

mid-midlittoral; *Enteromorpha* just below, and dark green *Cladophoropsis lyallii* dominating the lower midlittoral. The right-hand face, more exposed to light and to wind-waves, shows a broader, glistening *Verrucaria maura* zone, with a sprinkling of *Elminius modestus* just below it. At half tide, *Apophloea lyallii* (dark red) cuts across this, whilst further down are *Enteromorpha* and a filamentous brown. Below low tide level at the base of the boulder are *Mytilus edulis aoteanus*, these as well as the boulder itself carrying extensive colonies of the brackish-water hydroid *Cordylophora lacustris*. On two different days, surface salinity readings were 0‰, and the water did not taste detectably salty.

On travelling seawards from Deep Cove, one meets additional marine species on the shore at the seaward end of Elizabeth Island (Station M). Here, *Sypharochiton pelliserpentis** was not infrequent in the lowest part of the intertidal, though it did not extend up in its usual manner. Also submerged at low tide on this shore (but not further in) were patches of encrusting coralline algae, the greater part of which was dead (i.e., white). The presence of these at first sight appeared anomalous as far up the sound as this, when absent from the well-sampled Station D. However, whereas D was on a mountain face with much freshwater seepage, and surface salinities of 10‰, 11‰ M on a small island with but slight seepage showed inshore salinities, at different places around it, of 25‰ and 24‰. M. was an open exposed, primarily balanoid shore (*E. modestus*), with *Apophloea* and *Hormosira*. Crevices showed the shade algae, patches of *Cladophoropsis* here showing *Potamopyrgus* (sparse) mixed with *Lasaea hinemoa* (abundant). Above a 2ft high *Verrucaria* band, *Pertusaria graphica* was conspicuous.

Station D was in most respects a typical shaded, inner sound, algal-covered shore, though with some additional marine species (e.g., small *Patriella regularis* and *Aulacomya maoriana* at low tide). Special interest at this point in the sound centred round a rock Dr Rudwick brought up from 2–3 fathoms, which carried the brachiopods *Terebratella inconspicua* and *T. sanguinea*. *T. inconspicua* is patchily abundant in Otago Harbour up to low tide neap level, but was nowhere met intertidally at Doubtful Sound. Brachiopods are relatively stenohaline (Table I). *Terebratella inconspicua*, like *Mytilus edulis aoteanus*, *Pomatoceros cariniferus* and *Sypharochiton pelliserpentis*, does not come as far up the shore in inner Doubtful Sound as in more highly saline Otago Harbour. One suspects the steep vertical salinity gradient is restricting these (and probably other animals) to lower than their usual tidal levels, whereby they would be exposed to low salinity water for only short periods.

2. Outer Sound

Station O, on a small island in Shelter Cove, was an east-facing relatively sun-exposed shore, though sheltered from wind. Surface salinity readings (during rain) were 24‰ and 27‰. Suddenly one had come to a relatively "normal" marine southern New Zealand shore. *Potamopyrgus antipodum* had dropped out. The *Verrucaria maura* zone was irregular, and not like a painted stripe. The dominant balanoid was still *E. modestus*, though with *Chamaesipho columna* scattered amongst it, and *Tetraclita purpurascens* abundant under stones. Along

* All specimens checked from Doubtful Sound showed the second plate dark, as does the Tasmanian *S. mauganus* Iredale and May.