

The “Bargiolina”, an amazing historical stone from Monte Bracco (Piedmont, NW Italy)

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The Monte Bracco area (Western Alps, northern Italy) is located in the Dora Maira Massif, a geological unit belonging to the inner part of the Penninic Domain, extending more than 1000 km² in the central sector of Cottian Alps.

Monte Bracco is an isolated relief, mainly formed by ortho- and paragneisses, whose foliation is gently NW dipping. Some levels of quartzites, some metres thick, are cropping out only towards the uppermost part of Monte Bracco, and have been quarried as famous ornamental stones (“Bargiolina”). There are four main commercial and chromatic varieties: golden yellow (the most valuable), pale yellow, olive green, grey and white (the most common). The main technical characteristic of the “Bargiolina” is the regular schistosity, due to the presence of thin, plane parallel white mica layers; because of this feature it is possible to obtain very thin natural split slabs (1-2 cm). Under the optical microscope, the rock shows a fine and quite homogeneous grain size, a granular – lepidoblastic texture, with regular spaced schistose domains (up to mylonitic); small amounts of slightly altered K-feldspar (orthoclase) give to the rock a micro-augen texture. The main rock-forming minerals (XRD-QPA and SEM-EDS) are quartz (65 – 85 wt.%), white mica (up to 15 wt.%), potassic feldspar (5 – 10 wt.%) and traces of plagioclase and chlorite. Typical accessory minerals are zircon, rutile, titanite, hematite and limonite, whereas K-feldspar is often altered in kaolinite. The different colours are linked to the different abundance and degree of oxidation of secondary minerals, guided by fracture density and distribution.

The “Bargiolina”, known and used since the prehistoric age as substituting material for chert, and celebrated by Leonardo da Vinci (1511), has been exploited at least since the XIII century, peaking in the XX century (up to 300 kt/year), used as internal and external facing, because of its excellent technical proprieties (freeze-thaw resistance, flexural strength up to 40 MPa, low water absorption, excellent wear resistance). These valuable features decreed its success when it was massively used in the construction of basilicas and noble palaces by famous architects of Piedmontese Baroque: Filippo Juvarra (1678 – 1736) used it in the flooring of the side wings of the hunting lodge of Stupinigi and in the cloister of the Superga Basilica. In the second half of the XIX and at the beginning of the XX century, the quartzite was marketed in Northern Italy and exported to Russia and South America. Waste materials were also used for abrasives (even for toothpaste), due to the abundance of quartz.

Nowadays, only two quarries are involved in the exploitation of “Bargiolina”. The yield rate is about 20%; consequently 80% of the exploited material are rock wastes, disposed in quarry dumps. The poor exploitation planning of the past, which unfortunately involved the best portions of the rock body, led to only partly exploited quarry benches, with a residual yield rate of only 4-8%. The huge amount of quarry waste and the quartz-rich composition suggest interesting applications, especially for refractories and ceramic materials.