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## Is marble a metamorphosed limestone

Marble is a metamorphic rock that is not leafy and is formed when limestone is exposed to heat and pressure where calcite recrystallizes to form a rock that is a mass of interlocking calcite crystals. In marble not all of the rock is formed from calcite other minerals may also be present, such as clay minerals, micas, quartz, pyrite, iron oxides and graphite. The same as the limestone marble, dolostone at metamorphosis produces dolomitic marble. Marble is a rock due to metamorphosis of calcite-bearing limestone or dolomite rock. The resulting marble rock is usually composed of an interlocking mosaic of carbonate crystals. Primary sedimentary textures and structures of the original carbonate rock are usually modified or destroyed. As metamorphosis progresses, the crystals in the marble become large enough to easily recognize the interlocking calcite. Physical properties of marble and applications Pure white marble is the result of metamorphosis of a very pure limestone or dolomite protolith that is silicate-poor rock. The characteristic swirls and veins of many colored marble varieties are usually due to various mineral impurities such as clay, silt, sand, iron oxides or chert that were originally present as grains or layers in the limestone. Green staining is often due to serpentine due to originally high magnesium limestone or dolostone with silica impurities. These various impurities have been mobilized and resanitized by the intense pressure and heat of metamorphosis. If marble is composed of calcium carbonate, so it will react easily with acids to neutralize it. It is one of the most effective acid neutralizers. It is one of the main acid neutralizers used in lakes, streams and bottoms. It is used for acid neutralization in the chemical industry. Pharmaceutical product known as Tums is a small calcium carbonate pill, sometimes made of powdered marble that is used by people suffering from acid indigestion, composed of calcium carbonate marble has a hardness of three on the Mohs scale, so marble is easy to cut for sculptures making and ornamental purposes. The low hardness and solubility of marble makes it suitable for calcium additive in animal nutrition. After being sanded with gradually finer abrasives, marble can be polished to a high sheen. This allows attractive pieces of marble to be cut, polished and used as floor tiles, architectural panels, façade stone, windowsills, steps, columns and many other pieces of decorative stone. This article is about the rock. For the toys, see Marble (toys). For other applications, see Marble Non-foliated, metamorphic rock, often used for sculpture and as construction material MarbleMetamorphic rockCarrara marble quarry in ItalyCompositionMost calcite or dolomite The Taj Mahal is completely lined with marble. Marble is a metamorphic rock recrystallized carbonate minerals, usually calcite or dolomite. Marble is usually not foliated, although there are exceptions. In geology, the term marble refers to metamorphosis stone, but its use in stonemasonry more generally includes immetamorphosis. Marble is often used for sculpture and as a building material. Etymology Carlo Franzoni's sculptural marble wagon clock, the car of history, depicting Clio, the Greek muse of history. Marble wall of Ruskeala, Republic of Karelia, Russia The word marble is derived from the Ancient Greek μάρμαρον (mármaron),[2] from μάρμαρος (mármaros), crystalline rock, shining stone,[3][4] perhaps from the verb μαρμαίρω (marmairō), to blink, glare, gleam;[5] R. S. P. Beekes has suggested that a Pre-Greek origin is likely. [6] Folded and weathered marble at General Plas Carrera, Chile This tribe is also the ancestor of the English word marmoreal, meaning marble-like. [7] While the English term marble resembles the French marbre, most other European

languages (with words like marmorea) look more strongly like the original Old Greek. <sup>[quote needed]</sup> Physical origin Marble is a rock due to metamorphosis of sedimentary carbonate rocks, usually limestone or dolomite rock. Metamorphosis causes variable recrystallization of the original carbonate mineral grains. The resulting marble rock is usually composed of a interlocking mosaic of carbonate crystals. Primary sedimentary textures and structures of the original carbonate rock (protolith) are usually modified or destroyed. Pure white marble is the result of metamorphosis of a very pure (silicate-poor) limestone or dolomite protolith. The characteristic swirls and veins of many colored marble varieties are usually due to various mineral impurities such as clay, silt, sand, iron oxides, or chert that were originally present as grains or layers in the limestone. Green staining is often due to serpentine due to originally magnesium-rich limestone or dolomite with silica impurities. These various impurities have been mobilized and recrystallized by the intense pressure and heat of the metamorphosis. Main Article Types: List of types of marble Examples of historically notable marble varieties and locations: Marble Color Location Country Pentelic marble[8] pure-white, fine-grained semitranslucent Mount Pentelicus (Πεντελικό πορ), Attica (Ἄττικα) Greece Creole marble white and blue/black Pickens County, Georgia United States Etowah marble pink, salmon, rose Pickens County, Georgia United States Makrana marble white Makrana, Nagaur district, Rajasthan India Murphy marble white Pickens and Gilmer Counties, Georgia United States Marquina marble black Markina, Spain Parian marble pure-white, fine-grained island paros (Πρρος), South South (Νοτίου Αιγίδιου) Greece Carrara marble white or blue-grey Carrara, Tuscany Italy Ruskeala marble white near Ruskeala (Рускеала), Karelia (Карелия) Russia Rusčhia marble[9] white, pinkish, reddish Poiana Ruscă Mountains, Caraș-Severin County Romania Bianco Sivec white near Prilep (Прилеп), Pelagonia (Пелагониски) Northern Macedonia Swedish white marble green near Kolmården, Södermanland Sweden Sylacauga marble white Talladega County, Alabama United States Vermont marble white Proctor, Vermont United States Yule marble uniform pure white near Marble, Colorado United States Wunsiedel marble white Wunsiedel, Bavaria Germany Prokonnesos marble white Marmara Island, Sea of Marmara Turkey Uses marble products in Romblon, Philippines Sculpture White marble has been appreciated for its use in sculptures[10] since classical times. This preference has to do with its softness, which made it easier to cut, relative isotropy and homogeneity, and a relative resistance to shattering. Also the low index of refraction of calcite allows light to penetrate several millimeters into the stone before being scattered out,[citation needed] resulting in the characteristic waxy look that brings a lifelike sheen to marble sculptures of any kind, which is why many sculptors prefer and still prefer marble for sculpting. <sup>[quote needed]</sup> Construction marble Construction marble is a stone that is composed of calcite, dolomite or serpentine that is capable of taking a polish. <sup>[11]</sup> More generally in construction, specifically dimension stone trade, the term marble is used for any crystalline calcitic rock (and some non-calcitic rocks) useful as the building block. For example, Tennessee marble is really a dense grainy fossil from gray to pink to maroon Ordovician limestone that geologists call the Holston Formation. Ashgabat, the capital of Turkmenistan, was included in the 2013 Guinness Book of Records as having the world's highest concentration of white marble buildings. <sup>[12]</sup> Karibib Marble mining production (2018)22°06′16″S 015°48′48″E﻿ / ﻿22.10444°S 15.81333°E﻿ / -22.10444; 15.81333﻿ (Marmor) According to the United States Geological Survey, U.S. domestic marble production in 2006 was valued at 46,400 tons at about \$18.1 million, compared with 72,300 tons worth \$18.9 million in 2005. Crushed marble production (for aggregated and industrial applications) in 2006 was 11.8 million tons worth \$116 million, of which 6.5 million tons was finely ground calcium carbonate and the rest was construction aggregate. By comparison, 2005 crushed marble production was valued at 7.76 million tons at \$58.7 million, of which 4.8 million tons was fine calcium carbonate and the rest was the construction aggregate. American dimension marble demand is about 1.3 million tons. The DSAN World Demand for (finished) Marble Index growth of 12% per an year for the period 2000-2006, compared with 10.5% per an year for the period 2000-2005. The biggest dimension marble application is tile. In 1998, marble production was dominated by 4 countries that accounted for almost half of the world's production of marble and decorative stone. Italy and China were the world leaders, each representing 16% of world production, while Spain and India produced 9% and 8% respectively. <sup>[13]</sup> In 2018, Turkey was the world leader in marble exports, with a 42% share of global marble trade, followed by Italy with 18% and Greece with 10%. The largest importer of marble in 2018 was China with a market share of 64%, followed by India with 11% and Italy with 5%. <sup>[14]</sup> Safety at work Dust produced by cutting marble can cause lung disease but more research needs to be done into whether dust filters and other safety products reduce this risk. <sup>[15]</sup> In the United States, the Occupational Safety and Health Administration (OSHA) has set the legal limit (permissible exposure limit) for workplace marble exposure as 15 mg/m3 total exposure and 5 mg/m3 airway exposure during an 8-hour working day. The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) of 10 mg/m3 total exposure and 5 mg/m3 airway exposure during an 8-hour working day. <sup>[16]</sup> Acid breakdown Acids damage marble because it reacts calcium carbonate in marble, releasing carbon dioxide (technically carbon dioxide, but rapidly degrading to CO2 and H2O) : CaCO3(s) + 2H+(aq) → Ca2+(aq) + CO2(g) + H2O (l) So vinegar or other acid solutions should never be used on marble. Also outside marble statues, tombstones, or other marble structures are damaged by acid rain. Microbial degradation The haloal-calcified methylo trophic bacterium Methylophaga murata was isolated from deteriorating marble in the Kremlin. <sup>[17]</sup> Bacterial and fungal degradation was discovered in four samples of marble from milan cathedral; black Cladosporium attacked dried acrylic resin[18] using melanin. <sup>[19]</sup> Cultural Associations Jadwiga of the Sarcophagus of Poland by Antoni Madeyski, Wawel Cathedral, Cracow Relief on the Marble Door of Hagia Sophia in Istanbul As a favorite medium for Greek and Roman sculptors and architects (see classical sculpture), marble has become a cultural symbol of tradition and refined taste. The very varied and colorful patterns make it a favorite decorative material, and it is often imitated in background patterns for computer displays, etc. Places named after the stone are Marblehead, Massachusetts; Marblehead, Marble Arch, London; the Sea of Marmara; India's Marble Rocks; and the cities of Marble, Minnesota; Marble, Colorado; Marble Falls, Texas and Marble Hill, Manhattan, New York. The Elgin Marbles are marble sculptures from the Parthenon in on display at the British Museum. They were brought to Britain by the Earl of Elgin. Artificial marble This section quotes no sources. Help improve this section by adding quotes to trusted sources. Unsourced material can be challenged and removed. (July 2017) <sup>[Learn how and when to delete this template message]</sup> Marble fabric is combined with cement or synthetic resins to make reconstituted or cultivated marble. The appearance of marble can be simulated with faux marble, a painting technique that imitates the color patterns of the stone. Gallery The Nike of Samothrace is made of Parian marble (c. 220-190 BC) Laocoön and his sons at the Vatican The Praetorians Relief, made of gray veined marble, c. 51-52 AD Old marble columns in the prayer hall of the Mosque of Uqba, in Kairouan, Tunisia Cleopatra by William Wetmore Story was described and admired in Nathaniel Hawthorne's romance, The Marble Armchair, and is on display at the Metropolitan Museum of Art in New York City. Näckrosen (Water lily), Stockholm 1892, by the Swedish sculptor Per Hasselberg (1850-1894). Here a copy from 1953 in marble by Giovanni Ardini (Italy) placed in Rotneros Park near Sunne in Värmland /Sweden. Pažaislis Monastery complex has the most marble baroque church of the Grand Duchy of Lithuania See also Marble sculpture Paper marble Marmorino Pietra dura, inlay with marble and other stone Scagliola, imitate marble with plaster work Verd antiques, sometimes (wrongly) called serpentine marble, and also known as Connemara marble Ruin marble, marble that contains light and dark patterns, giving the impression of a ruined cityscape References ^ Kearey, Philip (2001). Dictionary of Geology, Penguin Group, London and New York, p. 163. ISBN 978-0-14-051494-0 ^ μάρμαρον[permanent dead link], Henry George Liddell, Robert Scott, A Greek-English Lexicon, at Perseus Digital Library ^ μάρμαρο, Henry Georgedell Member, Robert Scott, A Greek-English Lexicon, at Perseus Digital Library ^ Marble, Compact Oxford English Dictionary. Askoxford.com. Picked up at 2011-09-30. ^ μάρμαρον, Henry George Liddell, Robert Scott, A Greek-English Lexicon, on Perseus Digital Library ^ R. S. P. 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