

volcanic minerals, but off barrier and fringing reefs facing continents there may be a great variety of rocks and minerals. Beyond a depth of 1000 fathoms off coral islands the debris of the reefs begins to diminish, and the remains of pelagic organisms to increase; the deposit becomes more argillaceous, of a reddish or rose colour, and gradually passes into a *Globigerina* ooze or a red clay. Coral sands contain much less amorphous matter than coral muds, but in other respects they are similar, the sands being usually found nearer the reefs and in shallower water than the muds, except inside lagoons. In some regions the remains of calcareous algæ predominate, and in these cases the name *coralline mud* or *sand* is employed to point out the distinction. These deposits have a much greater resemblance to the White Chalk than has a *Globigerina* ooze.

Beyond an average distance of about 200 miles from land, the deposits are characterised by the great abundance of fragmentary volcanic materials which have usually undergone great alteration, and by the enormous abundance of the shells and skeletons of minute pelagic organisms which have fallen to the bottom from the surface waters. These true deep-sea or abysmal deposits may be divided into those in which the organic elements predominate, and those in which the mineral constituents play the chief part.

*Globigerina Ooze.*—Thus are designated all those truly pelagic deposits containing over 40 per cent. of carbonate of lime, which consists principally of the dead shells of pelagic Foraminifera—*Globigerina*, *Orbulina*, *Pulvinulina*, *Pullenia*, *Sphæroidina*, &c.; in the tropics some of the Foraminifera shells are visible to the naked eye. In some localities this deposit contains 95 per cent. of carbonate of lime. The colour is milky white, yellow, brown, or rose, these variations depending principally on the relative abundance in the deposit of the oxides of iron and manganese. This ooze is fine grained; when dried it is pulverulent. Analysis shows that the sediment contains, in addition to carbonate of lime, phosphate and sulphate of lime, carbonate of magnesia, oxides of iron and manganese, and argillaceous matters. The residue is of a reddish brown tinge. Lapilli, pumice, and glassy fragments, often altered into palagonite, seem always to be present, and are frequently very abundant. The mineral particles are generally angular, and rarely exceed 0·08 mm. in diameter; monoclinic and triclinic felspars, augite, olivine, hornblende, and magnetite are the most frequent. When quartz is present, it is in the form of minute, rounded, probably wind-borne grains, often partially covered with oxide of iron. More rarely white and black mica, bronzite, actinolite, chromite, glauconite, and cosmic dust are found. Siliceous organisms are probably never absent, sometimes forming 20 per cent. of the deposit, at other times they are only recognisable after careful microscopic examination. In some regions the frustules of Diatoms predominate, in others the skeletons of Radiolarians.

*Pteropod Ooze.*—This deposit differs in no way from a *Globigerina* ooze except in the presence of a greater number and variety of pelagic organisms, and especially in the presence of Pteropod and Heteropod shells, such as *Diacria*, *Atlanta*, *Styliola*, *Carinaria*.