

put themselves in authority over us: the freedom to display ignorance granted to these, as at Wavertree these last few weeks, is nothing short of a menace to society.

Still, the physicians have to heal themselves. When, fifty years ago, I began to teach my engineering students at the 'Central' to look chalk in the face, in the hope of leading them to take some slight interest in geology, I had the beautifully coloured large Geological Survey map of our islands, made by joining the separate sheets, pasted upon the wall, on the stairway leading to the laboratory, varnished and framed; it was there until I left in 1914. I made the class buy the key map of the Survey and Charles Kingsley's lectures on "Town Geology", advising students to hang the map up in their bedrooms. Looking for the map at the jubilee celebration, at the 'Central', this week, I found the wall reduced to the condition of the map bought by the 'brave Captain' in "The Hunting of the Snark"—a perfect and absolute blank! Modern professors of engineering have no use for geology; their hearts are so encased in steel that they no longer see anything in stones. A like map has reigned at the head of the stairway to the large science workshops at Christ's Hospital since the school was opened at Horsham more than thirty years ago. I expect soon to see its place taken by School Certificates. Geology is only brought before us to-day by the saving grace of the railway poster.

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Wasting Disease of *Zostera marina*

IN Dr. Kathleen B. Blackburn's letter on this subject¹, the conclusion seems well established, through a study of the chromosomes, that the narrow-leaved form of the eelgrass (grass wrack), which has in many of the diseased areas replaced the larger and broader type of plant, is clearly a form of *Z. marina* and not a hybrid of *Z. marina* and *Z. nana*, as some have believed. Miss Blackburn therefore suggests that the difference in the width of the leaves of varieties of *Z. marina* may be a purely ecological character. She further remarks that, in the localities examined, the width of the leaf of *Z. marina* was directly proportional to the depth of the water, and that the very narrow-leaved forms were those that had been longest exposed by the fall of the tide, while the broader were those that had not been exposed at all.

It may be of interest to report that on the American coast the evidence does not entirely support this ecological interpretation. *Zostera marina* is the only species recognised as occurring on this side of the Atlantic, and it extends from southern Labrador (with outlying stations in southern Greenland and in James Bay) southward to a point near the city of Beaufort, North Carolina. In travelling from north to south, one notices a gradual and progressive reduction in the size of the plant and in the width of the leaf blade. Leaves from plants found in northern Maine, for example, are often more than three times the width of those from Pamlico Sound, North Carolina. The diameter of the rhizomes likewise undergoes reduction southward, and there is an accompanying reduction in the number of leaf veins.

Dr. Setchell, in his excellent paper, "Morphological and Phenological Notes on *Zostera marina* L."², does not specifically state that the plants in their first year of growth are smaller and have narrower leaves than in the more mature stages, although he seems

to demonstrate this in his illustration of stages in the growth of plants. From observation of *Z. marina* in places where it has begun to re-establish itself along the Atlantic coast from Maine to North Carolina, there is ample evidence of this habit of growth. In many such places the plant has shown some slight evidence of recovery, and wherever examined, the new growth has been found more slender than in the mature plants.

At a point on the coast of eastern Maine where the average tide fluctuation is nearly 18 ft., I found eelgrass growing in more than 10 ft. of water at mean low tide. The plants here were narrower than in those that appeared to be of the same age growing in shallower water. It does not seem, therefore, that the depth at which the plant grows always is positively correlated with breadth of leaf.

The observed characters of *Zostera marina* on the Atlantic coast of North America would seem to indicate that robustness is correlated with both temperature and age of the plant, the northern forms of a given age being larger and having broader leaves than those from farther south. Perhaps the length of the growing season may be an important factor in this regard. Setchell shows that vegetative growth of this species takes place when the water temperature is 10°–20° C., while reproduction occurs only between the temperatures of 15° and 20° C. According to the same author, no growth or reproduction takes place when the temperature is either above or below these limits or during the period when the temperature is declining from 20° to 10° C., which he calls recrudescence rigor. Thus, there is a shorter growing season in extreme southern latitudes than in most of the northern areas of the plant's normal range.

Among local factors that frequently influence the development of submerged aquatics may be mentioned water currents, temperature, the condition of the bottom, particularly in regard to type and texture of soil, and the chemical composition of the water, especially in relation to fluctuation of salinity of tide water sections of coastal river systems. My own observations seem to show that the general vigour of *Zostera marina* is lessened in areas of greatly reduced salinity, and that at such places the leaf is comparatively narrow. The above and other factors are to be considered in any interpretation of the causes of abnormal leaf development.

It is conceivable that, in some circumstances, as in British waters, the plants might be stimulated by depth to produce broad leaves, yet this does not seem to be typical of conditions on the American coast.

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¹ NATURE, 134, 738; 1934.

² Univ. Calif. Publ. Bot., 14, No. 19, 389–452; 1929.

Germination of Resting Spores of Onion Mildew (*Peronospora Schleideni*)

IN spite of the ubiquity of the *Peronosporas* and the frequent occurrence of sexually produced spores amongst the various species, very little is known in regard to the ultimate fate and method of germination of such oospores. Several workers have recently commented on this fact.