exceeding a weak acid reaction; after the elimination of the carbonates, phosphates, and sulphates, the residue was analysed as described above.

A considerable number of sharks' teeth, bones of Cetaceans, and manganese nodules were selected by Mr. Murray and sent to Professor Dittmar, F.R.S., for analysis. This able chemist has himself given an account of the methods he has employed, and these will be stated in the various places where his results are discussed, throughout the body of this Report. The same chemist also made, at the request of the editor of the reports, experiments to establish the state of oxidation of the manganese in the deposits, and gives a full account of his methods.

Soon after the return of the Expedition, Mr. Murray selected, at the request of the late Sir C. Wyville Thomson, a rather extensive series of typical deposits, rocks, manganese nodules, and other substances, which were all sent to the late Professor Brazier of the University of Aberdeen for analysis. These will be found interpolated throughout the body of this work. These various deposits and concretions were analysed by submitting the substances to the hydrochloric acid test; the part dissolved in the acid was analysed separately, and the residue of this experiment was afterwards treated by solvents.[1]

d. Materials available and made use of during the Investigation.

It seems desirable, in concluding this introduction on the methods we have employed in this research on the nature and distribution of deep-sea deposits, to say a few words on the specimens and collections at our disposal during the investigation. While many thousands of samples of deposits have been examined by us from nearly every part of the great ocean basins, only those collected during the voyage of H.M.S. Challenger have been described in detail in the following tables. After much reflection it was deemed advisable to limit the descriptions to the Challenger collections, as they formed the basis of the whole inquiry. All the specimens were collected and labelled with great care immediately after they were brought up from the bottom of the ocean, and the conditions under which they were found were carefully noted. The quantity of the deposit procured at each station by the sounding tube, the trawl, and the dredge was as

[1] Professor Brazier says:—"The deposits in these analyses were treated as earths by me, and after digestion in hydrochloric acid, were evaporated to dryness and subsequently re-dissolved as far as possible; the insoluble residue, after weighing, was treated with boiling caustic potash, and so much of the residue as was then dissolved was looked upon as silica of easy combination, and classed along with the bodies soluble originally in hydrochloric acid. Where Diatoms and other siliceous organisms were present, I was puzzled to know in what state the silica existed at the bottom of the ocean, for in the analyses of these deposits there was little for it to be combined with. In such cases the silica dissolved by caustic potash must very closely represent the siliceous organic matter present. I need not mention that the silica, with alumina and iron remaining insoluble in the potash, was simply rocky grit. Apparently, some allowance should be made for small portions of silica derived from easily decomposed minerals yielding sesquioxide of iron and alumina."