

lime, much higher than what is usually met with in a Blue Mud, this being due, as has just been pointed out, to the presence of pelagic shells, which here approach nearer to the coasts than where blue mud deposits prevail. The insoluble portion, it will be seen from the analyses, must be almost exclusively made up of grains of quartz, since the alumina, the iron, the lime, and magnesia do not form more than a small fraction of this insoluble residue. The high percentage of insoluble silica shows that the mineral particles come from continental rocks, and not, as in the case of typical pelagic formations, from the disintegration of volcanic products. The felspar fragments indicated by the microscopical examination are also derived from ancient crystalline rocks, in which potash is a dominant base, and which doubtless furnish by their alteration one of the necessary elements in the constitution of glauconite, so characteristic of these Green Muds. We will refer to this fact in the chapter on the mineralogical composition and mode of formation of glauconite.

The Challenger met with Green Muds and Sands off the coast of Portugal, off the east coast of North America, off the Cape of Good Hope, off the coasts of Australia, Japan, and South America. By other expeditions they have been discovered off the Californian coast of America, off the eastern coast of Africa, and in many other regions. The Green Muds and Sands would appear to form an interrupted band along many continental shores at the upper edge of the continental slope, and the estimated area occupied by these deposits is about 1,000,000 square miles of the sea-bottom, including those occurring in the shallow-water zone in depths less than 100 fathoms.

VOLCANIC MUDS AND SANDS.

Around oceanic islands of volcanic origin the deposits consist in a large measure of the rocks and minerals arising from the disintegration of the volcanic rocks of the islands. Near shore, within the region of wave action, these are largely sands, composed of volcanic material and the fragments of calcareous organisms, the mean diameter of which may be from 0.5 mm. to several millimetres according to situation. In deeper water, further from the islands, the mineral particles become less abundant and smaller, while pelagic organisms, such as *Globigerina* shells, Coccoliths and Rhabdoliths, and Pteropod shells, increase in number, so that the deposit assumes the character of a mud in which there is a considerable quantity of clayey and calcareous matter. They are light grey, brown, or black in colour, and have an earthy rather than a clayey character. These deposits may be found along any coast where volcanic rocks prevail, but they are characteristically developed around the volcanic islands of the great ocean basins. In general appearance and composition they present great variety, depending on position, depth, and the organic remains that take part in their formation. In some regions