

so abundant are such fragments in some places that the fine amorphous matter, which may be regarded as the ultimate and universal basis of the deposit, appears to be present only in small proportion.

Mr. Murray has studied very carefully the distribution of volcanic débris over the floor of the ocean. He finds that recognizable pieces of pumice, varying from the size of a pea to that of a foot-ball, have been dredged at eighty stations, distributed all along our route; and he finds them in greater abundance in the neighborhood of volcanic centres, such as the Açores and the Philippines, than elsewhere. In deposits far from land they were most numerous in the pure deep-sea clays; minute particles of feldspar, having the appearance of disintegrated pumice, were detected in all such ocean deposits. Many of the large pieces were much decomposed, while some were only slightly altered; some were coated with manganese and iron, and many appeared as a mere nucleus, round which the manganese and iron had aggregated. They varied greatly in structure, being highly vesicular, or fibrous and compact, and in color from white through gray or green to black. There seemed to be every gradation from the feldspathic to the extreme pyroxenic varieties.

Mr. Murray believes that all the pieces of pumice which we find at the bottom of the sea have been formed by subaërial volcanic action. Some of them may have fallen upon the sea; but the great majority seem to have fallen on land, and been subsequently washed and floated out to sea by rains and rivers. After floating about for a longer or shorter time, they have become water-logged and have sunk to the bottom. Both in the North Atlantic and in the Pacific small pieces of pumice were several times taken on the surface of the ocean by means of the tow-net. Over the surface of some of these, serpulæ and algæ were growing, and crystals of sanidine projected, or were imbedded in the feldspar. During our visit to Ascension, there