

myte, which is calcitic (a mixture of calcite and dolomite), is apt to crumble from weathering, because the calcite is the most soluble, and becomes removed by filtrating waters.

As the kinds of fragmental materials which the rocks afford over the earth are either sand, gravel, earth, or mud, and clay, the kinds of fragmental rocks are few.

#### FRAGMENTAL ROCKS, NOT CALCAREOUS.

**CONGLOMERATE.** — A consolidated gravel-bed, consisting of a mixture of pebbles, or fragments of rocks, and finer material. *a.* If the pebbles are rounded, it is called *pudding-stone*; *b.* if angular, *breccia*. Conglomerates are named, according to their constituents, *siliceous* or *quartzose*, *granitic*, *calcareous*.

**GRIT, GRIT-ROCK.** — A hard, gritty rock, consisting of coarse quartz sand and small pebbles; called also *millstone grit*, because used sometimes for millstones.

**SANDSTONE.** — A rock made of sand; a consolidated sand-bed. There are *siliceous*, *granitic*, *micaceous*, *feldspathic*, *calcareous* sandstones, according to the character of the material. They are *thick-bedded* or *thin-bedded*, according to the thickness of the beds; *laminated* when divisible into laminae or slabs; *shaly* when splitting into thin pieces or sheets like shale or an imperfect slate. There are also *compact*, *friable*, *argillaceous*, *gritty*, *ferruginous*, *concretionary*, *massive*, *flexible*, and other kinds. Grindstones are made of an even-grained, rather friable sandstone. Hard, siliceous sandstones, grit, and conglomerate, in regions of metamorphic rocks, are called *quartzite* (page 82). The Arkansas *Noraculite*, or whetstone, is an exceedingly fine-grained sandstone microscopically porous through the loss by infiltrating waters of disseminated calcareous particles (L. S. Griswold).

**SAND-ROCK.** — A rock made of sand of any kind, especially if not siliceous or granitic. A *calcareous sand-rock* is one made of calcareous sand, as pulverized corals or shells.

**SHALE.** — Consolidated mud or clay; a soft, fragile, slaty, argillaceous rock. Shales are gray to black in color, and sometimes dull greenish, purplish, reddish.

**Varieties.** — *a.* *Carbonaceous shale*; black and impregnated with coaly material, yielding mineral oil or related bituminous matters when heated (*Brandschiefer* in German). *b.* *Alum shale*; impregnated with alum or pyrites, usually a crumbling rock. The alum proceeds from the alteration of pyrite, or an allied iron sulphide, in the rock.

**ARGILLYTE, or Clay-slate (Phyllyte).** — A slaty rock, like shale, but differing in breaking usually into thin and even slates or slabs. *Roofing* and *writing* slates are examples. It is sometimes thick-laminated. Moreover, unlike shale, it occurs in regions of metamorphic rocks, and often graduates into hydromica and mica schists. It graduates often into hard, thick-layered sandy beds, which used to be called *gray wacke*.

**TUFA.** — Consists of comminuted volcanic sand and small fragments of lavas, more or less altered. Usually of a gray, yellowish brown, or brown color, sometimes red. The tufa made from those igneous rocks that contain pyroxene is usually yellowish brown or brown in color (sometimes red) (often called *wacke*); and that made from the feldspathic igneous rocks, trachyte, pumice, and the like, is of an ash-gray color, or of other light shades. The finer deposits are often called *ash-beds*. Since volcanic ashes are often very widely distributed by the winds, they make deposits beyond the limits of the volcano, over the land, or lakes, or the sea-bottom; and sometimes the deposits have great thickness. *Pozzuolana* is a light-colored tufa, found in Italy, near Rome, and elsewhere, and used for making hydraulic cement. *Volcanic sand*, or *peperino*, is sand of volcanic origin, either the "*cinders*" or "*ashes*" (comminuted lava) formed by the process of ejection, or lava rocks otherwise comminuted.

**CLAY.** — Soft, impalpable, more or less plastic material, chiefly aluminous in composition, white, gray, yellow, red to brown and black in color.