lime, thus producing pseudomorphism.[1] But whatever may be the nature of the substance serving as a first centre for these concretions, we are led to believe that the phosphate of which they are constituted has passed through living matter. Its cycle may be traced by saying that, after having been concentrated by living beings, it is rendered to the mineral world again, after solution by sea-water, in a concretionary form, and is thus placed in a more stable form in reserve for the future wants of life.

V. Crystals of Phillipsite in Marine Deposits.

It has been pointed out that glauconite is a hydrated silicate now forming in considerable abundance in marine deposits; it has been shown that it never presents itself in a crystalline condition, and does not occur in a free state, but originates in the hollow spaces of calcareous organisms. It is limited to terrigenous deposits, and is always associated with ancient volcanic rocks or crystalline schists, from whose alteration in all probability its chemical constituents are derived. The hydrated silicate, phillipsite, to which we now propose to direct attention, is, on the other hand, always present in a crystalline form, and is found in a free or isolated condition in the deposits. It is limited to purely pelagic clays or oozes, and is associated with recent volcanic rocks, and the materials derived from their alteration. We hope to be able to show that these zeolitic crystals arise from the decomposition of such volcanic rocks.

Crystals of phillipsite were first discovered in deep-sea deposits during the cruise of the Challenger between the Sandwich and Society Islands, where they were found to make up 20 or 30 per cent. of some samples of Red Clay. A fact which proves that they must have been in considerable abundance at many points is that the shells of some arenaceous Foraminifera were entirely made up of these little crystals. They have been found distributed over wide spaces in the central regions of the Pacific, and have subsequently been discovered in the deep water of the Central Indian Ocean. Although found in the various kinds of deposits in the deep water of the Central Pacific and Indian Oceans far removed from land, they cannot be regarded as characteristic of any type of deep-sea deposit, although most widely distributed and abundant in some red clay areas. The presence of these microscopic crystals in enormous numbers and in a free state in the pelagic deposits possesses a high interest, viewed with respect to the chemical reactions taking place during the present period upon the floor of the great ocean basins. Zeolitic minerals, and phillipsite in particular, are known to occur in the vacuoles, fissures, and empty spaces of certain crystalline masses or tufaceous rocks of volcanic origin.

[1] Irvine and Anderson found that a porous variety of Coral had, in the course of six months, abstracted from a solution of phosphate of ammonia, phosphoric acid sufficient to replace about 60 per cent. of the carbonate of lime present.