

made a series of experiments with pumice stones dredged from the North Pacific sea-bed at a depth of 2900 fathoms. After these fragments, which were about the size of a hen's egg, had been out of the sea for seven years, they were placed in vessels of sea-water and floated lightly. They slowly sank in the water, some reaching the bottom of the vessel in three months, and others taking nine months. Similar experiments were made with the basic variety of pumice collected by Captain Turpey on the surface of the South Pacific, and it took one year and eight months before some of the fragments sank to the bottom of the vessels.

The great majority of the pumice fragments dredged by the Challenger from the sea-bed were more or less rounded, and varied from the size of a man's head or a cricket-ball down to the size of a pea or mustard-seed; many fragments, however, were angular. It is probable that nearly all these fragments of pumice floated a short time after their ejection at the surface of the sea, and then sank to the bottom. From their great abundance near volcanic centres, it is probable that some fragments float only for a very short time. The general appearance of some of the larger fragments of pumice from deep-sea deposits is represented on Plate I. In all the specimens the surface layers have undergone more or less alteration into a soft, brown-coloured, clayey substance; but in the case of the specimens represented in figs. 5 and 6 the structure of the pumice is almost completely lost except in the very centre, while the outer layers are composed of black depositions of the peroxides of iron and manganese—in short, these fragments have been transformed into manganese nodules with pumice nuclei.

There were great numbers of pumice stones in the dredgings around the Azores in the Atlantic, off the Kermadecs in the Pacific, around some of the Philippine Islands, and off the coast of Japan, and in general close to all recent volcanoes. In the North Pacific, hundreds of miles from land, at depths of 2300, 2900, and 2050 fathoms, the trawl and dredge brought up hundreds of these more or less rounded pumice stones. In general they were rather abundant in the Red Clays and Radiolarian Oozes, but less so in the Blue Muds and calcareous oozes, except where these were close to active volcanoes. It may be said, however, that in no case was a large quantity of any pelagic deposit passed through sieves without a number of pumice fragments, of small or large size, being detected, and minute particles can generally be observed when a relatively small sample of the deposit is under examination.

The most numerous specimens, collected floating at the surface or lying on the bottom of the sea, belong to the well-known variety of *liparitic pumice*. They are whitish or greyish, generally with elongated fibres; when little altered they present a silky aspect, but in many instances decomposition has transformed them, even to the very centre, into a friable earthy mass, which can be reduced by the finger nail, when the pumice is wet, to amorphous earthy matter with a muddy consistence. When fragments of this variety are examined under the microscope, they are seen to be composed of a colourless