaria discolor, L. procera;* geophytes, *Histiopteris incisa* (Thunb.) J.Sm., *Pteris tremula.* The occurrence of certain trees in this clump, e.g., *Anopterus glandulosus,* suggests that it tends towards temperate rain forest; the situation, on the west side of the plain, is somewhat sheltered from the west. Properties of a soil sample from this clump of trees are given in Table 1.

TABLE 1

Soil.	*Water-retaining Capacity.* Per cent.	*Loss on Ignition.* Per cent.	*pH.*	*Chloride.* Per cent.
Sand Dune	59·	3·4, 3·6	7·4	·01
Shrub Dune	71·	14, 20	7·0	·04
Dune Forest	200·	58, 64	5·7	·32
Eucalyptus Forest (clump in middle of swamp)	220·	47, 48	6·1	....
Gymnoschoenus sphaerocephalus Community	108·	33·	4·8	....
	121·	46·	4·3	....

On some of the ridges behind Cox's Bight, different species of Eucalyptus *(E. amygdalina, E. linearis)* are dominant. No explanation for this difference can be suggested.

SHRUB SUBCLIMAX: On the cliffs around New Harbour, especially those on the east side, the soil is too shallow and unstable for tree development, but is well-drained, so that shrubs are developed rather that the *Gymnoschoenus sphaerocephalus* community. The same type of vegetation occurs on some of the islands in the district, e.g., Breaksea Island in the mouth of Port Davey. As conditions of erosion indicate that these shrub communities have little prospect of proceeding by succession to forest, they are regarded as subclimax vegetation rather than as a stage of a lithosere.

The following species occur in the shrub community at New Harbour:

Nanophanerophytes:

Common: *Banksia marginata, Leptospermum myrtifolium* Sieb.

Occasional: *Persoonia Gunnii, Drimys lanceolata* Baill., *Acacia verticillata* var. *latifolia, Correa Laurenciana, Cyathodes acerrosa, Leucopogon collinus.*

Hemicryptophyte:

Common: *Blechnum cartilagineum.*

Geophyte:

Common: *Pteridium aquilinum* (L.) Kuhn.

Temperate Rain Forest

This formation is, in Tasmania, dominated characteristically by *Nothofagus Cunninghamii* (Hook) Oerst., which may be displaced locally by other lower trees, e.g., *Eucryphia Billardieri, Anopterus glandulosus, Anodopetalum biglandulosum.* These give the vegetation an entirely different facies, but the areas (e.g., those dominated by *Anodopetalum*, the 'Horizontal Scrub') may still be regarded as belonging to the formation.

In its characteristic form, dominated by *Nothofagus*, the formation in the New Harbour district seldom reaches within several hundred feet of sea-level, as it does on the Central West Coast (King River). This is probably due merely to the lack of suitably sheltered areas at low levels. In the sheltered gullies in hills north-west of New Harbour (easterly aspect), pockets of the community, which may be called the *Nothofagus Cunninghamii* association, are developed, apparently typical of the association as expressed elsewhere in Tasmania. The dominant, a tall tree, has a closed canopy; low trees (e.g., *Anopterus glandulosus, Drimys lanceolata* Baill.) are present rather sparsely; the ground flora is composed chiefly of ferns (e.g., *Lomaria procera*), and is discontinuous. Small vascular epiphytes (e.g., *Hymenophyllum flabellatum*) are common, as well as bryophytes. The interesting epacrids, *Richea scoparia* and *Dracophyllum Milligani* Hk., occur occasionally.

Along some creeks, e.g., in the *Gymnoschoenus sphaerocephalus* community, where there is insufficient shelter for *Nothofagus* to develop, some of the elements of the formation occur as low trees (e.g., *Anodopetalum, Anopterus*). In the sheltered part of a small gully at the south end of Roaring Beach, *Anopterus* dominates a small community which may be regarded as low-grade rain-forest. In these situations, units of the other formations, e.g., *Epacris impressa, Cyathodes acerrosa,* are often present.

Discussion

The variables which, as units of the total environment, govern the vegetational pattern in the New Harbour district may be subdivided as follows, gross climate (as opposed to microclimate) being taken as a constant:

Topography: The contour of (*a*) land surface and (*b*) bedrock surface (never of course coinciding where vascular vegetation is present) are primary factors in vegetational distribution. The former is important in respect to shelter, and temperate rain-forest is restricted to locations sheltered from the prevailing south-west winds. Land form is also important with respect to drainage, hillocks and ridges, with water-table lower than flat or undulating land, being necessary for forest development in such a wet climate, except where the soil is deep and permeable (e.g., in some rain-forest gullies and in the forest of the psammosere at New Harbour beach). The contour of bedrock is chiefly important in its effect on

drainage, although, in so far as it represents the depth of the soil, it is effective in limiting forest development, e.g., in the shrub subclimax of the shallow soils of the cliffs near New Harbour.

Most of the soils of the plains behind New Harbour and Cox's Bight are relatively shallow, six feet being judged an average from inspection of the various tin workings, and the surface of the underlying impermeable quartzite rock is fairly level. These conditions are conducive of a high water-table. Immediately beside many of the creeks, however, the water-table is lower and small trees of *Eucalyptus* spp., and shrubs, are present (Plate I). This apparent paradox is explained by Text fig. 2; the creeks have steep or vertical banks, and the water has cut through to the underlying rock; the banks are therefore better drained in all cases than those parts of the *Gymnoschoenus sphaerocephalus* community away from creeks. It should not be overlooked, however, that some few shrubs (e.g., *Leptospermum myrtifolium* Sieb., *Melaleuca squamea*) are able to grow in the wettest situations.

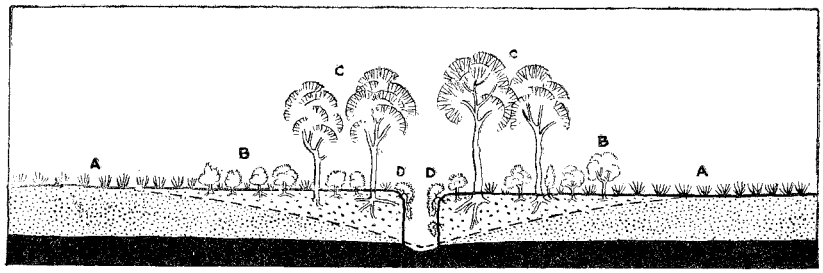

FIGURE 2.—Diagrammatic section across a creek in the *Gymnoschoenus sphaerocephalus* community, plain north of New Harbour. Horizontal scale 1 inch = 10 yards; V/H = 3/1. Black, quartzite rock; heavy stippling, water-logged soil; light stippling, soil not water-logged; broken line, water table.

A, *Gymnoschoenus sphaerocephalus*; B, shrubs; C, low trees; D, straggling plants such as *Bauera rubioides*, *Epacris impressa*, &c.

It has been noted that, while temperate rain-forest is confined to positions of easterly aspect, even Eucalyptus forest seems to prefer the western (east-facing) hills, though occasionally forming on west-facing slopes (e.g., immediately north-east of New Harbour). This may mean that the development even of trees of Eucalyptus is inhibited in part by the prevailing winds, but another (perhaps supplementary) explanation can be offered. The dip of most of the strata, which consist of much-altered sedimentary rocks, is to the east, and on the westerly-facing slopes the weathered ends of successive strata tend to impede water flow, and favour the development of moor instead of forest; on the east-facing slopes, the contour of rock surface is parallel, more or less, to the bedding planes, and drainage is facilitated.

Rock Type: This aspect of the investigation received too little attention, but a few preliminary notes may be put on record. In the first place, humus development and accumulation are so favoured by the climate that the texture of the original soil (i.e., as derived from rock decomposition, without the modification caused by humus) is less important than in some climates (cf., e.g., Davis 1941, with regard to the Bulli district, New South Wales, where humus content is generally low, and only in special situations is able to counteract the coarseness of texture of some soils in its effect on water-retaining capacity). The very high water-retaining capacity of the dune forest soil (200 per cent) may be cited as a

case in point, as dune sand less humus is one of the poorest of water-retainers (6). Here, the very coarseness and porosity of the dune soil seems to favour, rather than retard, the presence of a higher type of vegetation (sclerophyll forest as opposed to moor), if the swamp behind the dune forest has been correctly interpreted as a corollary to the progress of the psammosere.

In spite of the fact that the high average humus content rather discounts the effect of the soil texture as derived from the parent rock, it seems that forest, and especially rain-forest, is favoured by slate areas rather than the prevailing quartzite and granite in this district. This may perhaps be explained by the greater ease of weathering of the slate, and therefore the deeper soil of these areas, where the more deeply underlying bedrock has less effect in retarding drainage.

Any attempt to classify the vegetation in terms of the climax, under the concept that this is primarily controlled by climate, must be arbitrary in a zone transitional in climate between two types characterized by two recognized climax formations. Two schemes can be suggested: (1) Sclerophyll forest is the climax, moor is a subclimax due to physiographically-controlled high water table, and rain-forest postclimax. (2) Moor is the climax, sclerophyll and rain-forest primary and secondary postclimaxes. Actually, the region seems to be intermediate between that with moor as the climax formation, and that with sclerophyll forest. If any definite scheme is to be adopted, the second of those above seems preferable, as the moor formation is the most important spatially, and also since forest apparently passes into moor at the close of the psammosere.

The life-form spectrum of the moor formation is suggestive of a swamp community in any climatic zone, the life-forms which predominate giving little direct indication of the climate, but rather being characteristic of the soil conditions. Fires are frequent in the *Gymnoschoenus sphaerocephalus* community in the New Harbour district, spreading spontaneously when started even in damp and misty weather; if the hemicryptophytic and helophytic life-forms have any significance, it is probably in their survival value in the event of burning.

My thanks are due to Dr. F. Rodway, of Nowra, for identifying many of the specimens collected, and to Mr. S. Fowler, of the C.S.I.R. (Fisheries Division), for permission to use aerial photographs taken by him.

References

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(6) It should be noted, nevertheless, that the sand at New Harbour is of finer texture than that usually encountered in New South Wales; its W.R.C. is 59 per cent, as opposed to 30 per cent as an average for soils of this stage in New South Wales with corresponding loss on ignition.

PLATE I

Oblique aerial photograph of New Harbour, looking south-west. Psammosere behind beach; Eucalyptus forest (other than that of psammosere) on ridges east of New Harbour Creek, and on parts of the cliffs of New Harbour; shrub communities on cliffs east of New Harbour. Elsewhere, the *Gymnoschoenus sphaerocephalus* community is present, except on weathered hill-tops devoid of vegetation. The tendency for tree development along the banks of New Harbour Creek, well back from the dune zone, is also visible.

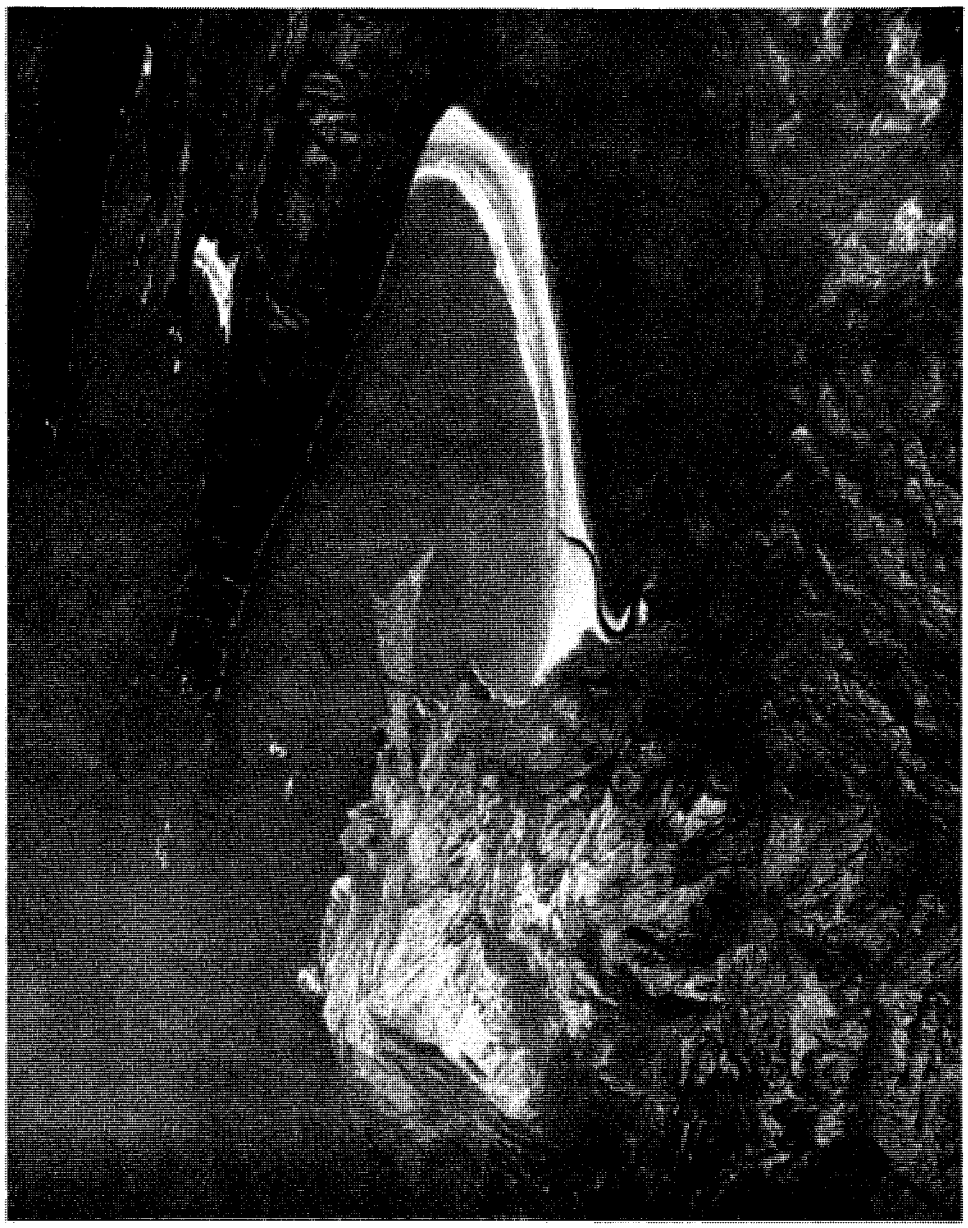
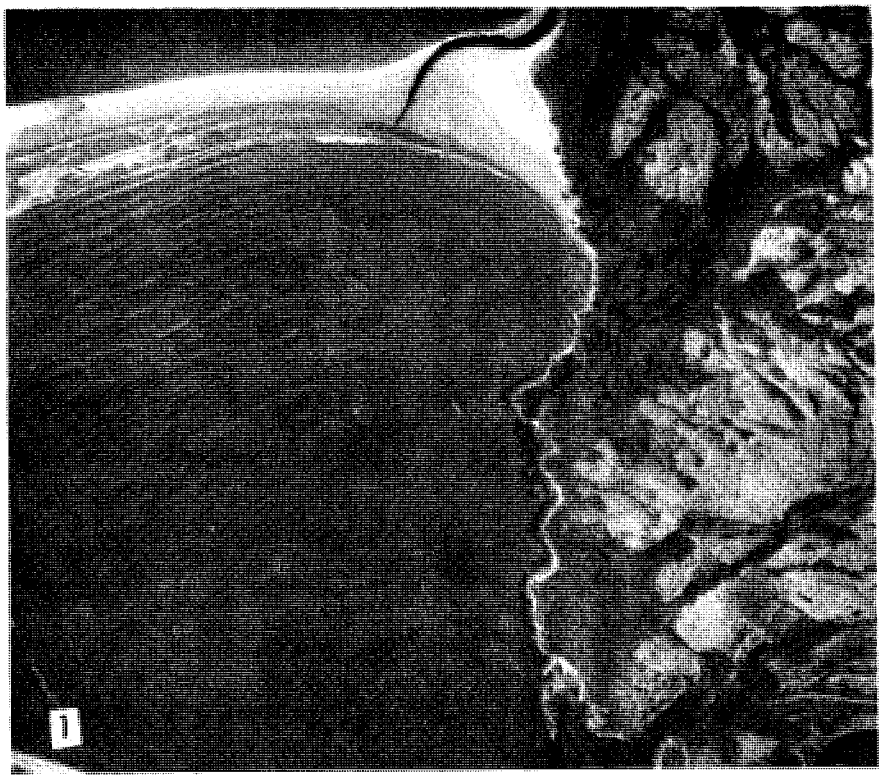


PLATE II

1. Vertical view of north-east corner of New Harbour, north side to the top. Vegetation comprises psammosere (behind beach), and *Gymnoschoenus sphaerocephalus* community, except where bare rock is exposed (hill-tops), or where better drainage permits shrub development on the cliffs on the right (east) side.

2. Oblique aerial view of New Harbour, direction of view south of east; Cox's Bight in the background. Psammosere behind beach; *Gymnoschoenus sphaerocephalus* community rising to bare rock on hill-tops; and shrub communities on shallow well-drained soil on cliffs immediately above the sea, east of New Harbour.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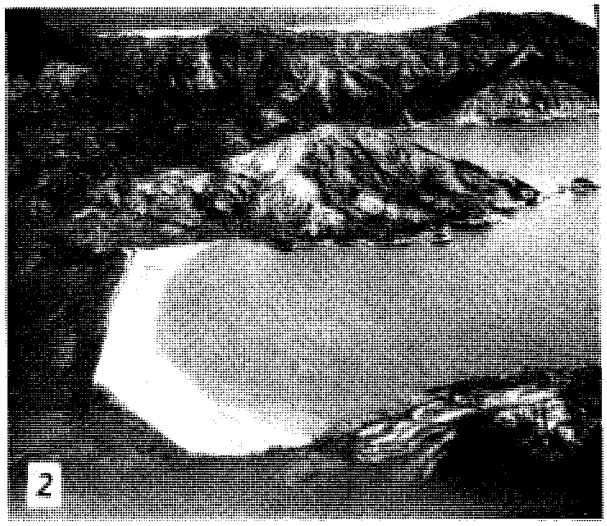
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PLATE III

1. *Gymnoschoenus sphaerocephalus* community, near Cox's Bight.
2. Looking south-east towards Cox's Bight, from hills between Cox's Bight and New Harbour. The entire plain is covered by the *Gymnoschoenus sphaerocephalus* community, which extends up the surrounding hills until the bare rock zone is reached.
3. Ridges behind and to the east of the beach, New Harbour, with *Gymnoschoenus sphaerocephalus* community, and Eucalyptus forest in positions of better drainage.


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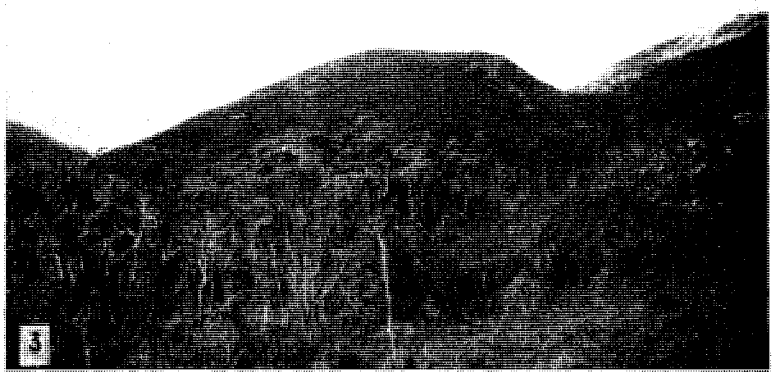
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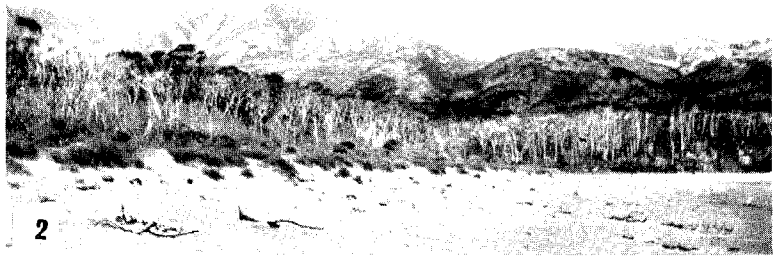
PLATE IV

1. Hills behind and to the west of Cox's Bight, with easterly aspect. *Gymnoschoenus sphaerocephalus* community, with a pocket of temperate rain-forest in a well-drained gully sheltered from the west.
2. Psammosere, New Harbour beach, looking north-east: *Festuca litoralis*, shrub dune, and dune forest. The hills in the background are partially covered with the *Gymnoschoenus sphaerocephalus* community.
3. Roaring Beach, Port Davey: Shrubs developed on steep slope of blown sand behind the beach; elsewhere, the high water-table limits the vegetation to *Gymnoschoenus sphaerocephalus* community.
4. Cliffs in the New Harbour district, with shrub subclimax developed on well-drained but shallow and shifting soil.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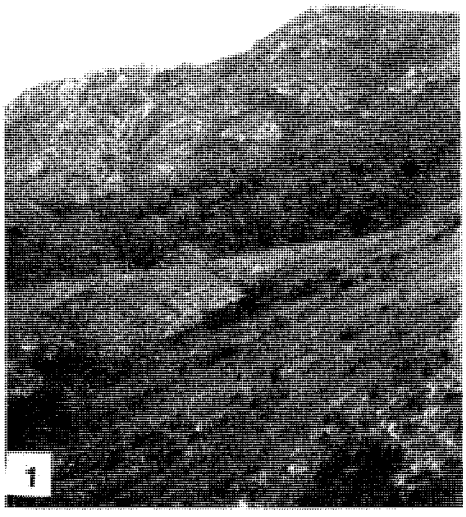
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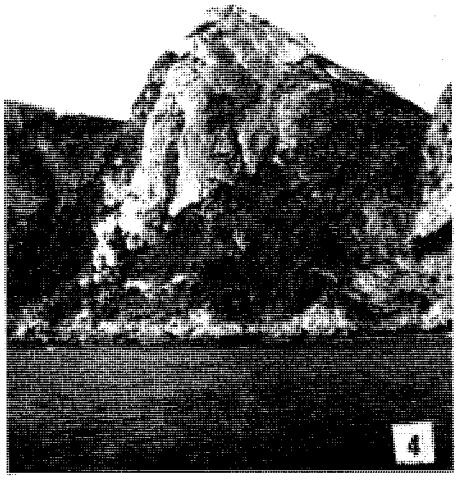
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