

particles which bear distinctly the impress of the calcareous shells. Many, indeed, are internal casts reproducing with great distinctness and sharpness the form of the chambers in which the glauconite has been developed. Some of the casts have a brown colour presenting few of the characters of typical glauconite, and it will be seen that these pale-coloured or brownish casts predominate in the residue represented in Pl. XXIV. fig. 3. When the residue of a Green Sand is shaken up with abundance of water, it may be separated by decantation into three distinct portions, the one composed mostly of the dark green grains of typical glauconite,¹ the second in which the pale green casts predominate,² and the third consisting for the most part of the white, pale grey, yellow, and brownish casts.³

When a sample of a typical Green Mud is hardened and cut into a thin microscopic section, it will be observed that a large number of the chambers of the Foraminifera and the areolar spaces in Echinoderm spines and other calcareous structures are empty, while others are partially filled with a small quantity of a brownish semi-transparent substance. This brownish material may fill one or two of the chambers, or may simply coat their internal surface; in this way we may pass from shells only partially to those completely filled. It may frequently be observed that some of the smaller chambers have a distinctly green colour, while the larger ones are yellow or brownish; other shells, again, are filled with a dark green substance, which presents all the characters of typical glauconite. A transition may thus be traced from the pale brown substance lining some of the chambers of the Foraminifera to the pale green substance that forms a complete cast; this again passes into the dark green glauconitic grains. No external casts formed of matter deposited on the outside of the Foraminiferous shells have ever been observed, although exceptionally some shells presented a greenish coating of apparently glauconitic matter. Very frequently the reddish imperfect casts of the Foraminifera gave the reaction of phosphate of lime. In Pl. XXV. numerous particles of glauconite are represented as they appear within the shells and in an isolated condition; in many instances the shell appears to have been broken or thrown off by the continued growth of the internal glauconitic nucleus, the further growth eventually transforming the internal cast into an irregular glauconitic grain with a mammillated and furrowed surface; the figures on this plate show all the transitions between these phases in the formation of glauconite. In many samples of Green Muds and Sands are numerous minute particles about the same size as the glauconitic grains, and having the same furrowed and mammillated surface, of a brownish or green colour, but these from their internal structure are apparently highly altered grains of crystalline, schisto-crystalline, and other rocks (see Pl. XXV. figs. 2, 3). Finally, it may be added, there is often associated with the glauconite in the Green Muds from the shallower depths, an amorphous brownish green substance which either is,

¹ See Analyses 86 and 87.

² See Analysis 85.

³ See Analysis 84.