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THE MACQUENOISE SANDSTONE : A suitable Lochkovian raw material for ancient millstones : quarries, properties, manufacture and distribution (Belgium-France)

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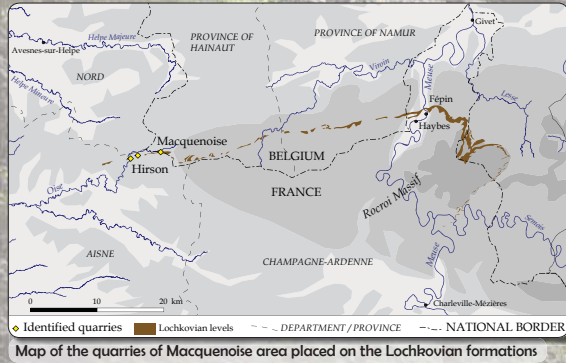
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Since a few years a French-Belgian team of archeologists and geologists works on the characterization of ancient querns and millstones (mainly from the Antique period) in relation to the determination of their stratigraphical and geographical provenances.

Through the identification of the rocks, their origin and their distribution, this collaboration aims at reconstructing the ancient commercial roads and the economic organization of territories during that period.



From geological characterization...

Near the Ardenne border between France and Belgium, the earliest Devonian (Lochkovian) sediments deposited on the Caledonian substrate are conglomerates, which are interpreted as continental alluvial fans.

A sandstone formation, formally defined as the "Arkose d'Haybes" is closely linked to the former Lochkovian conglomerates (called also the "Poudingue de Fépin"). The «Formation de Fépin» crops out around the eponymous localities : Haybes, Fépin and Hargnies (Ardennes, France), and displays a partly recrystallized, well-sorted grey to greenish sandstone (turbidite facies) with wine-red coloured joints.

Another important area displaying old quarries in the same formation is located between Hiron (Aisne, France) and Macquenoise (Hainaut, Belgium): here, a more homogenous grey coarse sandstone facies occurs, with a better consistency and small amounts of dark green tourmaline crystals.



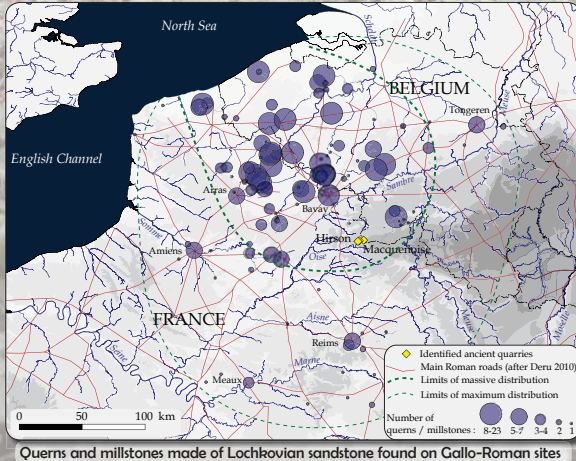
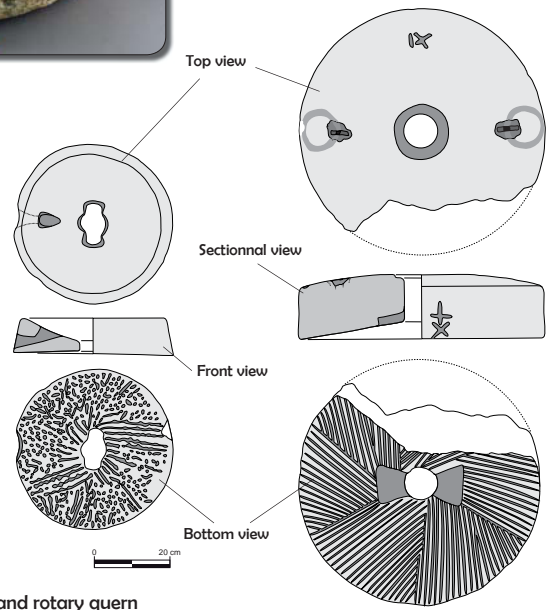
...to archaeological investigation

These detrital formations were locally quarried, not only for building stones but also for the manufacturing of querns and millstones. The huge Proto-historical and Roman millstone quarries in Lochkovian conglomerates and sandstones of Macquenoise and Milourd areas are known and identified since the end of the 19th century.

Even if the lack of recent archaeological excavations do not allow yet to precise the exact age of their quarrying, the dating of the various products derived from these quarries allows to consider the duration of the active extraction and how far the millstones from Macquenoise area were transported into the northern Gallo-Roman provinces.

These products consist both of small querns operated in domestic hand mills, and of large millstones used in hydraulic geared mills. They are massively found on Roman archaeological sites of the North-western Ardennes and the Western Flemish Basin, 100 km from the Macquenoise area (regional scale). These heavy goods are still but sparsely unearthed in a 200 km radius, especially in big Roman cities, well served by the main commercial roads. This distant distribution however requires more than one day of transport by inland waterway and more than five days by road.

Roman rotary querns and millstones made of Macquenoise sandstone



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