Clark Ross's Antarctic voyage, had pointed out the great abundance of Diatoms in the Antarctic Ocean, and in the deposits forming near the great Ice Barrier, but the Diatom Ooze was first met with in its most characteristic form during the voyage of the Challenger between Kerguelen and the Antarctic Ice Barrier, in 1260 fathoms. It was afterwards collected at a good many points in the same region by the Expedition, and subsequently by H.M.S. "Egeria" in the South Indian Ocean. In the North Pacific, south of the Kurile Islands, the "Tuscarora" discovered deposits somewhat similar to the Diatom deposits of the southern hemisphere.

The deposit when collected and when wet has a yellowish straw or cream colour; when dried it is nearly pure white, and resembles flour. Near land it may assume a bluish tinge from the admixture of land detritus. The surface layers are thin and watery, but the deeper ones are more dense and coherent, breaking up into laminated fragments in the same way as the deeper layers of a Radiolarian Ooze. It is soft and light to the touch when dried, taking the impress of the fingers and sticking to them like fine flour, and in most respects has the same physical appearance as the purest samples of Diatomite of fresh-water origin. Small samples appear quite homogeneous and uniform, but in all the soundings there were fragments of minerals and rocks, and gritty particles can generally be felt when the substance is passed between the fingers.

It effervesces with dilute acids, and may contain from 3 to 30 per cent. of carbonate of lime, which consists chiefly of the shells of pelagic *Globigerinæ*, but other Foraminifera, fragments of Molluscs, Polyzoa, Echinoderms, Ostracodes, otoliths of fish, and Cephalopod beaks are usually present in greater or less abundance.

In the Challenger collections there are five specimens of Diatom Ooze, all from the Southern Ocean. These range from 600 fathoms at Station 147A to 1975 fathoms at Station 156, the average depth being 1477 fathoms. In colour these deposits are dirty white, pure white, yellowish, or grey.

The principal part of the deposit is made up of the dead frustules of Diatoms belonging to many genera and species, together with Radiolarian remains, Sponge spicules, and fragments of these siliceous organisms. The estimated proportion of siliceous organisms ranges in the five different specimens from 20 per cent. in 600 fathoms to 60 per cent. in 1975 fathoms, averaging 41 per cent.; this is without taking into account the remains of these organisms in the "fine washings," which are largely made up of their comminuted fragments. Diatoms and Radiolarians were, of course, present in all cases, and Sponge spicules were recognised in all or nearly all the samples; arenaceous Foraminifera were also observed whenever a large quantity of the deposit was examined.

The following is a list of the Diatoms observed in a typical Diatom Ooze from the Antarctic, viz., Station 157, 1950 fathoms :—