

and sometimes through the action of living organisms. Being more easily soluble than calcite, it has no doubt in many cases disappeared from limestones originally formed mainly of aragonite shells, and has been replaced by the more durable calcite, with a consequent destruction of the traces of organic origin. Hence what are now thoroughly crystalline limestones may have been formed by a slow alteration of such shelly deposits (p. 811).

Dolomite (Bitter-spar $(Ca; Mg)CO_3$, p. 264) occurs (1) as an original deposit in massive beds (magnesian limestone), belonging to many different geological formations; (2) as a product of alteration, especially of ordinary limestone or of aragonite (Dolomitization, p. 546).

Siderite (Brown Ironstone, Spathic Iron, Chalybite, Ferrous Carbonate, $FeCO_3$) occurs crystallized in association with metallic ores, also in beds and veins of many crystalline rocks, particularly with limestones; the compact argillaceous varieties (clay-ironstone) are found in abundant nodules and beds in the shales of Carboniferous and other formations where they have been deposited from solution in water in presence of decaying organic matter (see pp. 257, 267).

7. **SULPHATES.** Among the sulphates of the mineral kingdom, only two deserve notice here as important compounds in the constitution of rocks—viz. calcium-sulphate or sulphate of lime in its two forms, Anhydrite and Gypsum; and barium-sulphate or sulphate of baryta in Barytes.

Anhydrite ($CaSO_4$) occurs more especially in association with beds of gypsum and rock-salt (see p. 265).

Gypsum (Selenite, $CaSO_4 + 2H_2O$). Abundant as an original aqueous deposit in many sedimentary formations (see p. 265).

Barytes (Heavy Spar, $BaSO_4$). Frequent in veins and especially associated with metallic ores as one of their characteristic vein-stones.

8. **PHOSPHATES.** The phosphates which occur most conspicuously as constituents or accessory ingredients of rocks are the tricalcic phosphate or Apatite, and triferrous phosphate or Vivianite.

Apatite ($3Ca_3(PO_4) + CaF_2$) occurs in many igneous rocks (granites, basalts, etc.), in minute hexagonal non-pleochroic needles, giving faint polarization tints; also in large crystals and massive beds associated with metamorphic rocks.

Vivianite (Blue iron-earth, $Fe_3P_2O_8, 8H_2O$) occurs crystallized in metalliferous veins; the earthy variety is not infre-