

very indefinite it is difficult to estimate, even approximately, the quantity present in a deposit. However, it augments in proportion as the deposit becomes more clayey, but only a small quantity of this substance is necessary to give a clayey character to a deposit. That which predominates in this fundamental base, are irregular fragments of minerals, vitreous rocks, and remains of siliceous organisms. These particles probably make up about 50 per cent. of the whole mass, and this large percentage of foreign matters must necessarily mask the character of the clayey matter in which they are imbedded.

The mineral particles are seldom larger than 0.01 mm. in diameter, but descend from this size to the merest specks. It is impossible on account of their size to say to what mineral species they belong, their thickness not being sufficient to be distinguished by polarised light, their outlines too irregular, and all special coloration having likewise disappeared. All that can reasonably be said is that these minute mineral particles probably belong to the same species as the larger particles in the same deposit, such as felspar, hornblende, magnetite. In the case of the pumice and siliceous organisms the fragments can be recognised when of a much less size than in the case of the above minerals. Here the structure and fracture of the pumice, and form and markings of the organisms, enable very minute particles to be detected. However, some particles of pumice are so small as to have lost entirely their fibrous structure, the bulbs of air, and the peculiar fracture with frequent semicircular contours, and are therefore indistinguishable from the minute fragments of minerals which are likewise isotropic. In the same way extremely minute fragments of siliceous organisms cannot be distinguished from minerals and pumice fragments of about the same size.

The colouring substances are the hydrated oxides of iron and manganese. The former is scattered through all the mass in a state of very fine division. In some points, however, it is more localised, the argillaceous matter appearing with a brown tinge, but these spots are noticed gradually to disappear in the surrounding mass. The coloration given by the manganese is much more distinct. There are small, rounded, brown-coloured spots, with a diameter of less than 0.01 mm., which disappear under the action of hydrochloric acid with disengagement of chlorine. Among the magnetic particles, which consisted of small fragments of magnetite and small spherules, there was one spherule of bronzite (see p. 812).

The mineral particles collected after dissolving away a very large quantity of the ooze were the same as to size and species as those indicated in the description of the deposit. A quantity of the ooze was taken from the dredge, and divided into three portions by decantations. The finest portion gave 88.15 per cent. of carbonate of lime, the second gave 98.84 per cent., and the third 98.56 per cent. The finest portion consisted chiefly of Coccoliths, Rhabdoliths, primordial chambers of Foraminifera, and amorphous clayey and calcareous particles, thus showing that most of the clayey matter passed away with