

mollusks, echinoderms, and crustaceans, but also, as Mr. Darwin observed upon studying the coral islands of the Pacific, from the fæcal matter ejected by echinoderms, conchs, and coral-eating fish. In the West Indian seas, the conch (*Strombus gigas*) adds largely to the chalky mud by means of its fæcal pellets, composed of minute grains of soft calcareous matter, exhibiting some organic tissue. Mr. Darwin describes gregarious fishes of the genus *Scarus*, seen through the clear waters of the coral regions of the Pacific browsing quietly in great numbers on living corals, like grazing herds of graminivorous quadrupeds. On opening their bodies, their intestines were found to be filled with impure chalk. This circumstance is the more in point, when we recollect how the fossilist was formerly puzzled by meeting, in chalk, with certain bodies, called "larch-cones," which were afterwards recognized by Dr. Buckland to be the excrement of fish. Such spiral coprolites (fig. 251), like the scales and bones of fossil fish in the chalk, are composed chiefly of phosphate of lime.

Fig. 251.

Coprolites of fish, called *Iulo eido-copri*, from the chalk.

In the Bahamas, the angel-fish, and the unicorn or trumpet-fish, and many others, feed on shell-fish, or on corals.

The mud derived from the sources above mentioned may be actually seen in the Maldiva Atolls to be washed out of the lagoons through narrow openings leading from the lagoon to the ocean, and the waters of the sea are discolored by it for some distance. When dried, this mud is very like common chalk, and might probably be made by a moderate pressure to resemble it more closely.\*

Mr. Dana, when describing the elevated coral reef of Oahu, in the Sandwich Islands, says that some varieties of the rock consist of aggregated shells, imbedded in a compact calcareous base as firm in texture as any secondary limestone; while others are like chalk, having its color, its earthy fracture, its soft homogeneous texture, and being an equally good writing material. The same author describes, in many growing coral reefs, a similar formation of modern chalk, undistinguishable from the ancient.† The extension, over a wide submarine area, of the calcareous matrix of the chalk, as well as of the imbedded fossils, would take place more readily in consequence of the low specific gravity of the shells of mollusca and zoophytes, when compared with ordinary sand and mineral matter. The mud also derived from their decomposition would be much lighter than argillaceous and inorganic mud, and very easily transported by currents, especially in salt water.

*Single pebbles in chalk.*—The general absence of sand and pebbles in the white chalk has been already mentioned; but the occurrence here and there, in the southeast of England, of a few isolated pebbles of

\* See Nelson, Geol. Trans. 1837, vol. v. p. 108; and Geol. Quart. Journ. 1863, p. 200.

† Geol. of U. S. Exploring Exped. p. 252, 1840.