

or during relatively recent periods. The small dimensions and areolar structure of these fragmental volcanic materials admit of their being universally distributed over the floor of the ocean, and from the very fact that they are easily distributed by meteorological and oceanic agencies, they are especially characteristic of pelagic deposits. The second of these categories comprises all the rocks and minerals derived immediately from the disintegration of all continental and other lands by ordinary meteorological agencies, especially from the disintegration of crystalline, schisto-crystalline, and clastic rocks, which form the larger part of the continental masses. These disintegrated materials are carried to the ocean by rivers and by winds, and are distributed to the deep sea by waves, tides, currents, and floating ice, but not so widely as the fragmental volcanic materials of the first category; they are essentially characteristic of those deposits formed near continental shores and islands, which we have called Terrigenous Deposits.¹

(a.) *Recent Volcanic Products.*

It is merely necessary to cast a glance at the synoptical Tables of Chapter II. to be convinced of the universal distribution of volcanic products in marine deposits. In running the eye down the column indicating the mineral particles, it will be seen that in nearly all the samples of the different types of deposits minerals and rocks occur which we recognise, from the study of terrestrial volcanoes, as having been derived from eruptions of the present or of relatively recent geological periods. It is not the same, however, with those rocks and minerals to which we attribute a continental origin, properly so called, for these last are especially abundant near land, and are almost wholly absent in the central parts of the great ocean basins. The fragmentary volcanic materials, while very often associated with the continental rocks and minerals near shore, are especially abundant in, and characteristic of, deposits far from land. It could not well be otherwise, if the structure, conditions of formation, and mode of ejection of these volcanic materials be borne in mind. Whilst there may be a limit, towards the open sea, to which the minerals and fragments derived from the disintegration of the continental masses can be transported, there is no such limit for the rocks and minerals projected as dust, lapilli, and masses of pumice by terrestrial volcanoes, and though they may have a more restricted distribution, the same is the case with ejectamenta of submarine eruptions.

In this connection it is but necessary to recall the distribution of active and recent volcanoes over the earth's surface to show how favourably the ocean basins are situated for receiving the fragmentary materials projected into the air or the sea during eruptions.

¹ Although we believe that there are no essential differences between the older and recent eruptive rocks, in the sense formerly admitted by petrographers, there is no doubt that each of these two groups, in the generality of the cases under consideration, offers some peculiarities on which rests the subdivision adopted in this and other chapters.