

SEAWEEDS.

(Extracts from Notes kindly provided by Mrs. Sinclair, Leader of the Study Circle on May 21st.)

For a long time seaweeds were to me pretty pieces of *Ulva* with which to decorate childish castles in the sand. Even the name I did not know -- no one knew seaweed names. Then later at Varsity seaweeds were just a few types which had to be learned. We were not taken to meet them as living plants in the sea.

But they are of lively interest and of an importance which will surely develop beyond present comprehension. They present a grand study for the ecologist, for the histologist and the taxonomist, many possibilities for the chemist, and will, in the future, provide a growing source of material for the manufacturer. Apart from the purely scientific aspects, we can find untold joy in the beauty and grace of seaweeds as they swirl and turn as the current carries them to and fro. Their rich colourings and beautiful forms give inspiration to the artist, while the photographer too can find worthy subjects which call forth all his skill.

Sir Joseph Banks and Dr. Solander, when they accompanied Cook on his first voyage 1769-70, collected 15 species, which seems a very small number when one considers the wealth of algal growth on our long and varied coast-line. *Fucus banksii*, which we know as *Hormosira*, occupies the first plate in the first English work of importance (Turner's *Fuci*) dealing with the seaweeds in general. Lesson, the French botanist, gathered 29 species when he visited New Zealand in the 'Astrolabe', but not all of these were new records. His name was honoured in the genus *Lessonia*. Some fifty species were enumerated from D'Urville's third voyage. Hooker and Lyall, accompanying Sir James Ross on his exploratory voyages collected extensively, and in Hooker's Handbook of the New Zealand Flora, published in 1867, 317 species were described. It still remains the only work in English in which the student can obtain a general account of the local species. J.G. Agardh, working in Sweden, subjected the Handbook list to critical revision, and in 1877, published a shorter, but more reliable list. The first New Zealand botanist to work seriously on seaweeds was Robert M. Laing, of Laing and Blackwell fame. His first "Revised List" published 1900-1905 included 419 species. Until his death in 1941 Laing continued to work on seaweeds, and contributed very largely to the present knowledge of our algal flora. His valuable collection is now in the keeping of the Biology Department of Canterbury College.

In the first 150 years things did not move very fast, and it is only lately that more New Zealanders are becoming "seaweed conscious". Amongst our own members Dr. Oliver and Miss Moore have worked on this group. Mr. V.W. Lindauer, a teacher by profession, does a great deal of collecting and distributing of specimens to overseas phycologists. His critical examinations are constantly clearing up problems in seaweed systematics. In Wellington the Botany Division is fortunate in having added to its herbarium a large and valuable collection built up and presented by Mr. Scarfe, also a member of our Society. At the Auckland Museum is another modern collection, the work of Miss Cranwell. The Dominion Museum has a fine set of duplicates of the material studied by Agardh.

Like other plants, seaweeds must find homes to suit them. Cacti will not be found in a bog, and so you will not see *Bostrychia arbuscula* growing below low tide level. Seaweeds generally need to be fixed to a stable foundation; hence one finds a more prolific growth where there are rocks, wharf piles, jetties, etc. Species of *Gracilaria*, *Ulva* and *Enteromorpha* are more sand-tolerant than some. Where the growth is good it is easy to see that some species of seaweed prefer a restricted range in relation to tide level. Such is *Bostrychia arbuscula*, a small tufty high-level plant that shrivels in warm drying winds and freshens with the return of the tide. It is very plentiful on the rocks at Stewart Is. and can be seen at Lyall Bay. A little lower, bands or patches of *Porphyra* are often characteristic. About mid-tide one finds *Hormosira banksii* and *Scytothamnus australis*, both very common. At low tide is an entirely different set of seaweeds, including many of the large brown ones. *Carophyllum maschalocarpum* is a very wide spread example.

On the rougher coasts, *Durvillea antarctica* is often dominant near low tide level. To watch its dark thick blades swirl round in a cold gloomy looking water gives one a weird sensation. The holdfasts, which are roughly circular,

are attached at surf level; the short cylindrical stipe is extremely strong, and the wide leathery blade is broader in relatively sheltered places. Xiphophora likes about the same level as Durvillea, Lessonia, Cystophora and Sargassum are all found near low tide level, while Landsburgia quercifolia and the two species of Marginaria are usually in deeper water, as are the rose red sheets of Laingia hookeri. Too much light can injure delicate seaweeds, and bleached tips are often seen after days of bright sunshine at spring tides. Then water temperature is another controlling factor in the distribution of species. To increase their buoyancy and hold the fronds up to the light when the tide is in, plants of Carpophyllum, Macrocystis, Marginaria and Sargassum have gas-filled vesicles amongst their leaves. Hollow organs filled with watery or mucilaginous matter are seen in Hormosira, Adenocystis and Splachnidium. These may help to resist undue desiccation (as well as making useful squirts for children!).

The seaweed population changes with latitude, and only some species can tolerate the increased fresh water of estuaries and river mouths. Like the higher plants, seaweeds may be annual or perennial, parasites, epiphytes, or endophytes. On the two species of Pterocladia I have found nearly twenty different kinds of epiphytes. And when looking for seaweeds do not neglect those peculiar, often circular, brownish patches on rocks and stones. They look like stains, but they are algae too, of such genera as Ralfsia and Petrospongium.

The Wellington coast provides excellent collecting grounds and Lyall Bay is the type locality for many species. One afternoon in a small baylet between Karehana and Maori Bays I noted 40 species. Stewart Island is a veritable paradise, and so is Hokianga Heads with its huge black rocks. Generally the east coast has been more explored than the west, possibly because it is safer. The number of species described for New Zealand is now a little over 500, and of these a large number are endemic.

We have still much to learn botanically about our algal flora; but there are as well, I feel convinced, vast commercial possibilities for seaweeds generally. Economic scientists are turning to new sources for materials for experimentation, and the world of seaweeds is but little touched though it is amazing to see the multitudinous small ways in which seaweeds have been used. For food we have heard of the various Oriental kinds, the Karengo (Porphyra sp.) of the Maori, and the carrageen types (Gigartina spp.) that have proved so profitable to the Stewart Island gatherers recently, and what more delectable green is there than Chaetomorpha darwinii -- for those who can pick it fresh? From seaweeds, potash, soda, and iodine have been extracted, and certain kinds can be highly recommended for garden manure. In medicines and in textiles, in cosmetics and in glue, seaweed products are being or will be used. As a more or less problematical use Laing suggested in 1926 "the production of a kind of gelatine". This has actually become a reality and today a firm in Christchurch is manufacturing all New Zealand's requirements of agar, using as raw material two species of Pterocladia collected from our own shores.

RIMUTAKAS.

February 3 dawned with threatening summer showers but two enthusiasts packed their mackintoshes with their lunches and made the journey to the Rimutaka Summit. They were rewarded by a beautiful calm day of warm sunshine. Walking back down the railway line they saw the interesting assortment of plants covering the railway cuttings. Dwarfed ferns, Gnaphalium, Wahlenbergia hanging sprays of graceful bluebells, Gaultheria - how different from the cuttings a few miles down the line! A track led down through the beech forest to the river bank where there were rimu and other trees among the beech. One fine large rimu lay prone on a beach where it had been felled by a picnic party, "for fun", a disgusted railwayman informed us. We saw Jovellana and Rubus schmideloides here. This place is well worth visiting again.

Greta B. Cone.