

and, lastly, the calcareous rocks or limestones consist of carbonic acid and lime.

*Arenaceous or siliceous rocks.*—To speak first of the sandy division: beds of loose sand are frequently met with, of which the grains consist entirely of silex, which term comprehends all purely siliceous minerals, as quartz and common flint. Quartz is silex in its purest form; flint usually contains some admixture of alumine and oxide of iron. The siliceous grains in sand are usually rounded, as if by the action of running water. Sandstone is an aggregate of such grains, which often cohere together without any visible cement, but more commonly are bound together by a slight quantity of siliceous or calcareous matter, or by iron or clay.

Pure siliceous rocks may be known by not effervescing when a drop of nitric, sulphuric, or other acid is applied to them, or by the grains not being readily scratched or broken by ordinary pressure. In nature there is every intermediate gradation, from perfectly loose sand, to the hardest sandstone. In *micaceous sandstones* mica is very abundant; and the thin silvery plates into which that mineral divides, are often arranged in layers parallel to the planes of stratification, giving a slaty or laminated texture to the rock.

When sandstone is coarse-grained, it is usually called *grit*. If the grains are rounded, and large enough to be called pebbles, it becomes a *conglomerate*, or *pudding-stone*, which may consist of pieces of one or of many different kinds of rock. A conglomerate, therefore, is simply gravel bound together by a cement.

*Argillaceous rocks.*—Clay, strictly speaking, is a mixture of silex or flint with a large proportion, usually about one-fourth, of alumine, or argil; but, in common language, any earth which possesses sufficient ductility, when kneaded up with water, to be fashioned like paste by the hand, or by the potter's lathe, is called a *clay*; and such clays vary greatly in their composition, and are, in general, nothing more than mud derived from the decomposition or wearing down of rocks. The purest clay found in nature is porcelain clay, or kaolin, which results from the decomposition of a rock composed of felspar and quartz, and it is almost always mixed with quartz.\* *Shale* has also the property, like clay, of becoming plastic in water: it is a more solid form of clay, or argillaceous matter, condensed by pressure. It usually divides into laminae, more or less regular.

One general character of all argillaceous rocks is to give out a peculiar, earthy odor when breathed upon, which is a test of the presence of alumine, although it does not belong to pure alumine, but, apparently, to the combination of that substance with oxide of iron.†

\* The kaolin of China consists of 71·15 parts of silex, 15·86 of alumine, 1·92 of lime, and 6·73 of water (W. Phillips, *Mineralogy*, p. 33); but other porcelain clays differ materially, that of Cornwall being composed, according to Boase, of nearly equal parts of silica and alumine, with 1 per cent. of magnesia. (*Phil. Mag.* vol. x. 1837.)

† See W. Phillips's *Mineralogy*, "Alumine."