Marine Algae of the West of Ireland

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Thouars,* and it was found that these two plants agreed in most of their anatomical characters. The chief points in which the latter species differs from "Kokoti" are: sclerenchyma on the upper side only of the smaller veins; vascular "ring" of the midrib open on the upper side; wood-vessels only rarely having scalariform perforations; cork-cells mostly thin-walled, thickening of inner wall only seen in a few cells; crystals of oxalate of lime in certain cells of both upper and lower epidermics of the leaf, instead of only in the lower epidermics, as in "Kokoti."

From the anatomical agreement it is evident that the affinity of "Kokoti" is with *Macarisia* and the *Legnotideae*. The close affinity between "Kokoti" and *Anopyxis Klaineana* is supported by their anatomical structure, which shows only trivial differences.

XLII.—MARINE ALGAE OF THE WEST OF IRELAND.

A. D. COTTON.

In April of the present year a Natural History survey was commenced of Clare Island and the adjoining mainland in the county of Mayo. The locality was selected on account of its relatively primitive nature, two of the principal objects of the investigation being—(a) a detailed study of the fauna and flora of a promising portion of the West Coast of Ireland; and (b) a comparative study of the fauna and flora of Clare Island with those of the mainland, with a view of elucidating the history of the fauna and flora of the island.

The survey will extend over a period of two or three years, and will be carried out under the leadership of Mr. R. Lloyd Praeger by means of monthly trips, except in the winter, when special visits will be arranged as occasion may require. A laboratory with necessary apparatus has been fitted up on the island, and there is hotel accommodation for a party of about twelve. Workers are still required in certain branches of both Zoology and Botany; but the services of a large number of specialists have been enlisted, and there is every prospect of the work being carried out in a thorough manner.

The algal flora of the West and South-West of Ireland is of special interest, and the neighbourhood of Clare Island is particularly suitable as a centre for investigation. In anticipation of the flora being rich, and considering the extent of ground to be worked, it was highly desirable that the study of the marine algae should be put in hand at once, the writer therefore joined the first collecting party which proceeded to Clare Island immediately before Easter. In addition to the ordinary work of the survey, opportunity was taken of enriching the Kew collections, by gathering and drying a number of specimens for the Herbarium, special

* For some of the anatomical features *Macarisia lanceolata*, Baill. was used instead of *M. pyramidata*.

attention being given to groups which are at present poorly represented. Material in formalin, of parasitic and endophytic algae, and of other species which cannot properly be examined in a dried state, was also obtained.

The first visit, necessarily more or less of a preliminary character, may be regarded as entirely satisfactory, both as to the suitability of the site for algal exploration and as to the amount of work that was accomplished.

Various types of collecting ground are met with. On Clare Island itself the rocky exposed shores offer a typically "exposed" flora. On the mainland such channels as Achill Sound afford quiet but fully saline conditions, where a "sheltered" type of flora exists, the growth here being often exceedingly luxuriant. Clew Bay, with its innumerable islands and sand banks, presents another and different type of vegetation, which may be termed a sand-bay flora, where every transition from exposed to sheltered conditions may be found. Land-locked bays, such as Bellacragher, furnish brackish water, where a fourth and characteristic vegetation obtains. Muddy ground with mud-loving species is also supplied in many parts of Clew Bay. To obtain a detailed knowledge of the algae of such a district, each of these types of collecting ground should be examined thoroughly, and that as often as possible throughout the year. Many of the smaller algae are very transient in their appearance, so that unless frequent collections be made, their presence is liable to be overlooked. It is thus manifest that, though an endeavour will be made to visit the Clare Island district as often as possible, any collections and observations by other botanists would be of great assistance.

The following is a brief account of the algological investigations during the Easter visit, the work on the island being first referred to, and afterwards that on the mainland :—

Nine days were spent on Clare Island, during which a general idea of the marine flora was obtained, and several positions were selected for the study of distribution. Special attention was paid to the last-named subject, as it is a branch of algology which has been almost entirely neglected in this country.

The shore on the west side of the island is practically inaccessible on account of the precipitous nature of the cliffs, but on the south and east sides there is excellent ground for collecting, though the frequency of swells and gales from the Atlantic make this sometimes a difficult, if not impossible, task. When such is the case, compensation may be found in the presence of a big "wash-up." The shores consist of rugged rocks and boulders, wide expanses of flat rock with various degrees of wave exposure, occasional lagoon-like areas of shallow water, and numerous deep rock pools; whilst caves, sheltered creeks, and sandy bays may also be found. The water is clean, and apparently pure, the diatomaceous coating which frequently disfigures the Red Seaweeds being little in evidence. On the island the work was entirely confined to the study of the littoral flora, the investigation of the benthos being postponed until the summer. The littoral vegetation is plentiful and robust, although as usual on exposed coasts a dwarf growth of some species occurs.

With regard to the distribution of the larger algae, the factors of first importance would seem to be—(1) the temperature of the water ; (2) the salinity of the water ; and (3) the physical nature of the coast. When dealing with an area such as Clare Island, the conditions dependent upon these three factors are fairly uniform, and then the distribution of the algae and algal associations appear to be principally affected by conditions of illumination, desiccation, and exposure to waves and rough water. The respective influence of each of these may, to a certain extent, be readily observed. The effect of light may be studied in shady situations, such as caves or deep gulleys. The importance of not being exposed to dry air may be observed by means of rock pools, when it will be noted that sublittoral algae and species which are rarely uncovered by the tide can occur in pools nearly up to high-water mark, whilst the effect of breakers and rough water will be detected on passing from a fully exposed to a sheltered part of the shore. The influence of the first two factors is, no doubt, intimately connected, as sublittoral species have of necessity a diminished amount of light, but the presence of deep water algae in dark and partly dry caves would suggest that light, and not air-exposure, is often the determining factor.

The collections made on Clare Island contain numerous microscopic species. Several of these are new to Ireland, and quite as many supplied the first specimens from the British Isles for the Herbarium. A few species obtained were entirely unrepresented at Kew.

Turning now to the work on the mainland, one day at Mallaranny was all that could be spared for studying the sand-bay flora of Clew Bay. The littoral vegetation here is very meagre compared with that of the rocky coast of Clare Island, but a number of shallow pools and low rocks exist which support a flora characteristic of such a shore. Clew Bay is very suitable for dredging, and it may be confidently expected amply to repay careful investigation of the benthos.

A trip to Bellacragher Bay, an arm of Blacksod Bay, for the purpose of examining the brackish flora, was of special interest. At the particular portion of the bay visited, a Brown and Green Seaweed vegetation was much in evidence, whilst the Red Algae (*Florideae*) were almost entirely absent. A most attractive piece of work in such localities is to trace the gradual appearance of the different species of *Florideae*, as the more saline areas are approached. The flora of Bellacragher Bay is typical of a land-locked arm of the sea. It is largely developed in many of the Scotch lochs, and is well worthy of a more detailed investigation than it has hitherto received.

In striking contrast to Bellacragher Bay was the profusion of *Florideae* in parts of Achill Sound. Protected at each end from the open sea, yet feeling the full effects of the tide, the floridean vegetation in April was magnificent. Much of the Sound is completely uncovered at low tide, and the channels of rapidly-flowing water which are left, possessed in places a most luxuriant vegetation. Some very fine specimens were collected here for the Herbarium.

It is well-known that the phanerogamic flora of the West of Ireland presents features of remarkable interest. There is the striking mixture of South-west European plants with those characteristic of North America. *Erica mediterranea*, *E. Mackaii*, *Arbutus Unedo*, *Saxifraga Geum*, and *Pinguicula grandiflora* may be taken as representatives of the first group; whilst *Eriocaulon septangulare*, *Sisyrinchium angustifolium*, and *Spiranthes Romanzoffiana* are examples of the second. In addition to these there is the remarkable sight of such alpine plants as *Gentiana verna*, *Dryas octopetala* and *Euphrasia salisburgensis* growing in immense quantities right down to sea-level, and that in a warm humid climate. Lloyd Praeger has stated that such a startling mixture of types is not to be found elsewhere in Europe. In the case of the marine algae the same overlapping of northern and southern elements is, to a certain extent, known to exist, a fact which was strikingly verified in at least one instance during the Easter visit.

The explanation of these peculiar phenomena is one of the interesting problems before the biologists at Clare Island. It is too much to hope that a solution of such intricate problems will be effected by a local survey, but if only a more detailed account of facts be obtained, much good and important work will have been accomplished.

XLIII.—MISCELLANEOUS NOTES.

MR. ROBERT GILL, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, a Curator in the Agricultural Department of Southern Nigeria.

Bust of Darwin.—The centenary of the birth of Darwin has been marked by the presentation to Kew of a bronze bust of this very distinguished naturalist. For this gift the institution is indebted to the generosity of the Bentham Trustees. The bust is the work of Mr. Horace Montford; it has been placed in Museum No. I., and was put in position on June 23, 1909, the central day of the Darwin Centenary celebration at Cambridge. At this celebration Kew was officially represented by the Director, who, on the same day, presented to the University the following address:—

UNIVERSITATI CANTABRIGIENSI
S. P. D.

Quod etiam nos ad ferias natales viri clarissimi scientiarumque naturalium laude florentis CAROLI DARWIN concelebrandas invitastis gratias quam maximas vobis agimus. Nobis enim in honore praeceptuo habendus vir quam eruditus tam liberalis, beneficiorum cujus ac munificentiae gratia botanices studiosi gaudent opus momenti maximi, **Index Kewensis Plantarum Phanerogamarum** nuncupatum, in usum publicum confectum atque editum esse.