

include besides quartz, felspars, phosphate of lime, and other minerals, more or less altered. The Foraminifera and fragments of Echinoderms and other organisms in these muds are frequently filled with glauconitic substance, and beautiful casts of these organisms remain after treatment with dilute acid. At times there are few calcareous organisms in these deposits, and at other times the remains of Diatoms and Radiolarians are abundant. When dried these muds become earthy and of a grey-green colour, and they frequently give out a sulphuretted hydrogen odour. The green sands differ from the muds only in the comparative absence of the argillaceous and other amorphous matter, and by the more important part played by the grains of glauconite, to which the green colour is chiefly due, although it appears sometimes to be due to the presence of organic matter, probably of vegetable origin, and to the reduction of peroxide of iron to protoxide under its influence.

*Red Muds.*—In some localities, as for instance off the Brazilian coast of America, the deposits differ from blue muds by the large quantity of ochreous matter brought down by the rivers and deposited along the coast; the ferruginous particles when mixed up with the argillaceous matter give the whole deposit a reddish colour. These deposits, which are very rich in limonite, do not appear to contain any traces of glauconite, and have relatively few remains of siliceous organisms.

*Volcanic Muds and Sands.*—The muds and sands around volcanic islands are black or grey; when dried they are rarely coherent. The mineral particles are generally fragmentary, and consist of lapilli of the basic and acid series of modern volcanic rocks, which are scoriaceous or compact, vitreous or crystalline, and usually present traces of alteration. The minerals are sometimes isolated, sometimes surrounded by their matrix, and consist principally of plagioclases, sanidine, amphibole, pyroxene, biotite, olivine, and magnetic iron; the size of the particles diminishes with distance from the shore, but the mean diameter is generally 0.5 mm. Glauconite does not appear to be present in these deposits, and quartz is also very rare or absent. The fragments of shells and rocks are frequently covered with a coating of peroxide of manganese. Shells of calcareous organisms are often present in great abundance, rendering the deposit of a lighter colour, and the remains of Diatoms and Radiolarians are usually present.

*Coral Muds and Sands.*—These muds frequently contain as much as 95 per cent. of carbonate of lime, which consists of fragments of Corals, calcareous Algæ, Foraminifera, *Serpula*, Molluscs, and remains of other lime-secreting organisms. There is a large amount of amorphous calcareous matter, which gives the deposit a sticky and chalky character. The particles may be of all sizes according to the distance from the reefs, the mean diameter being 1 to 2 mm., but occasionally there are large blocks of coral and large calcareous concretions; the particles are white and red. Remains of siliceous organisms seldom make up over 2 or 3 per cent. of a typical coral mud. The residue consists usually of a small amount of argillaceous matter, with a few fragments of felspar and other