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SZELETIAN FELSITIC PORPHYRY: NON-DESTRUCTIVE ANALYSIS OF A CLASSICAL PALAEOLITHIC RAW MATERIAL

Szeletian felsitic porphyry is one of the most famous raw materials used in the Hungarian Palaeolithic.[1] It was identified, under various names, by students of the Palaeolithic material of the Bükk region in the earliest petroarchaeological descriptions. Due to its high silica content and homogeneity it was erroneously identified as hornstone,[2] later as ash-grey chalcedony,[3] even in petrographical descriptions based on thin sections.[4] Interestingly, the geological source was placed on the plateau of the Avas, where solid 'flint' and 'chert' were reported.[5] With the advance of new analytical methods and their application to archaeology, Lajos Tóth, at that time general engineer of the Diósgyőr Steel Works, and László Vértes, curator of the Hungarian National Museum, performed a classical study to fingerprint this material.

Following the geological descriptions of Gábor Pantó,[6] they sampled sources of "quartzporphyry," high silica content epi-metamorphic volcanic rock outcrops from Károly Kaán spring in the vicinity of Miskolc. They compared these samples to archaeological material from nineteen sites of various ages and industries with the help of X-ray diffraction analysis (XRD) *(Fig. 1).* Because, in addition to silica, "quartz porphyry" is composed of feldspars, mica, and kaolinite, all of them with typical XRD signals,[7] they were able to separate their raw material samples from silex (mainly postvolcanic silices, chalcedony, and hornstone). They published their results in a classic study in Acta Archaeologica Hungarica: *Der Gebrauch des glasigen Quartzporphyrs im Paläolithikum des Bükk-Gebirges.*[8] This study can be considered the first Hungarian effort to apply high-tech analytical methods to the study of lithic materials and is an early application of an archaeometrical approach in archaeology altogether.

The drawback of the method is partly its destructive character (at least, on a routine way),[9] partly rooted in the applicability of the method. XRD is typically used in combination with other methods, mainly chemical analysis of the main components and thermal analyses for more precise identification of the mineral phases.

In the mid-1970s, during a general study of Hungarian lithic raw materials by V. T. Dobosi and L. Ravasz-Baranyai, some "quartz porphyry" finds were also examined. After thin sectioning, this kind of rock was identified as felsitic banded rhyolite (*felzites-sávos riolit*),[10] which raised the problem of differentiating between palaeovolcanic rocks from the Ladinian stage and the remains of Neogene volcanism.[11] However, unless they were heavily silicified, young rhyolites were seemingly not used for the production of Palaeolithic chipped stone implements.

In course of the raw material historical research program led by J. Fülöp at the Hungarian Geological Survey,[12] a systematic study of the most important Hungarian chipped stone raw materials was performed, including – among others – Szeletian felsitic porphyry. Petrographic thin sections, chemical analy-

[1] http://www.ace.hu/litot/186-024c.html; cf. BALOGH 1964, 422–425.

[2] HERMAN 1893, 9, 17–18; HERMAN 1906, 10, 8; KADIĆ 1907, 343.

[3] KADIĆ 1909, 527, 536; KADIĆ 1915, 212; KADIĆ–KORMOS 1911, 112.

[4] VENDL 1930, 468; VENDL 1935, 229–230.

[5] PAPP 1907, 117–118. The raw material outcrop at Miskolc-Avas is, in fact, limnic quartzite: see SIMÁN 1995.

[6] PANTÓ 1951, 139–143.

[7] SZTRÓKAY et al. 1971.

[8] VÉRTES–TÓTH 1963.

[9] Modern methods of XRD allow the analysis of intact objects: p.c. by T. WEISZBURG.

[10] DOBOSI 1978, 16.

[11] DOBOSI 1978, 18.

[12] FÜLÖP 1984.

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ses of the main components, OES and IR spectra as well as X-ray diffractograms were made of all the sample raw materials.[13] The analytical series comprised only geological samples and was destructive in all cases.

Distribution of Szeletian felsitic porphyry on archaeological sites in the light of previous research

Several studies have been devoted to the distribution of Szeletian felsitic porphyry, directly or as part of larger catalogues. We have tried to summarise the available evidence and arrange them in chronological order.

According to present knowledge, the earliest occurrence of this raw material is known from the fifth layer of Kálmán Lambrecht Cave. Based on palaeontological and anthracological data, the small *"Premousterian"* assemblage was dated to the Riss/Würm Interglacial.[14]

Szeletian felsitic porphyry was also found in both layers of Subalyuk Cave and in other Middle Palaeolithic cave sites in the Bükk Mountains (Lökvölgy Cave, Mexikóvölgy Cave). It should be stressed that it comprised more than 80% of the Middle Palaeolithic assemblages of Büdöspest Cave, lying in the proximity of the geological source, and other classic sites are also rich in Szeletian felsitic porphyry (Szeleta, Ottó Herman Cave, Puskaporos Rockshelter).[15] From the s.l. Mousterian limnic quartzite workshop site at Avas-Alsószentgyörgy only two tools were reported as made of felsitic porphyry.[16] The exact geological source of the "*kremenné porfýr*" found on the Late Mousterian site of Prievidza[17] (Upper Nitra valley, Slovakia), which could theoretically be identical with this material, is unknown.

Felsitic porphyry was quite popular in the Middle and Early Upper Palaeolithic bifacial industries (Bábonyian,[18] Eger-Kőporos and related industries,[19] Szeletian[20]). Cave sites with Middle Palaeolithic assemblages (Balla Cave, Háromkúti Cave, and Diósgyőr-Tapolca Cave[21]) may also be linked to this group. Tools made of Szeletian felsitic porphyry are also known from surface sites with bifacial industries of uncertain age both in Hungary (Korlát-Ravaszlyuk-tető, Kisgyőr-Bub-tető, Kistokaj-Kültelek,[22] Parád,[23] Szob, and Aszód[24]) and in Slovakia (Domica Cave,[25] Velký Gýreš,[26] and Velký Šariš[27]). It also appears in assemblages of other bifacial industries lying farther from the Bükk Mountains, e.g. on the eponym site of the Middle Palaeolithic *Jankovichian* industry,[28] and in the Slovakian (Moravány-Dlhá[29]), and Moravian Szeletian industries (Ondratice, Ořechov II[30]).

The real role of the raw material in the Middle Palaeolithic bifacial industries can not be estimated for the time being. M. Gábori mentioned in 1981, that "after working for long years 40 new collecting points have been recognised" from the hill tops in the vicinity of the Bükk Mountains.[31] In 1983, 70 tools from six sites were published in the first and, until the present, only study consecrated to the detailed examination of the Bábonyian artefacts themselves.[32] According to the laconic references made to the Sajóbábony-Méhész hill site, three paleosoils of different ages and with different archaeological cultures (*Bábonyian* and *Szeletian*) were found on the surface of the plateau.[33] These data suggest that a much more colourful picture can be drawn than was supposed earlier.

[13] BIRÓ–PÁLOSI 1986.
[14] VÉRTES 1953, 18.
[15] MESTER 1995.
[16] SIMÁN 1986, 273.
[17] BÁRTA 1979, 6, obr. 2:1
[18] ROZSNYÓI 1963; RINGER 1983; SIMÁN 1985, 14; DOBOSI 1990, 177–178.
[19] DOBOSI 1995, 51, Tab. 2.
[20] SIMÁN 1990, 192.
[21] For details see: VÉRTES–TÓTH 1963; VÉRTES 1965; HELLEBRANDT et al. 1976, 10–11. – for the recent interpretation of the find assemblages from the Balla Cave and Diósgyőr-Tapolca Cave see: RINGER 2001, 78–81.
[22] DOBOSI 1978; SIMÁN 1986, 272–273.
[23] BIRÓ 1984.
[24] *Cf. infra.*
[25] BÁRTA 1979, obr. 2:2.
[26] VÉRTES 1965, 227, Pl. XL.
[27] SIMÁN 1993, 249. – According to the Slovakian literature only leaf shaped points made of radiolarite are known from this site: KAMINSKÁ 1991, 10.
[28] BÁCSKAY–KORDOS 1984, 357, Fig. 6; GÁBORI-CSÁNK 1994, 105.
[29] BÁRTA 1979, 6–8.
[30] VALOCH 2000, 292.
[31] GÁBORI 1981, 100.
[32] RINGER 1983.
[33] RINGER et al. 2001, 75. – in respect of Miskolc-Kánás see: 78.