ATLANTIC OCEAN (HOMEWARD VOYAGE).

Station 330, 2440 fathoms.—There were a good many manganese particles in the deposit, sometimes in the form of tubes, and one worm-tube appeared to be filled in the inside with deposits of manganese.

Station 337, 1240 fathoms.—The sounding tube here brought up a number of Pteropod and Heteropod shells, with a thin coating of manganese, and similar shells were found in the bag of the dredge.

Station 339, 1415 fathoms.—The larger Pteropod and Heteropod shells in this Pteropod Ooze were covered on the outside with thin coatings of peroxide of manganese.

Station 341, 1475 fathoms.—The sounding tube came up empty, except for a few Pteropod and Foraminifera shells, and small particles of peroxide of manganese. On the outside of the tube were several black streaks, which on examination proved to be due to peroxide of manganese.

Station 343, 425 fathoms; Station 344, 420 fathoms.—Some pieces of dead Coral, fragments of rocks and shells, coated with manganese, came up in the sounding tubes. Some of the small rock fragments are black vesicular basalts transforming into palagonite.

There do not appear to have been any large hauls of manganese nodules from the abysmal regions other than those made by the Challenger Expedition. H.M.S. "Egeria" in the centre of the Indian Ocean, and the U.S.S. "Tuscarora" in many parts of the Pacific, have, however, procured in the sounding tube samples of red and chocolate clays identical with those obtained by the Challenger in the regions from which the large numbers of manganese nodules were trawled. It may therefore be assumed that very wide regions of the deep sea, other than those examined by the Challenger, are covered with nodules and organic remains similar to those described in the foregoing enumeration.

In the Atlantic no indications have as yet been forthcoming of manganese areas similar in character and extent to those of the Pacific and Indian Oceans, containing many sharks' teeth, earbones of Cetaceans, crystals of phillipsite, and numerous cosmic spherules, for in none of the samples of deposits procured in the sounding tube are there any of the dark chocolate-coloured Red Clays.[1] The manganese deposits in the Atlantic appear

[1] Mr J. Y. Buchanan has described some small manganese nodules and manganiferous deposits dredged first by himself and subsequently by Mr Murray, in the estuary of the Clyde, Scotland, in 104 fathoms and lesser depths (see *Nature*, vol. xviii. p. 628, 1878; *Trans. Roy. Soc. Edin.*, vol. xxxvi., 1891). The small nodules resemble in some respects those from the deep sea; they contain more quartz and larger traces of copper, but smaller traces of cobalt and nickel. The state of oxidation of the manganese is, according to Buchanan, very little over $Mn_2O_3$, while in deep-sea nodules it falls very little short of $MnO_2$. The peroxide of manganese in the deposits of Loch Fyne and other parts of the Clyde sea-area appears for the most part to have been derived from the chemical works of the district, and not from the decomposition of the minerals and rocks of the deposits; one firm alone, Messrs C. Tennant and Co., state that between the years 1818 and 1846 they threw into the river Clyde over 56,000 tons of chloride of manganese as a waste product of their manufactures. This view as to the source of the manganese seems to be confirmed by Mr Murray's recent extensive dredgings on the west coast of Scotland, for while manganese nodules and coatings are abundant in many regions of the Clyde sea-area—for instance, on the Skelmorlie Bank, in Loch Strivan, Loch Goil, and Loch Long—only relatively small traces of manganese peroxide can be found in the more northern lochs of the west coast, where the rocks and minerals in the deposits are similar in nature to those in the Clyde area.