

Just how old are the oldest relics of stone architecture in Poland?

The Age of Stone

PRZEMYSŁAW URBAŃCZYK

Institute of Archeology and Ethnology, Warsaw
Polish Academy of Sciences
uprzemek@iaepan.edu.pl

Precise identification of the age of medieval stone buildings enables their construction to be correlated with important historical events. Using state-of-the-art dating methods, Polish researchers have solved the longstanding riddle of when the monumental constructions of medieval Poland were erected

The year 2007 saw the conclusion of a program funded by the Polish Ministry of Science and Higher Education aimed at clarifying the age of masonry constructions raised

during the early period of Polish statehood, i.e. between the 10th and 13th centuries. Of the nearly 200 known buildings with such chronology, our study selected more than 80 constructions considered to represent the pre-Romanesque or Early Romanesque period. They were largely overbuilt, preserved fragmentarily as ruins, or almost as debris.

The existing methods used by art historians to identify the age of such buildings are far from precise, giving dating discrepancies that may exceed 100 years. The Institute of Archeology and Ethnology, Polish Academy of Sciences, therefore set up an interdisciplinary team to explore radiocarbon analysis of wall mortar samples as a new dating method for stone constructions. 140 mortar samples carefully extracted from the best-preserved fragments of 40 buildings were searched for organic particles, which were subsequently analyzed at the Poznań Radiocarbon Laboratory using the Accelerated Mass Spectrometry



The choir gallery in the 12th-century rotunda of St. Prokop in Strzelno, the largest Romanesque structure in Poland built with a circular layout. Inset is a map of Poland showing locations chosen for the research project described here

Just how old are the oldest relics of stone architecture in Poland?

(AMS) method. The results obtained fully confirmed our intuitions that such a method would yield new insights into the dating of early Polish stone architecture.

Chronology conundrum

Information about the early period of Polish statehood is available from only a very limited set of credible historical sources. Medieval studies specialists are therefore repeatedly faced with a lack of accurate data for pinpointing the age of important sites. This becomes particularly acute in studies of early monumental architecture, i.e. the physical manifestations of the power of early political and Church leaders. Precise dating of such sites is crucial for identifying those rulers' creative legacy and their political, religious, and cultural contacts.

Only a handful of reliable written sources refer to the origins and earliest period of the Polish state. Archeology and art history make a valuable contribution to our understanding of those times, yet suffer from imprecise dating methods. Medieval studies specialists are therefore repeatedly faced with a lack of accurate data pinpointing the age of important sites. This is particularly problematic for the study of early monumental buildings, whose erection had high symbolic value as manifestations of the power of political and Church leaders. Their precise dating is key for identifying the creative legacy of particular early rulers and the scope of their political, ecclesiastical, and cultural connections.

Przemysław Urbańczyk



The St. Prokop rotunda in Strzelno

In southern Poland, a more precise chronology of preserved stone structures could help resolve the age-old controversies between Polish and Czech researchers, who place some early buildings (e.g. those discovered on Wawel hill in Kraków) into different political periods. Also unknown are the consecration dates for some still-standing great basilicas (Czerwińsk, Kruszwica, Opatów, Trzemeszno) and Cistercian monasteries (Jędrzejów, Koprzywnica, Sulejów, and Wąchock) from the 12th century.

Until recent years, no reliable stone architecture dating method was available offering the same kind of precision as is possible with wooden constructions, where dendrochronology can sometimes pinpoint a specific year. This disadvantage has partially disappeared thanks to progress made with radiocarbon analysis. A state-of-the-art spectrometer set up in Poznań has enabled researchers to focus on the tiny particles of charcoal frequently found in old mortars. The effectiveness of this AMS method was tested in 2002, when the ruins of a stone rotunda discovered in Łekno were dated to the early 11th century. This experiment showed that although masonry dating would still not be comparable to the precision of dendochronology, the margin of error can indeed be reduced to a quarter century or even a decade, making it possible to achieve substantial progress in our historical knowledge.

Such a positive outcome encouraged our group of scholars working with various aspects of early stone architecture to use the AMS method on a much broader scale. A project of internationally unprecedented scale was devised by three professors from Warsaw, the art historian Zygmunt Świechowski, the conservator Andrzej Koss, and the historian Przemysław Urbańczyk (the present author), securing a grant from the Polish Ministry of Science and Higher Education in 2005. We planned to finally bring resolution to various controversies about the earliest Polish rulers' raising of monumental stone structures. The extensive approach we chose aimed to date all known masonry remnants whose origins had been more or less precisely placed in the pre-Romanesque or Romanesque periods. They were largely overbuilt, preserved fragmentarily as ruins, or almost as debris. A lack of historical sources up to that point left researchers to rely upon imprecise classical analyses of spatial design, ornamental details, and masonry techniques as the only way to approach the chronology of the original buildings. To alter this frustrating situation, mortars that survived between the stones of every one of the 80 buildings/ruins had to be sampled and searched for charcoal particles ($> 1 \text{ mm}^3$) suitable for AMS dating.

Mortar under the spectrometer

It was at this rather technical stage that the project came up against serious problems. Most of the ancient walls had undergone reconstruction, reparation, or modern



J. Koss / Instytut Archeologii

Collecting original mortar samples from deep inside a rebuilt wall. Research team members Wiesław Procyk and Andrzej Koss (right)

conservation efforts, making identification of original fragments very difficult. Each case therefore required archival analysis, consultations with earlier investigators, and careful inspection of accessible surfaces. In several instances of excellent masonry technique (such as the Cistercian abbeys in Wąchock and Opatowo), where the spaces between stones are only 3 mm thick and filled with very well washed mortar, it proved necessary to repeat the sampling procedure in many places. In cases of fully renovated surfaces, the only way to obtain suitable samples was to mechanically drill holes reaching the untouched cores of thick constructions.

Such difficulties made the sampling fieldwork more time-consuming than originally anticipated. The separation of suitable quantities of charcoal also required much time. Ultimately, however, it was not the time expenditure but financial restrictions that prevented execution of the full research plan. As a result, only 140 samples were dated (of 320 taken). At the same time, we strove to analyze sets of several samples all from the same site. Earlier experience had shown that working with a larger number of samples helps eliminate the risk of error, when for example “old” wood (recycled from a previous use) may have been used to fire the lime in the mortar.

The mystery of Mieszko I

Despite these shortcomings, the results obtained confirmed the method’s usefulness without a doubt. Its precision has been corroborated, for instance, by control results obtained for the Cistercian abbey in Koprzywnica, where written sources indicate construction was initiated in 1207. Samples taken from its eastern wall produced a date of ca. 1210, which perfectly fits the multi-year construction period for such a structure.

Such a purposeful test of the method therefore allows us to draw reliable conclusions about other buildings with a much greater precision than before. Excellent examples are to be found in the three *palatia* discovered in the Greater Poland region (Ostrów Lednicki and Giecz) and eastern Lesser Poland region (Przemyśl). More than 100 years of debate have not succeeded in clearly ascribing them to one of the first three Polish rulers of the Piast dynasty, but now we can pinpoint their construction to the very late period of the rule of King Bolesław Chrobry (992–1025) with possible continuation by his son Mieszko II. Moreover, the dates obtained so far indicate that Poland’s first historical ruler, Mieszko I (?–992), devoted little, if any, energy to raising masonry buildings, a finding that goes against the grain of the commonly-held view.

These and other conclusions still need to be confirmed by further work, testing a greater number of samples to rule out possible errors. Continuation of this experiment, novel on a Europe-wide scale, has now been made possible by a grant awarded by the Polish Ministry of Science and Higher Education on 29 July 2008. ■

Further reading:

- Urbańczyk P. (2004). *Wczesnośredniowieczna architektura polska w kontekście archeologicznym* [Early Medieval Polish Architecture in the Archaeological Context]. [In:] Janiak T., Stryniak D. (Eds.). *Początki architektury monumentalnej w Polsce* [Beginnings of Monumental Architecture in Poland]. Gniezno: Muzeum Początków Państwa Polskiego.
- Wyrwa A. (2002). O możliwościach datowania zapraw metodą 14C w obiektach architektonicznych [On the Possibilities of Dating Mortars in Architectural Sites with the 14C Method]. *Wiekopolski Biuletyn Konserwatorski*, 1, 169–181.
- Wyrwa A. (2003). Datierung von Mörtel in architektonischen Objekten mittels 14C Methode. *Ethnographisch Archäologische Zeitschrift*, 44, 209–277.