here employed, or it takes place only imperfectly, and this is especially the case where the bands are rich in alloys of nickel and cobalt. In some of the spherules we ourselves detected traces of cobalt, though the experiments were always more or less doubtful owing to the small amount of material at our command, and it must be remarked that the manganiferous nodules from which the spherules were frequently extracted, or with which they were closely associated in the sediments, in nearly all cases contained cobalt and nickel, as may be seen by consulting the analyses in Appendix III.

Fig. 2 represents a magnetic fragment from the same station (Station 276), which presents certain peculiarities, and differs from those hitherto noticed. Its form is irregular, or only partially rounded; its mineral nature is also different, as it has no metallic nucleus. With reflected light it appears bluish-black, and the surface is less brilliant than that of the spherules with metallic centres. The interior of this fragment presents a crystalline structure shown by lines of cleavage and by rather regular fractures with acute angles; the direction of the fractures, however, is not constant, but varies at different points. The fractures cannot be said to have the same character as the cleavages observed in certain meteoric irons. On the whole, it is very questionable if this magnetic fragment be of cosmic origin, and it is merely represented here as a doubtful specimen.

Fig. 12 represents the appearance of the magnetic particles extracted by the magnet from a Red Clay in the Central Pacific, Station 274, 2750 fathoms, after being broken down in an agate mortar and treated with an acid solution of sulphate of copper. It is to be observed that a certain number of the particles have been covered by copper, and are believed to be the flattened metallic nuclei of the black spherules which were observed in the sample before pounding in the mortar. The black and opaque fragments are pieces of the outer coatings of the black spherules, together with irregular fragments of magnetite and titanic iron, derived from the volcanic materials present in the deposit. While it may be urged that some of these particles of iron have been derived from fragments of eruptive rocks, there seems to be little doubt that those of a circular form must have been derived from the black magnetic spherules, and hence are probably of cosmic origin. Support is lent to this view from the circumstance that magnetic particles from a volcanic tufa from the sea-bottom, in which no spherules are observed, rarely contain any of these metallic particles, while they are generally more or less abundant in the magnetic particles from a Red Clay in which the black spherules are observed under the microscope.

Finally, it may be pointed out, with reference to these black magnetic spherules, that some of them, and especially the smaller specimens, do not contain any metallic nuclei whatever, being formed throughout of a material similar to the black coating surrounding the metallic centres. Gustav Rose pointed out long ago that at the periphery of meteorites rich in iron there was a coating of magnetic oxide similar to that present in these