

the bottom. It is in the central regions of the Pacific that the typical examples are met with. Like other marine deposits, this one passes laterally, according to position and depth, into the adjacent kinds of deep-sea ooze or mud.

The argillaceous matters are of a more or less deep brown tint from the presence of the oxides of iron and manganese. In the typical examples no mineralogical species can be distinguished by the naked eye, for the grains are exceedingly fine and of nearly uniform dimensions, rarely exceeding 0.05 mm. in diameter. It is plastic and greasy to the touch; when dried it coagulates into lumps so coherent that considerable force must be employed to break them. It gives the brilliant streak of clay, and breaks down in water. The pyrognostic properties show that it is not a pure clay, for it fuses easily before the blow-pipe into a magnetic bead.

Under the term red clay are comprised those deposits which do not conspicuously exhibit the characters of clay, but are mainly composed of minute particles of pumice and other volcanic materials that have not undergone great alteration owing to their relatively recent deposition. If the analyses of red clay be calculated, it will be seen, moreover, that the silicate of alumina present as clay ($2\text{SiO}_2, \text{Al}_2\text{O}_3 + 2\text{H}_2\text{O}$) comprises only a relatively small portion of the sediment; the calculation shows always an excess of free silica, which is attributed chiefly to the presence of siliceous organisms.

Microscopic examination shows that a red clay consists of argillaceous matter, minute mineral particles, and fragments of siliceous organisms; in a word, it is in nearly all respects identical with the residue of the organic oozes. The mineral particles are for the greater part of volcanic origin, except in those cases where continental matters are transported by floating ice, or where the sand of deserts has been carried to great distances by winds. These volcanic minerals are the same constituent minerals of modern eruptive rocks, enumerated in the description of volcanic muds and sands; in the great majority of cases they are accompanied by fragments of lapilli and of pumice more or less altered. Vitreous volcanic matters belonging to the acid and basic series of rocks predominate in the regions where the red clay has its greatest development, and the most characteristic decompositions which there take place are associated with pyroxenic lavas.

Calcareous organisms are so generally absent in the red clay that they cannot be regarded as characteristic; when present they are chiefly the shells of pelagic Foraminifera, and are usually met with in greater numbers in the surface layers of the deposit, to which they give a lighter colour. On the other hand, the remains of Diatoms, Radiolarians, and Sponge spicules are generally present, and are sometimes very abundant.

The description of the fine washings of a *Globigerina* ooze (pp. 913, 914) applies in all respects to the finer parts of a typical red clay. The bones of Cetaceans, Sharks' teeth, cosmic dust, manganese nodules, and zeolites, associated together in typical red clays, are referred to on p. 807.