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Wanted: suitable replacement stones for the Lede stone (Belgium)

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The Lede stone is an arenaceous limestone with a Lutetian age, occurring as discrete (most of the times three) stone banks in the marine sandy sediments of the Lede Formation (Belgium). It has a quartz content of approximate 40%. This increases abrasion strength and together with the cementation results in an average compressive strength of about 80-85 MPa. The cement is a microsparitic calcite cement. Other carbonate particles are both microfossils (mainly foraminifers) and macrofossils (bivalves, serpulids, echinoderms, ...). This great diversity gives the stone a heterogeneous, animated appearance. The intra- and interparticle porosity is in total 5-10 % in average and the apparent density is 2400-2550 kg/m^3. Another important constituent is glauconite, present in a few percent. In fresh state, the stone has a greenish-grey colour, but when it is exposed to atmospheric conditions for a couple of years, the stone acquires a yellowish to rust-coloured patina due to the weathering of glauconite. Sulphatation causes severe damage to the stone, and black gypsum crusts are common in urban environments on stones protected from runoff.

This stone was excavated in both open air and underground quarries in the areas of Brussels and Ghent. The proximity of main rivers such as the Scheldt and Zenne provided transport routes for export towards the north (e.g. Antwerp and The Netherlands). Its first known use dates back to Roman times but the stone flourished in Gothic architecture due to its easy workability and its 'divine' light coloured patina. This results nowadays in a dominant occurrence in the cultural heritage of northwestern Belgium and the south of The Netherlands. Socio-economical reasons caused several declines and revivals of Lede stone in use. In the beginning of the 20th century, only a few excavation sites remained, with as main quarry the one located at Bambrugge (Belgium). By the end of the first half of the 20th century, however, no quarry sites remained. In the sixties, a sand quarry located in Balegem (Belgium) started with the extraction of Lede stone combined with its other activities. Until now, only this site supplies blocks of fresh Lede stones and it doesn't seem there will rise an opportunity of a new site in the near future. Therefore, during the huge amount of renovation works in the past century, the Lede stone was often replaced by imported (mostly French) limestones such as Massangis stone, Savonnières stone and Euville stone. The commercial value seems to have had a large impact and too little attention was paid on the optical appearance, ageing and technical compatibility of the stones. The use of especially Massangis stone was taken for granted.

In the 21st century, there is a growing awareness of the impact of such consequent replacement for the historical value of our cultural heritage and several alternative stones are suggested and even used. These include stones from France, Spain and Portugal, but also from other regions in Belgium. For the moment, there is no consensus on the most appropriate replacement stone and further research should be done in order to evaluate compatibility of the different stone types with Lede stone. In this context, it is also very important to actively search for better alternatives, which resemble the Lede stone in both a mechanical and aesthetical point of view. Therefore, this abstract is an open question to its readers. Any commercial natural stone suggestions with affiliation to the aforementioned properties are welcome by e-mailing the corresponding author.