

THE MINNESOTA SEASIDE STATION.

AMONG newer American establishments for the study of marine biology, the Minnesota Seaside Station has awakened considerable interest. It is upon British soil, being situated about sixty miles north-west of



FIG. 1.—Buildings of Minnesota Seaside Station as seen across Station Cove. The large laboratory building is not shown, but stands immediately to the right of the smaller building. The buildings face nearly south.

Victoria, British Columbia, just at the entrance of the Straits of Fuca. The site was chosen after a careful reconnaissance of the Pacific coast, both Canadian and American, and presents some remarkable advantages. So far as accessibility is concerned, it may be reached from Seattle, Port Townsend or Victoria, and commands, not only the outer waters of the ocean, but the region of Puget Sound as well.

The physiographic features of the shore in the vicinity of Port Renfrew, Vancouver Island, the nearest harbour to the Station, are extraordinarily favourable for the development of its special and characteristic work. The country rock is a tilted slate, cut by dykes of diabase and overlaid by millstone grit and sandstone. The bold promontory, just north of the Station, is of sandstone covered with glacial drift. The very broad shelving shore of sandstone is dotted with a great number of pot holes, worn by glacial boulders and ironstone concretions from the country rock. These pot holes vary in size and depth from little shallow saucers a few inches across to huge wells and cisterns many yards in diameter and often twenty feet or more in depth. Hundreds of such pools between tide marks serve as natural aquaria. Each has its characteristic distribution of plants and animals. For this reason, the Station shore is astonishingly rich in types of oceanic fauna and flora. Within a couple of miles, the formations change, and

no other place upon the entire Alaskan, British Columbian or Californian coast is known to be so favourable for naturalistic study and research as that where the Minnesota Seaside Station has been built.

The thing of most importance about a seaside station is the sea. Minnesota, occupying a mid-continental position, might send its students with equal ease to the Atlantic or to the Pacific. It seemed, however, that a rallying point upon the Pacific would be the more inspiring. The eastern shore is already somewhat hackneyed and overcivilised, so that the distractions of village life, golf, yachting and society may, in some circumstances, interfere with the free and genuine activities of a station. It is undeniable that, when a laboratory by the sea has acquired the appurtenances and refinements of a highly organised institution, something is lost on the side of Nature to counterbalance the gain in comfort and conventionality. The Minnesota Seaside Station, two thousand miles distant from the laboratories of the University of Minneapolis, behind the great plains and mountain ranges, sixty miles from any considerable settlement, free from the influence of morning newspapers, daily mails and inquiring tourists, has for its paramount source of interest and principal spring of enthusiasm the sea, and the sea alone.

From its site, three miles south of the harbour of Port Renfrew, visited four times a month by a little coasting steamer belonging to the Pacific Navigation Co., the Seaside Station looks

out directly towards Cape Flattery. To the right roll the swells of the open Pacific. To the left, across the blue straits, rise, peak upon peak, the Olympics with their glistening glaciers, untrodden summits and eternal snows. There are few more beautiful spots in



FIG. 2.—Group of students holding an extended specimen of the Giant Kelp, *Nereocystis prriapus*. The holdfast is seen hanging down on the right and the leaves are held upon the left.

northern latitudes. One feels the magic of the mountains, the forest and the sea, and not to be a naturalist in such an environment is scarcely possible.

During its first season, there were twenty-nine in attendance at the Station. In 1902, the number rose to

thirty-eight. Most of the party met at Minneapolis and journeyed to the coast in chartered cars which were cut off for several days in the mountains both going and returning. This enabled those who wished to climb some of the peaks in the vicinity of Banff, Laggan and Glacier. The whole region along the Canadian Pacific Railway from Banff to Mission abounds in problems for alpinists, and there is no better climbing in Europe or North America than that near Laggan, where Mounts Temple, Victoria, Hector, Hungabee and Lefroy, among the rest, are a perpetual challenge to the venturesome.

At the Minnesota Seaside Station, three buildings have been erected. One, a large log boarding house some thirty by sixty feet upon the ground and two storeys in height, serves as a camp. A smaller one storey log house is used as a laboratory for zoology, and a two-storey frame building, twenty-four by forty feet in dimensions, is occupied by elementary and advanced students of botany. Lecture courses last year were conducted for the most part out of doors—either in the forest or upon the rocks by the sea. Indoor talks in connection with

enrolled themselves among its members. It is, in fact, organised somewhat like a club, and while unable to compete with the older stations in expenditure, nevertheless derives a certain advantage from its community of interest and independence.

For the use of the illustrations which accompany this article, we are indebted to the *Popular Science Monthly*.

MR. CARNEGIE'S ST. ANDREWS ADDRESS.¹

MR. CARNEGIE'S rectorial address at St. Andrews is an interesting study in the psychology of the typical business man of modern times, as well as a memoir on the conditions of great business, which people must read for the sake of the shrewd and acute remarks themselves, such as no statesman or economic student can afford to overlook. The address is written exclusively from the point of view of a great industrial chief who has availed himself to the full of the conditions of business in the most favoured and wealthy community which

the world has yet seen—that of the United States. He has observed and seized the great opportunity for the concentration and development of industry on a large scale which the United States has afforded. A large area of complete internal free trade, and an active, vigorous and rapidly growing population throughout this area, have given the United States manufacturer for many years an unrivalled opportunity for colossal arrangements, involving the cheapening of cost by means of subdivision of labour and the institution of mechanical and automatic processes wherever hand labour could be superseded. This opportunity, properly used, has been the occasion of Mr. Carnegie's gigantic fortune, and it is accordingly natural that he should speak of all business as conforming to this type, so that a community like the United States supplies the model for great manufacturing business in future. The cheapness of production once established, it is assumed, will enable the United States to be the most successful competitors internationally, and Britain accordingly will take a second place in future, if not a third place, with Germany second. Naturally

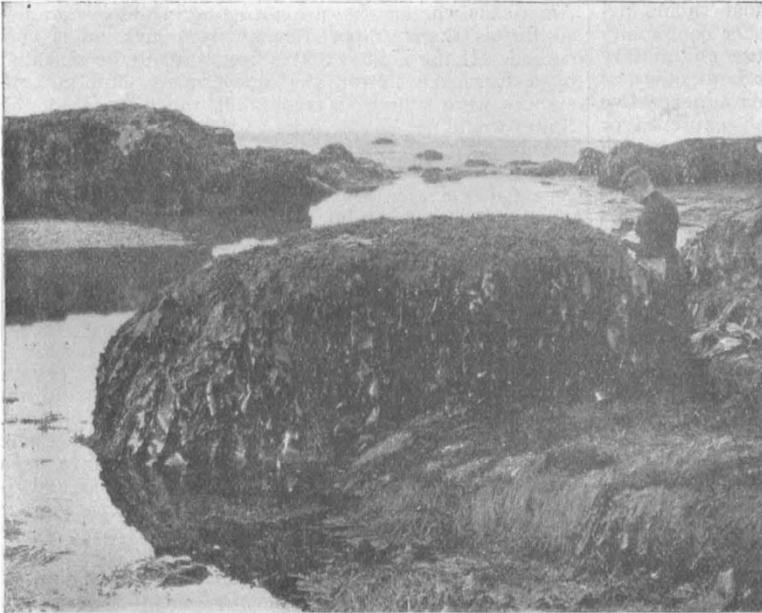


FIG. 3.—Kelp-covered rock at low tide showing specimens of *Alaria*, *Egregia* and *Halo-saccion* in characteristic attitudes. *Phyllospadix scouleri* appears in the foreground.

microscopic study of fresh material or around the fireplace in the large living room after dinner were also features of the work.

Several papers, both of a scientific and popular nature, and based upon observations or research at the Minnesota Seaside Station, have already been published. Some of these have appeared in "Minnesota Botanical Studies" and others in "Postelsia," the year-book of the Station, the volume of which for 1901 has recently come from the press.

Many useful phases of marine biological work have not yet been, and perhaps never will be, developed at Port Renfrew. There is an absence of dredging apparatus. No pumps, conduits or artificial aquaria have been installed, nor are the buildings supplied with electricity or gas. A serviceable steam launch is still one of the dreams of the future. Unlike most other marine stations, the one on the Straits of Fuca has never received any gratuities whatever from Government, institution, society or individual, but has been built and modestly equipped entirely through the cooperation of those who have

also, Mr. Carnegie regards the protectionist policy of the United States as having contributed to this result and given the United States manufacturer the monopoly of his large home market. Nor is it surprising to find the ordinary American idea about the economic effect of military armaments put forward by Mr. Carnegie as explaining the backward state of Europe compared with the United States. The ideas come from his environment and history, and the result of their combination with Mr. Carnegie's own shrewd observations is the present most instructive address.

The interest, however, is mainly psychological. Economically, there is nothing really new and true. Adam Smith explained long ago the economic gain of the subdivision of labour, the condition of manufacturing on a large scale, while the practical value of manufacturing on a large scale and for the largest possible market was exemplified first of all, not by the American, but by the Lancashire manufacturer, who had the home market of

¹ A rectorial address delivered to the students in the University of St. Andrews, October 22, by Andrew Carnegie. (T. and A. Constable, 1902.)