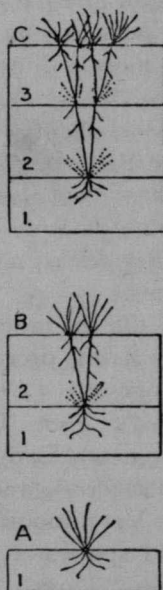


visible between the tufts, sand is both removed from the dunes in this phase as well as deposited. As, however, the amount retained exceeds that blown away, the sand-hills continue their growth. But if, as commonly happens, on the type of shore under consideration, another bank of shingle or sand is thrown up on the seaward side of the one first formed, this may undergo colonization by plants, and another, outer, system of dunes will arise. Such a system intercepts much of the sand supplies that fed the older systems, with the result that the first range will grow no more in height, and may, on the contrary, be lowered by loss of sand which is not replaced. Where sand supplies entirely fail, dune systems gradually shrink, unless the surface be covered by a perfect carpet of secondary colonists. Even then, though it may be deferred for centuries, the fate of a dune starved of sand is to be lowered to base level, because rabbits are continually burrowing and exposing the bare sand to the wind.

Fig. 12. — Diagrams showing Relation of *Psamma* to an Intermittently Rising Ground Level

A, Plant growing in the original soil (1). B, A second stratum of soil (2) having been deposited, buds push up to the new surface, where tufts of leaves are formed. Roots arise from these rhizomes and the original tuft of leaves dies (dotted). C, Shows the further history after addition of a third layer of soil (3). The dotted structures are the dead leaves. (After Massart.)



The type of dune building just outlined tends to produce successive ranges of more or less parallel hills (Plate IV, 2). The dune, in many quarters of the earth's surface, is an effective barrier of defence against sea encroachment. Egypt would probably have been blotted from the map and the fertile Nile Valley obliterated, as has happened over large tracts abutting on the Persian Gulf, had the sand drifting up from the Desert not been arrested by vegetation and protecting sand-hills thus brought into being. These primary ridges, however, become modified and distorted by the play of conflicting winds, so that the prevailing relief is very complicated and defies analysis.