

from Mr. Bishop that a Surveyors' track has gone right through the area. Mr. Bishop on being approached has, however, been kind enough to allow two of our members (Miss Crookes and Miss Dingley) to remove some clumps from the patch. These are now in the capable hands of Mr. Jollie and it is hoped that one of them may eventually be established in natural surroundings in the University Reserve at Swanson.

We would like to take this opportunity of expressing our thanks to Mr. Bishop for his co-operation in this matter and also for the helpful and kindly interest that botanists always know they can expect from him. Mr. T.A. Bishop is a son of the late Mr. John Bishop of Titirangi, who collected for Mr. Cheeseman and others in the old days and was well known as a most reliable and ardent field botanist.

Mr. T.A. Bishop inherits his father's love of the bush, and in his own kindly, unassuming way, has always been ready to show interest in students of botany. So for the gift of Ophioglossum, and for past kindnesses we offer him our very hearty thanks.

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SEAWEEDS ONCE MORE

Tidal pools always have a fascination of their own, and Miss Ambler, who has investigated those at Narrow Neck to some purpose, now passes on some very helpful information about them for the benefit of members. We extend hearty thanks!

SEAWEEDS IN TIDE POOLS AT NARROW NECK

Tide pools are characteristic of a rocky shore and are to be found at all levels. Because of differences in level and situation the pools undergo periods of exposure and submergence and there may be very marked changes in such factors as temperatures and salinity during the time of emergence. The seaweed or algae found growing in tide pools are under very different conditions from species found growing exposed on the rocks or else permanently submerged, e.g. the desiccation factor, important for algae growing exposed, is negligible for the tide pool algae and while the ocean is marked by uniformity of conditions, tide pools show very great diversity.

Tide pools have generally been classified according to

level, those of high levels undergoing long periods of exposure and containing as a rule green algae whilst lower level pools have more uniform conditions and contain the large brown algae and certain red species.

In regard to the factors affecting tide pools, temperature and salinity changes are most marked in the high level pools which are not covered by every high tide, i.e., pools which undergo periods of continuous exposure. The highest temperature recorded in these pools at Narrow Neck was 32°C in January and the lowest 11°C in June. Temperature increases occur daily in the pools and there is usually a greater increase in pools at high levels. During the short time the low level pools are exposed there may be quite a considerable change. A general seasonal trend is evident and it was found that pool temperatures were higher than the sea during the day and lower at night. In the high level shallow pools the water may be almost fresh during rain and the species here can tolerate both fresh water conditions as well as salt. Oxygen content is another variable factor but the pools tested were found to be supersaturated.

At Narrow Neck the tide pools studied are situated on the headland and the reef at the Northern end of the beach. The high level pools, all situated on the headland, are shallow pools and in the winter months contain a luxuriant growth of green Enteromorpha. One pool has a sand covered bottom and contains a species of Ceramium as well as Polysiphonia variabilis, both delicate red species. At intermediate levels are to be found a few of the large brown seaweeds as well as Corallina and epiphytic green Enteromorpha.

The large brown kelps such as Ecklonia radiata, Carpophyllum maschalocarpum, C. plumosum, Sargassum sinclairii, are seen best developed in the low level pools. Corallina covers the sides and bottom of the pools. The number of algae is greatly increased as compared with the vegetation of the upper pools and the algal population often completely fills the whole pool.

Species of Dictyota and Zonaria which are smaller brown forms are found in these pools as well as Laurencia botrychoides and Gigartina chapmanii, small red algae.

There are some interesting examples of the elevation of a species which grows exposed at low levels and in the tide pools at higher levels. Caulerpa sediodes occurs towards the Northern

end of the reef at Low Water Mark of Spring Tides and in a pool about three feet higher. Corallina sp. is found exposed in the mid-tidal region, but only in the pools at High Water Mark of Spring Tides.

Such species as Splachnidium rugosum, Scytothamus australis and Codium adhaerens which grow exposed on the rocks are never found in pools. Hormosira banksii, common in association with Corallina in the mid-tidal zone is found fringing pools and to a depth of about 12 inches in pools at intermediate levels. Common species belonging to pools on the East Coast are:

Green: Enteromorpha procera
Ulva linza

Brown: Hormosira banksii
Ecklonia radiata
Carpophyllum plumosum
C. maschalocarpum
C. phyllanthus
Sargassum sinclairii
Blossvillea torulosum
Calpomenia sinuosa

Red: Corallina sp.
Pterocladia capillacea
Plocamium sp.
Gigartina chapmanii
Laurencia botrychioides
Ceramium sp.
Rhodymenia leptophylla
Lenormandia coronata

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For those who enjoy their seaweeding under more adventurous conditions, Mr. Hamken has kindly provided a most useful account of our local West Coast zones. Members must remember to take this article with them on our Bethel's excursion!

SEAWEEDES OF THE INTERTIDAL ZONE ON THE
WEST COAST

- P.B. Mannken.

The wave-lashed, rocky shores of the Western coastline near Auckland seem an inhospitable place for the growth of such delicate plants as seaweeds. However, the wind and waves are constant features so that plants adapted to such conditions are able to grow successfully. The regularity of controlling factors, of which the tidal rise and fall is the most important, leads to, and is clearly illustrated by, the zonation of plants from the lowest to the highest points on the shoreline.

There are a large number of seaweeds growing on these shores, each adapted perfectly to its own station. Many are small and easily overlooked at first, but once one is acquainted with