

them together as a cement. Iron, the great coloring ingredient of rocks, gives rise to red, brown, yellow, and green hues, according to its degree of oxidation and hydration.

Like conglomerates, sandstones differ in the nature of their component grains, and in that of the cementing matrix. Though consisting for the most part of siliceous grains, they include others of clay, felspar, mica, zircon, rutile, tourmaline, or other minerals such as occur in sand (p. 227), and these may increase in number so as to give a special character to the rock. Thus, sandstones may be argillaceous, feldspathic, micaceous, calcareous, etc. By an increase in the argillaceous constituents, a sandstone may pass into one of the clay-rocks, just as modern sand on the sea-floor shades imperceptibly into mud. On the other hand, by an augmentation in the size and sharpness of the grains, a sandstone may become a grit, and by an increase in the size and number of pebbles may pass into a pebbly or conglomeratic sandstone, and thence into a fine conglomerate. A piece of fine-grained sandstone, seen under the microscope, looks like a coarse conglomerate, so that the difference between the two rocks is little more than one of relative size of particles.

The cementing material of sandstones may be *ferruginous*, as in most ordinary red and yellow sandstones, where the anhydrous or hydrous iron-oxide is mixed with clay or other impurity—in red sandstones the grains are held together by a hæmatitic, in yellow sandstones by a limonitic cement; *argillaceous*, where the grains are united by a base of clay, recognizable by the earthy smell when breathed upon; *calcareous*, where carbonate of lime occurs either as an amorphous paste or as a crystalline cement between the grains; *siliceous*, where the component particles are bound together by silica, as in the exposed blocks of Eocene sandstone known as "grayweathers" in Wiltshire, and which occur also over the north of France toward the Ardennes.

Among the varieties of sandstone the following may here be mentioned. *Flagstone*—a thin-bedded sandstone, capable of being split along the lines of stratification into thin beds or flags; *Micaceous sandstone* (*mica-psammite*)—a rock so full of mica-flakes that it splits readily into thin laminæ, each of which has a lustrous surface from the quantity of silvery mica. This rock is called "fakes" in Scotland. *Freestone*—a sandstone (the term being applied sometimes also to limestone) which can be cut into blocks in any direction, without a marked tendency to split in any one plane more than in another. Though this rock