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Exploration of ceramical and cementing raw materials in Hungary till 1945

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With respect to the exploration of ceramical and cementing raw materials two periods can be clearly distinguished: the period of *random exploration* from the beginning till the middle of the 19-th century and the period of *scientific exploration* from the mid-19th century till the end of World War II.

The period of random exploration. The first bricks were made in Hungary by the Romans and the manufacturing of bricks has newer ceased since. Even the constructional elements of the castles of the Middle-Ages contain some bricks. Hungarian brick manufacturing utilized the most primitive methods till the middle of the 19th century. Slow development began with the installation of some muncipial brick factories. The first real industrial brick and tile factory was the Drasche factory, constructed at Rákos in 1838. The quality of the clays utilized for brick manufacturing was not tested in this period by scientific methods: it was proved only by the quality of the product.

King MATHIAS established in his Buda castle a majolica workshop, enjoying high reputation between 1470 to 1480. The glas tiles for stoves, facing and flooring tiles and pottery were manufactured supposedly of materials imported from Italy, yet it can also be supposed that some experiments were made to replace the imported material with locally available ones. Some conclusions can be won about Hungarian pottery materials from the geographical location of potteries. The Hungarian ceramics industry began to florish from the middle of the 18th century. The location of the workshops was not so much by the location of good quality raw materials influenced, but by economic factors. The first china manufacturing factory was founded by prince N. BRETZENHEIM at the beginning of the 1820es at Telkibánya. Basic raw material was the locally found kaolin. The fine ceramics industry experienced much hardship, because as quoted from L. PETRIK: „... manufacturing was started here and there always without sufficient knowledge of technology and available raw materials. Indigenous raw materials were always in demand, and they were looked for, occasionally and by chance due to lacking adequate geological foundation.

The period of scientific invcstigation. Some catalogues and material testing summaries were published by the Hungarian Royal Geological Institute and by the Royal Science Society about the available raw materials for construction and building in the last decades of the 19th century. In the history of the Geological Institute the opening of the Chemical laboratory in 1884 was a very important event from the practical point of view. In the laboratory not only the samples collected by the staff of the Institute were exactly analysed, but also

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other samples delivered for examination by some outsiders. The explanations compiled to the geological maps and published usually in the Annual Reports of the Hungarian Royal Geological Institute called attention to constructional materials as well. Geological exploration was carried out, in addition to the geologists of the Geological Institute, also by the staff of the geological departments of Universities and academies, and by the specialists of the big mining companies. Indirectly also some individuals took part in the work announcing some discoveries, or claims, sending-in samples for examination.

L. LÓCZY, SEN. organized a section for practical geology as a first step of his directorship at the Geological Institute. Some research subjects of the section were „Investigation of rocks suitable for cement manufacturing" and „Compiling a summarizing book about the minerals and rocks, occurring in Hungary which can be economically, industrially and commercially utilized".

The development of the brick industry received a new impetus in the 1860es by the invention of railways, cupola-furnace and brick-press. The coal could be transported now by rails also for the brick factories in the Great Hungarian Plain replacing straw as fuel. V. ZSOLNAY, the founder of the Zsolnay china factory at Pécs designed the technology of the factory for the utilization of local raw materials in addition to imported ones. The old quarries supplying the ancient potters of Pécs were searched and claimed for, to supply the factory with high quality clay. The scientific foundation of utilizing indigenous resources was laid down in the publications of L. PETRIK.

For the construction of the Chain-Bridge at Budapest A. CLARK utilized Roman marl from Beocsin (1839—1849), which was calcinated in the kilns installed on the plot of land where later the building of the Hungarian Academy of Sciences was built. The calcinated marl was ground by the mills floating nearby on the Danube.

Further exploration was much hampered by World War II. Most of the data relating the exploration of raw materials to supply the factories existing or to be built are to be found in the related manuscripts of consulting. J. GYÖRKI, like L. PETRIK is advocating powerfully the utilization of indigenous kaolines, supporting his recommendations by economic arguments. (Kaolin occurrences in Hungary, 1932.) At the beginning of the 1930es L. LÓCZY, JUN. submits a detailled memorandum to the government relating to the exploration of probable mineral resources in the country. The results and position of kaolin and fire clay investigations carried out by the staff of the Geological Institute are represented best in the reports of A. LIFFA and A. FÖLDVÁRI, published in the Annual Reports of the Hungarian Royal Geological Institute.

Geological exploration with respect to ceramical and cementing raw materials was conducted during the above-mentioned periods rather unsystematically. An integral, extensive investigation of the problem was out of question, due to very restricted financial and technical possibilities, despite the best intentions of highly qualified specialists and leading personalities.