

and Blue Muds, the carbonate of lime shells being removed from the Red Clays, and masked in the Blue Muds by the abundance of detrital matter. A description of the clayey materials in the different varieties of marine deposits has been given in Chapter III. when discussing the several types of Pelagic and Terrigenous Deposits.

II. MANGANESE NODULES.

The hydrates of manganese¹ along with ferric hydrate are among the most widely distributed bodies in marine deposits, being especially abundant in those of the abysmal regions. In the descriptions of the samples of the deposits from the various stations of the Challenger Expedition, as well as when referring to the organic remains, we have often had occasion to point out the presence of these oxides as colouring matters, or as thin or thick coatings on shells, Corals, sharks' teeth, bones, and fragments of rocks. It may be said that manganese in this form exists in all deep-sea deposits, for rarely can a large sample of any mud, clay, or ooze be examined with care without traces of the oxides of this metal being discovered, either as coatings or minute grains. In some regions of the ocean the Challenger discovered ferro-manganic concretions in great abundance, the minute grains giving a dark chocolate colour to the deposit, while the dredges and trawls yielded immense numbers of more or less circular nodules or botryoidal masses of these oxides of large dimensions.

Mode of Occurrence.—To mention all the regions where manganese was observed would take up too much space, but reference will now be made to those stations at which it was found in greatest abundance or in some special form. Many of the remarkable and characteristic concretionary shapes assumed by the ferro-manganic nodules are represented in the Plates at the end of the volume, and these illustrations will be specially referred to in the following descriptions, in which the associations of the manganese nodules, and the conditions under which they occur, at each locality will be pointed out with considerable detail. In these descriptions we shall almost exclusively refer to specimens examined by us, forming part of the collections brought home by the Challenger. When large hauls of manganese nodules were obtained members of the expedition were, at the time, permitted to retain specimens for their own use, so that in many instances the nodules, teeth, bones, and rocks actually dredged were more numerous than here stated.

ATLANTIC OCEAN (OUTWARD VOYAGE).

Station 3, 1525 fathoms.—The dredge brought up several large flat pieces of rock, consisting for the most part of peroxide of manganese. Some of these fragments were

¹ In this chapter, and other parts of this work, the terms: manganese, hydroxides of manganese, hydrates of manganese, peroxide of manganese, black oxide of manganese, are all used for the same black substance.