

alternating zones give to the nodule a well-marked concretionary and shelly structure. What would appear to have been the original nucleus of pumice has likewise assumed a concentric arrangement. Two processes probably took place: the one a deposition of manganese layers on the outside in successive bands, and a simultaneous alteration of the nucleus, which likewise produced a concentric arrangement. The external zones of the nodule are not so dark coloured as those towards the centre, and the fine, black, undulating, concretionary lines are less numerous, but the whole face of a nodule like this one takes on a beautiful, black, metallic lustre when polished with the hand or with a piece of cloth. The demanganised portion represented in the right half of the figure is of a whitish colour, and easily pulverised into an impalpable powder. The dark shaded portions in the left-hand figure represent the zones in which the manganese is most abundant, and these appear on the right-hand figure as empty spaces on the surface treated with concentrated hydrochloric acid. Pl. II. fig. 4 represents another of these nodules in section (natural size). In this case there are several nuclei, all probably highly altered fragments of pumice, surrounded by concentric layers of manganese, and the whole cemented into one large nodule. This figure shows again the concretionary and shelly structure, the nodule frequently breaking up into successive scales like an onion. Pl. II. fig. 2 represents still another nodule from this station, the central parts of which are occupied by a siliceous Sponge (*Farrea*). Although in some places portions of the skeleton appear to have been removed in solution, still on the whole it is very well preserved; it is everywhere surrounded by the manganese depositions, and the manganese has even penetrated into the canals of the spicules. In the stalk-like portion at the lower part of the figure there were numerous Sponge spicules. Fig. 2a represents a magnified portion of the Sponge skeleton, which retains its vitreous and brilliant appearance. Among these large rounded nodules there were several tube-like bodies composed of manganese, 4 to 5 cm. in length and 1 cm. in diameter, with a hollow centre in which were many spicules of siliceous Sponges. Pl. I. figs. 5 and 6 represent (natural size) the appearance of a good many nodules from this station. The nuclei consist of pumice, much decomposed, especially on the surface in contact with the enveloping layers of manganese, which vary from a millimetre to several centimetres in thickness. In fig. 5 the pumice at the centre of the fragment is white, and retains nearly all its characters, but close to the manganese layers decomposition is much more advanced and it assumes a brown colour. When examined under the microscope with reflected light, the pores of the pumice are seen to be filled with an earthy matter, which forms casts of the little vesicles. They do not disaggregate under the action of hydrochloric acid, but simply undergo discoloration; sometimes these granules give a black cross with polarised light, in fact they have a great resemblance to certain casts of Foraminifera observed at Station 176, 1450 fathoms, South Pacific. In fig. 6 the pumice has undergone greater alteration than in the specimen represented in fig. 5, and is surrounded with a thicker deposit of manganese.