Seaweeds of Wellington

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INTRODUCTION

The Wellington of this paper includes perhaps 100 km of coastline ranging from the shallow estuarine shores of the Pauatahanui and Porirua inlets and the Hutt River mouth, through the variously sheltered bays and points of Port Nicholson, to the wildest rocky headlands of Cook Strait. The seaweeds to be described here grow mostly above or at no great depth below low tide.

ESTUARINE

On the broad mud-sand flats of the Porirua and Pauatahanui inlets, growing conditions suit only a limited number of macroscopic algae. The most obvious intertidal flowering plant is eel grass, *Zostera muelleri,* which builds up fibrous turfs and so channels the water into miniature scours or holds it back in shallow pools. *Gracilaria chilensis* is a most abundant seaweed. Its thin, rather fleshy, sparsely branched and sometimes modulated strings reach a length of up to 50 cm, and if traced back to their origins are usually found to be attached to a pipi shell. Although dull brownish in colour they are technically red seaweeds, and the tell-tale purplish tinge can be seen in rapidly growing tips, or in parts little exposed to light. *Caulacanthus ustulatus* (including *C. spinellus*) is only a few centimetres high, often attached to small scraps of shell, its many stiff short branches ending in acute tips. *Gelidium caulacantheum*, a taller, bushy, slightly purplish little plant, prefers a more stable substratum, and is less common. In most parts of Porirua Harbour unattached sheets of sea lettuce *Ulva*, up to a metre in diameter, form green patches, which, like those of the narrow tubular *Enteromorpha*, suggest pollution with nitrogenous matter. Where high tide laps gently amongst the tall jointed rushes, delicate red seaweeds, mostly *Bostrychia harveyi* (including *B. scorpioides*), clothe the bases of the stems, and on salt flats a felt of *Rhizoclonium* fills spaces amongst low-growing herbs like *Selliera radicans*.

In rather different sites where embankments for railways or roads have cut off segments of the harbour in permanent lagoons, a thick growth of filamentous green algae tends to form a scum in stiller parts, but nearer the outlet culverts, where tidal currents flow faster, a few larger brown algae grow. Intermediate conditions in some of these basins favour the growth of unattached plants of *Hormosira banksii*, proliferating into loose hemispheres of short, much-branched twigs. Elsewhere in Porirua Harbour this same species grows attached and its fronds are much simpler, but the individual knobs are exceptionally large.

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TIDAL POOLS

In the tidal pools on the open coast many of the common Wellington seaweeds can be seen growing and can be examined easily. The content of the pool depends on its area, its depth, its level on the shore, and the extent to which it is accessible to inflow from the open sea through low clefts or channels. Pools intermediate in all these respects will show a good range of species and will include most of the weeds to be found on the stretch of coast from Ohau Bay to Pukerua Bay.

Amongst the conspicuously brown weeds up to a metre long is the firm, evenly and pinnately branched flapjack, *Carpophyllum maschalocarpum*. Other short brown weeds include several species of *Halopteris*, like harsh tufts of coarse hair; *Scytosiphon lomentaria*, constricted at intervals like a string of sausages; and *Scytothamnus australis*, in untidily branched, slightly slippery bunches.

Yellow-brown bubbles of *Colpomenia sinuosa* and the rather more fleshy *Leathesia difformis* vary from the size of a small bead to that of a clenched fist, the former species often growing on other brown, or occasionally red, weeds. *Splachnidium rugosum*, in the shape of a miniature cactus, is more often found above the margins of a pool than in the water, and there its flat branches can dry and wrinkle up in the sun, in spite of being filled with thick mucilage.

The green weeds give a strong contrast in colour – sheets of sea lettuce, shining, glass-green beaded filaments of *Chaetomorpha coliformis* and velvety codiums in long tassels (*Codium fragile*) or in rumpled carpeting form (*C. convolutum*). Caulerpas prefer the shadier sides and easily bleach white where exposed to the sun at a pool margin; the short branchlets of *Caulerpa geminata* resemble diminutive bunches of grapes, whereas *C. brownii*, except for its soft texture, matches almost exactly the terminal twigs of a rimu tree.

The most ubiquitous, but most easily overlooked, red seaweed of pools is the limey coralline "paint" that covers the rocky sides and often paves the bottom also, sometimes bleached white at the upper margin but pink where it thrives best. Bushy little tufts of *Corallina* that often fringe a pool feel gritty when crushed between the fingers. *Porphyra*, in colour between purple and green, begins as transparent ribbons of silky texture, growing in winter to up to half a metre square, though rarely so large in pools. The two agar weeds (*Pterocladia*) are definitely red when growing, both fern-like in shape; the smaller, *P. capillacea*, is found in pools up to half tide, the larger, *P. lucida*, only nearer low water mark. *Melanthalia abscissa*, also a low-level plant, is of the same red colour when alive, but its narrow squarely ending twigs dry quite black, earning it the name of wireweed. Finer red weeds are of many species and varied form, each restricted to certain types of habitat.

EXPOSED COASTS

On the coast facing the narrow and roughest stretches of Cook Strait, pools matching those just described can be found easily, but numerous deep, vertical-sided channels and promontories and islets exposed to the full force of sea and wind provide habitats for another range of species. Some of these (marked * below) do not grow on the less rugged coasts northwards from Ohariu Bay, or within the limits of the harbour.

Bull kelp, **Durvillaea antarctica*, attached at low tide level, picks out the very roughest sites and is not easily approached, though between Island and Houghton Bays an old sewer provides a convenient and generally dry and safe pathway almost out to *Durvillaea* rocks. Where heavy surge beats against steep rock faces a wide band of barnacles, sometimes accompanied by *Porphyra*, gives way below to a well-defined, markedly pale band of encrusting corallines; next, forming a strikingly straight and dark line, is a narrow fringe of small tufted weeds, usually composed largely of *Champia*, above a thick hanging curtain of uniformly linear, golden-brown fronds of **Xiphophora chondrophylla* var. *maxima*. Below this, and exposed only as the surge retreats, is a zone dominated by **Marginariella boryana* with the broader ribbon-like segments of its spirally arranged fronds buoyed up by long oval floats. Here, also, the oak-leaved kelp, **Landsburgia quercifolia*, grows. Further inshore *Marginariella* decreases, the *Xiphophora* band narrows, and the dominant alga is *Lessonia variegata*, a species which also forms extensive sublittoral groves. Many of the pool species are available to fill and cover any flattish surface below half tide level, often forming a heterogeneous tight growth in which *Halopteris* and *Zonaria* play a large part. *Carpophyllum maschalocarpum* becomes abundant in more shelving inshore sites, and on rocks that dry out between shallow pools *Ralfsia* forms an inconspicuous continuous brown crust. Further still inshore a narrow high-level dark band of *Stictosiphonia arbuscula* may be found. Towards the beaches the effect of sand and shingle can be seen, and where rocks emerge only to half tide level, as in the Island Bay and Princess Bay beaches and at the ends of Houghton Bay, the growth of the carrageen weeds is favoured, and almost pure stands of *Gigartina decipiens* can be seen.

THE WESTERN HARBOUR

Within the harbour of Port Nicholson the coasts differ in several ways from those of the open strait, and an example is taken from Worser Bay, inside the Heads and facing east. There a steep rock may be almost without macroscopic algae on faces that dry in the sun, showing only a wide barnacle zone above the pale coralline "paint" at about the level of low tide neap; below this, *Carpophyllum maschalocarpum* is likely to dominate, with more sea lettuce inshore and, rooted in deeper water, the bladder kelp, *Macrocystis pyrifera*, floats its fronds between rocky points. Below low tide level on such rocks broad

Fig. 1. *Porphyra* at Muritai, south of Eastbourne, 1940. Photo L.B. Moore.

Fig. 2. Drift seaweed piled up at Princess Bay, 1943. Nancy Adams pictured. Photographer not known.

gigartinas and some larger delessarians e.g., species of *Schizoseris* occur. More sloping, less sunny rocks display a more varied flora including *Porphyra*, *Scytothamnus*, *Ralfsia*, *Splachnidium*, *Codium convolutum*, *C. fragile*, *Gigartina decipiens*, and slippery pink sheets of *Schizymenia*. Sandy bottoms seem to favour rather than discourage several species, for example, of *Scytosiphon*, *Gracilaria*, *Myriogloia*, and *Papenfussiella*. Mussels abound locally in these parts.

Macrocystis grows in a wide offshore band stretching outside the rocky points from here to Point Halswell, paralleling the flow of the flooding tidal stream. In 1969 it had developed also along the Hataitai shore of Evans Bay from Point Jerningham to the dry dock where for many years from the 1940s onwards it had been absent. In those days the bouldery substratum there supported a low growth of *Gigartina* and *Ulva*. The change followed, but did not necessarily depend upon, the reclamation of many acres of land at the head of Evans Bay. The present sequence of communities from tufted *Gigartina* plus *Ulva* out to *Macrocystis* matches what was recorded between the floating dock site and Kaiwharawhara in 1940 when some experiments in harvesting *Macrocystis* were made there; this latter area has since been much altered by road construction. *Macrocystis* does not seem to grow at all in Oriental Bay, on the inner side of Point Jerningham.

THE EASTERN HARBOUR

The eastern shores present a rather different picture. Parts here are fully exposed to violent southerly storms, the direction of the tidal flow is the reverse of that on the opposite side, and there may be intermittent effects from lower salinity when, under northerly conditions, the Hutt River water traverses a narrow path close to this shoreline. Over long stretches, large rounded boulders standing in shingle on gently sloping shores are fully submerged before high tide and so provide an unusually extensive and varied series of surfaces at particularly favourable levels.

Porphyra covers tops of rocks (Fig. 1), followed, on higher boulders only, by barnacles and mussels, and then by *Scytothamnus* and a miscellany of smaller weeds down to the damp shingly base. *Champia* tends to increase on outer faces towards low tide level, to be followed by *Carpophyllum maschalocarpum*. Beds of *Macrocystis* lie offshore, but not in such well-defined bands as on the Worser Bay side. The miscellaneous smaller weeds include, either growing together or as alternatives for one another: *Splachnidium*, *Scytothamnus*, *Leathesia*, *Stictosiphonia arbuscula*, *Ulva*, *Champia*, *Codium convolutum* and *C. fragile*, *Hormosira*, *Schizymenia*, and *Grateloupia*. Gigartinas, both finely divided and foliaceous, grow well amongst small stones between the large boulders. Near the sewer outfall *Ulva* reaches plague proportions periodically.

DRIFT WEED

Every year many tonnes of seaweeds wash up on Wellington's beaches, piling up after certain storms to depths of 1 m or more (Fig. 2). This drift weed includes representatives of sublittoral species that are not usually seen growing. On open beaches all but the toughest weeds tend to be comminuted into barely recognisable fragments, but in deep narrow inshore channels where the waves have lost their force, a wealth of finer material floats gently in, the delicate fronds intact and still retaining their varied natural colours. This is the place to find the most beautiful and some of the rarest of Wellington's seaweeds, though in the world of the scuba diver, more treasures are present. Some species, like the lacy red *Euptilota formosissima*, come in almost every drift; others, like the spectacular *Laingia hookeri*, are found consistently only in certain select spots. The Eastbourne and Muritai shores often yield a rich harvest of fine red weeds.

Bull kelp is common in the drift of the strait, and the big plants last a long time when they lie high and dry. A rare item here is *Carpophyllum plumosum*, interesting because this northern species is not known growing on the Wellington and adjacent west coasts, although it is abundant on the east coast as far south as Cape Palliser.

REFERENCES AND SUGGESTED READING

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