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MARINE NATIONAL PARKS

AT the Club's September meeting a Sea Fisheries Officer gave a brief outline of the abalone fishing industry and highlighted some of the problems and unknown factors affecting it. In reply to a question the lecturer expressed his agreement with the need for a marine national park or reserve where marine life may be preserved free from interference by the fisheries industry and other agencies.

This idea is a comparatively new one, and so far little has been achieved in this direction. In recent years there has been a growing demand for more national parks so that samples of each land habitat and areas of special scenic and scientific interest can be preserved for the future, and it is reasonable that marine habitats should be included. These would have very real value as areas where marine life could be studied to the advantage of the fishing industry, and they might also be a considerable attraction to the growing number of under-water enthusiasts for the simple pleasure of watching the strange world beneath the sea's surface.

A proposal for such a reserve was included in the submission by the South West Committee to the Government for the orderly development of the South West of our State, and it deserves the support of all those interested in conservation, a term which it is pleasing to note is now receiving some recognition in official quarters.

LICHENS IN TASMANIA

by G. C. Bratt

LICHENS - the beardlike growths on trees, the coloured patches on rocks and the 'toadstool' - like pixie cups on soil - are a curious and poorly understood physiological association of a fungus and an algal colony within a single structure.

It is difficult to find an economic justification for the study of lichens, but because they are there (like Mt. Everest) one is obliged to recognise and perhaps attempt to understand these misfits. Lichenologists in general are a rare breed and work on Tasmanian lichen species has been neglected. The last major publications on Tasmanian lichens were in the 1890's. Many lichens are extremely slow growing, are sensitive to atmospheric pollutants (especially sulphur dioxide) and are, of course, destroyed by fire. Thus it is obvious that the lichen population of this island is being reduced and/or altered by urban and industrial spread, forestry farming and mining operations, land flooding and bushfires. It would appear that interest should be re-kindled.

Classification, which at times seems tiresome and even useless when perpetual changes are made, does seem to be of benefit in defining what one is dealing with in the biological kingdom. Preliminary classification often divides lichens into foliose, fruticose and crustose types according to the thallus (the leaf or body of the lichen) structure. Foliose lichens have an expanded or leafy form, fruticose implies a cylindrical or strap-shaped thallus and crustose lichens are closely appressed or partially embedded in the substrate.

Typical of foliose lichens are Pseudocyphellaria glabra and Peltigera polydactyla, the former a green leafy outgrowth from trees in shady forests and the

latter resembling a grey-brown liverwort growing among mosses in wet situations. Both may be found in the forests of the Florentine Valley.

Fruiticose lichens include the very common Usnea arida which grows like green beards on dead wood and may often be found on firewood. A more colourful fruticose lichen is Teloschistes spinosis which occurs as bright orange tufts on East Coast granite (e.g. at Mt. Amos). This stands erect on the rock and is thus easily distinguishable from the crustose species such as Caloplaca murorum which, although orange, cannot be separated from the rock and is usually found only close to the shore.

Since lichens cannot be made by man the natural means of reproduction are of importance. Three methods are known but only two appear to be effective under natural conditions. Portions of the thallus may break off and, since such fragments contain both algal and fungal components, a separate lichen may develop. Some lichens reproduce only by this vegetative method and have easily detachable thalline excrescences. Some lichen thalli may develop fruiting bodies which discharge fungal spores. To develop a new lichen these must find both a suitable algal colony and a suitable location. The form of the fruiting body varies widely and is of use in the identification of species.

Several interesting lichens which occur only in Australia are briefly discussed below.

Heterodea muelleri in Tasmania is apparently restricted to an area of sandy soil and low rainfall (less than twenty inches) near Conara, but may occur under similar conditions near Bothwell. The areas where it occurs are being reduced by extension of pasture lands. It looks rather like a liverwort when wet, but when dry rolls up and may be confused with sheep droppings.

It was originally described from Tasmania by Hooker in 1860, but its position in lichen systematics was confused and it still appears difficult to fit in most classification systems.

Thysanothecium hookeri resembles a small green toadstool with a flattened brown top and grows only on charred wood (suggestive that there have always been bushfires in Australia). It prefers the drier areas but is fairly widely distributed at present and may spread further as a result of the February bushfires.

Cystocoleus niger. It was found for the first time in the Southern Hemisphere in 1963 near Orford beach, but since has been found in a variety of situations including the top of Tim Shea. This lichen occurs as black filamentous patches on rocks and appears to confuse even the specialists who have variously referred to it as a lichen, a fungus or an alga. Tasmanian material of this species is at present being subjected to a more detailed study and may need reclassification.

The distribution of lichen species in Tasmania is, like some of the higher plants, extremely uneven. Thus, Coccocarpia gayana, a lichen with a blue upper surface and a delicate filigree work of fungal threads on the lower surface, has been identified only once from a collection made on the slopes of Mt. Picton. Two other collections of immature material which cannot be positively identified were from near Tarraleah and on the Waldheim road.

Pilophorus conglomeratum, which has an erect green stalk about one inch high capped by a black globose head had until 1965 been found only three times, twice in New Zealand and once in Victoria. Diligent searching since 1965 has resulted in this rare species being found on the Hartz Mts., near Collins Bonnet, near Lake Pedder and near Mt. Arrowsmith. In each of these locations P. conglomeratum has been found only in small amounts. It would appear that the tiny spores (10 x 3 microns) have to travel long distances before finding a suitable algal partner.

As some rather rare species occur in Tasmania and the distribution of most species is poorly known it is clear that observations supported by collections would be of real value. Collections should be of reasonable size (relative to the size of the species) and should be marked with the location, substrate, nature of surroundings and date of collection. Material should be dried soon after collection by spreading it out in a warm room and kept dry thereafter.

An attempt would be made by the author to identify material collected as described above, especially if from remote areas. It should be noted, however, that indiscriminate large-scale collections should be avoided because of the generally slow growth of lichens.

TASMANIAN SEA STARS

A. J. Dartnall

SEA STARS, (not starfish, for the name only produces confusion), are echinoderms - separated from other animal groups by possessing a skeleton made of calcite. The phylum Echinodermata also includes the sea cucumbers, feather stars, brittle stars and sea urchins.

More than thirty species of sea star are found around Tasmanian coasts from the shore to deep water off the Continental shelf.

The earliest reference that I can find about sea stars in Tasmania, is in Matthew Flinders' introduction to his Voyage to Terra Australis (1814), in which he tells of Capt. Marion's visit in 1772 - "and the curious picked up sea stars, sea eggs and a variety of fine and rare shells". He makes no mention of the species or attempts to describe them, but it is more than likely that Marion's crew would find the large eleven-armed sea star, Coscinasterias calamaria, of scallop-eating fame and the smaller colourfully patterned, eight-armed Patriella calcar.

I know of no other observations on sea stars until 1882-83 when Henry Daldy of Gordon told the Royal Commission on the Fisheries of Tasmania that "Rays and starfishes are also largely caught for the manufacture of the 'manure'". To the same Commission William Tapner of Triabunna voiced the opinion that "the natural enemies of oysters are the stingaree, crabs, starfish,".

Some rare and unusual sea stars have been found in Tasmanian waters during the last forty years. The B. A. N. Z. Antarctic Research Expedition of 1929-1931 collected specimens from four stations off Tasmania. From station 113, off Maria Island at a depth of 174-155 metres one small sea star of 9 m. m. radius was taken and attributed to a genus called Marginaster. The animal was similar to Marginaster paucispinus from Hong Kong which itself is a bit of a mystery being described from one specimen - the only one. Very few zoologists will describe a new species from a single specimen nowadays so Tasmania's Marginaster remains without a specific name until such time as more specimens are obtained. The record, however, added another genus of sea stars to the Australian faunal list.

From stations 113 and 115 (the latter off N. E. Tasmania in 128 metres) came three specimens of the long armed Stylasterias reticulata which is only known from around Tasmania in deep water. It is certainly rare and difficult to get at these depths. There are no specimens in the collections of the Tasmanian Museum.

Also, during the last eighteen months, three specimens of a large, gaudy sea star, Asterodiscus truncatus, have been taken off Bicheno, being the first records for the State although it is known to be common off N. S. W. and Victoria. It is probably not so rare as it appears. As fishing methods diversify and man hunts the deeper, offshore waters it is quite likely that new sea stars, amongst other animals, will see the light of day for the first time.

Tasmanian littoral sea stars fall into three groups: (1) The biscuit stars, Tosia, (2) the cushion stars, Patriella, which are one of the most conspicuous sea star groups of the southern hemisphere, (3) a group of long-armed sea stars including Coscinasterias and Allostichaster. Both forms can reproduce by splitting and fragmentation - an arm and a portion of the central disc providing a basis for development of further arms. In fact it is unusual to find a symmetrical Allostichaster polyplax which nearly always appears to be losing or regenerating arms.

As skin and SCUBA diving become more popular scientists are finding out more about the world of the sea shore animals. It is rather like finding out how the other half lives - that is if your house is under water for 80% of the time.

My own interest is in the cushion stars which are well represented in Tasmania. Patriella calcar is found all round the coast from mid-tide level to below low water. Patriella exigua, which is small (seldom with a radius greater than 12 m. m.), five-armed and dull blue/green on its under surface has a similar distribution but does not appear to withstand as much wave action: as P. calcar which can live on more exposed shores. P. calcar can be found commonly in rock pools on predominantly sand beaches, completely covered in sand; a habitat where P. exigua is never found. Patriella gunnii, for which George Town is the locality from which the type specimens were collected, has six arms, is tinged with purple and is found on the shore in northern Tasmania and just below low tide level further south.

The most common cushion star in the D'Entrecasteaux Channel, Frederick Henry Bay and around Bruny Island is another five-armed form, Patiriella regularis - a New Zealand species thought to have arrived here with imported oysters some forty years ago. Belying its name P. regularis is not regular. Eight-, seven- and six-armed, square individuals have been found. So much for the accuracy of scientific names!

Most sea stars release eggs into the water. After fertilisation the eggs develop into larvae which are free swimming for a period before they metamorphose and settle down to life on the sea bottom. Patiriella exigua, however, discharges its eggs onto the rock where the young develop inside a gelatinous envelope. By missing out the precarious free swimming stage P. exigua ensures a better start for the next generation.

Another cushion star, known from a few sites in southern Tasmania, goes one better. In this form the eggs develop internally until, as small sea stars, they burst through the upper surface of the adult and crawl away. This sea star is not yet officially named and described. When its life history and development are worked out it will be called Patiriella vivipara.

I hope I have conveyed, in this short space, how little is known of one of the most conspicuous groups of our marine fauna. Specimens of even our common species will be gratefully received at the Tasmanian Museum especially if from the more remote parts of the State. Records from early literature, local newspapers and personal observation would be very welcome.

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BOOK REVIEW

"Wildflowers of Victoria", by Jean Galbraith (Price \$4.75)

FOR many years there has been a need for a handbook of Tasmanian flowers for the use of those who, though they have never studied botany, are interested in the plants they see in the bush and would like to know their names and more about them. So far as Tasmania is concerned that need is still unfulfilled, but until such a handbook is available an excellent substitute is the book 'Wildflowers of Victoria', by Jean Galbraith. A copy of the third edition has been sent to us by the publishers, Longmans.

Since so many species, and especially genera of plants, are common to both Victoria and Tasmania this book is almost as useful here as in Victoria, except perhaps in the higher mountain areas where Tasmanian vegetation has more Antarctic and New Zealand affinities than Victoria has. In this book the plants are grouped into a hundred sections and the new edition contains a 'Guide to the Sections' made into a simple broad key. The glossary has been improved and the text brought up to date since the first edition of 1950. There are 175 photographs following the sections and in the same order, and a number of line sketches of orchids to aid in identification. The descriptions of plants are mostly in non-technical language, and where technical terms are used they are simply explained and sketched in the glossary.

The book is not intended to replace a Flora for the botanist, but is excellent as a field guide for the plant lover or naturalist.

H. K. A.

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