

The construction of a new sandy beach at Cherbourg offered a unique opportunity for studying the colonization of sand under similar conditions. The beach, about 200—300 metres in depth and 500 metres long, was covered to a depth of half to one metre with sand dredged near by from a depth of four to nine metres. When completed in June 1932 the sandy beach was practically barren of life. The chief exception was the presence of a few patches of relict fauna which had survived from the earlier beach, comprising *Audouinia tentaculata*, *Arenicola marina*, *Nephtys caeca*, and the anemone *Cylista viduata*.

Subsequent colonization was of two kinds — the invasion of adult forms, which was the first phase, and later the settlement and growth of free-swimming larvae. The adults were motile forms such as *Ophiodromus flexuosus* and various spionids. Along with these came diatoms on the sand surface, and algal spores on the stones — *Callithamnion corymbosum* and *Pilaiella littoralis* first, followed by *Polisiphonia* spp, *Rhodymenia*, *Porphyra*, and *Fucus*. The second phase (spring 1933 to spring 1934) contained animals which utilized the food and shelter provided by the earlier colonizers: on the stones *Ascidia mentula*, *Pomatoceros*, *Balanus*, and a very rich polychaete fauna sheltering among these, and in the sand young *Arenicola marina*, *Nephtys*, *Audouinia*, spionids, capitellids etc.

This paper gives a detailed account of the pre-existing fauna, and preliminary observations on the process of recolonization. The chief generalization emerging at present is the necessity of a plant fauna in the sand (mostly diatoms) before the animal fauna can establish itself in any quantity. The future development of the area will render these early stages even more interesting. It is to be hoped that along with this, the opportunity will be taken of giving details of the rate of growth of the colonizing polychaetes.

H. B. M.

**J. A. Kitching.** "An introduction to the ecology of the intertidal rock surfaces on the coast of Argyll." Trans. Roy. Soc. Edinburgh. Vol. LVIII, Pt. II, No. 15, pp. 351—374. Edinburgh, 1935.

Conditions in the intertidal region of the shore are rendered very complex by the numerous and widely varying environmental factors involved. In this paper Kitching describes the distribution of some of the important intertidal animals and algae in an area where conditions are to some extent simplified. Every stage from high wave-exposure to complete shelter is available within a short distance; tidal ranges vary from six to fifteen feet at spring tides; and most important of all, shore surfaces dropping comparatively uniformly and at an even slope into deep water are plentiful. This account is confined to primary forms, deriving their food supply directly from the water, i. e., as plankton or dissolved salts. Secondary forms such as *Patella* and *Purpura*, which depend for their food on other littoral species, are not considered.

Wave-exposure plays an important part in determining distribution. The splash-zone is raised by wave action, so that forms like *Pelvetia canaliculata* and *Chthamalus stellatus* can reach a higher level than in a sheltered place. On the other hand fragile forms like *Antedon rosacea* and *Ascidea virginea* may ascend into the intertidal zone in places where this is sufficiently sheltered. The angle of slope of the surface is another factor with clearly

defined limits for certain species. Here, however, several other factors seem to be involved, such as the adequacy of the resulting illumination (in certain algae), or the degree of protection from too great illumination (some sponges). Tidal level also has a very marked controlling effect on distribution, involving as it does such factors as period of immersion, period of insolation, etc., and these in turn involving further factors such as the period available for feeding, the diurnal range of temperature, etc. Here, therefore, it is difficult to separate the individual factors directly concerned.

A detailed account is given of the distribution of the various species concerned. Where there is an obvious relation to environmental factors this is discussed. In addition a table is given of the observed values of pH, oxygen concentration, and temperature at a representative series of stations. The value of this paper lies not only in its new observations on distribution, but also in its attempt to give an accurate measure of some of the environmental conditions, and thus render possible a comparison with other localities.

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**W. Templeman.** "Lobster tagging in the Gulf of St. Lawrence." Journ. Biol. Board Canada. Vol. I, No. 4. Toronto, 1935.

The experiments in marking lobsters agree in respect of results which indicate a relative sedentary behaviour. Few have been found to have migrated any notable distance from the place of marking. In this case the result is not surprising, for the lobsters were captured and liberated at the lonely Magdalen Islands in the Gulf of St. Lawrence, a region with the lobster fishing grounds near the islands and deep water all round. The recaptures were made therefore in the region of marking and on either side. As the marking took place at the end of the summer of one season and the recaptures early in the following season, all that can be gathered is that in the interval the lobsters had visited deeper water and returned. Nor did they go round the islands from the eastern to the western side. Not one was reported from any region but the islands. An earlier experiment on the coast of the Northumberland Strait gave similar results. The only indication of some degree of sex difference was that the females to some extent migrated, or rather returned, to a region more distant than the males.

The lobsters marked were large and mature and had recently cast. The method of marking by a label fastened by piercing the telson, is open to criticism, for it is evident that when casting took place the freeing of the cuticle would be very difficult, indeed impossible. The marking on the Northumberland coast was done simply by threading the metal label on a piece of copper wire and twisting the latter loosely, around the base of the large claw (chela) and this method proved satisfactory, and the method if adopted would avoid the risk of converting the subject of experiment into a victim.

*A. M.*

**T. H. Järvi.** "Die Seefischerei von Finnland." Handb. d. Seefisch. Nord-europas, Bd. VIII, H. 4. E. Schweizerbart'sche Verlagsbuchhandlung (Erwin Nägele) G. m. b. H., Stuttgart, 1934.

A new volume in the series edited by *L ü b b e r t* and *E h r e n b a u m*, on the fisheries of Northern Europe, deals with the fishery of Finland.