Marble Encyclopedia Article

Marble

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Marble

Marble is metamorphosed **limestone**, that is, limestone that has been melted and allowed to resolidify. If the original limestone is a calcite limestone, then the marble is a calcite marble (i.e., mostly $CaCO_3$); if the original limestone is a dolomitic limestone, then the marble is a dolomitic or magnesian marble (i.e., mostly $CaMg(CO_3)_2$). In nongeological contexts the term marble is often used to refer to any hard, calcite **rock** that can be cut or polished, including some unmetamorphosed limestones. In **geology**, however, it is reserved strictly for metamorphosed limestones.

Certain marbles have been valued since antiquity for sculpture and for architectural uses. The marbles prized for statuary are usually quite pure (i.e., white in color and free from inclusions or marks) and reflect light softly or semitranslucently due to their property of allowing some incident light to penetrate to a depth of about an inch (1–2.5 cm) before reflecting it.

Some marbles that show colorful patterning are used for decorative architecture. Patterning in marble arises from various trace **minerals**, most often silicates (e.g., **quartz, olivine**, garnet), **graphite**, pyrite, and organic substances. The **magma** responsible for metamorphosing the original limestone may also contribute impurities.

Wrinkled thin layers that show in cross-section as sinuous lines are common in marbles. These layers are termed stylolites. Stylolites consist of silicates or other accessory minerals and are usually darker than the surrounding marble. They do not form as sedimentary layers in the original limestone, but result from the selective removal of limestone by **water**. Calcite is a highly soluble mineral; when part of the original limestone is dissolved by infiltrating water, the fine particles that are left are compacted into an irregular layer or stylolite. Comparison of accessory mineral concentrations in adjacent marble and in stylolites shows that 40% or more of a limestone bed may be dissolved in the process of forming stylolites.

Calcite marble, like any other calcite rock, effervesces vigorously (yielding **carbon dioxide** [CO_2]) when tested with hydrochloric acid. Dolomitic marble effervesces more weakly. Otherwise, they are difficult to distinguish.

See Also

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