

plants a foothold. A striking manifestation of this consolidation is sometimes to be seen at places where the uncompressed soil has weathered out, leaving the consolidated soil beneath the rut as a ridge standing out in relief.

By no means every sandy salt marsh is colonized quite in the manner described. Frequently the species of plants are not the same, though they play substantially the same parts. For instance, near Silverdale, in Morecambe Bay, and elsewhere, *Glyceria maritima* is the actual hummock-building pioneer (phase 1), and is followed by the grasses *Lepturus filiformis*, *Agrostis alba* v. *maritima*, and *Festuca rubra* v. *pruinosa*, together with *Plantago* and *Armeria*. (Cf. Appendix V, p. 269.)

Muddy Salt Marshes.—There are different consistences of mud, and this character has a marked influence on the nature of the pioneer colonists. Soft mud and relatively hard mud, however, contrast with sand, in that they show little tendency to develop hummocks in the manner described in the preceding pages. The material does not collect rapidly at particular spots as in the case of sand. Where hummocks are a very prominent feature on mud, they are in part residual, i.e. have been exaggerated by the cutting away of the intervening ground. (See also p. 195.)

Soft mud¹ is relatively more obstinate to colonization than firm mud—(1) because it is not easy for many otherwise suitable species of plants to get a proper foothold; (2) because its waterlogged state retards the diffusion of oxygen needed for the respiration of the embedded parts of the plants. Consequently it is not surprising that the pioneers on soft mud are usually specialist plants capable of dealing with these peculiarities of the habitat. By means of creeping rhizomes rooting all along, they get a good hold of the ground, whilst, by the provision of an ample system of internal lacunæ throughout the plant, the oxygen dissociated from carbon dioxide in the process of chlorophyll assimilation is able to diffuse readily to the embedded portions of the plant.

The commonest pioneer on soft mud is the Grass-wrack

¹ "Soft mud" may be defined roughly as mud into which the foot sinks ankle-deep or more; "firm mud", not beyond the sole of the boot.