



NEW C-14 DATES FROM THE HUNGARIAN UPPER PALAEOLITHIC

Viola T. DOBOSI¹; Ede HERTELENDI²

D
O
S
S
I
E
R
S

The relative chronology of the events of the Late Pleistocene period in Hungary were reconstructed reliably several decades ago on the basis of the stratigraphy of loess profiles. Lately, the low number of radiometric chronological dates have been essentially increased due to the activity of the C-14 laboratory of the Nuclear Research Institute of the HAS (ATOMKI) in Debrecen. The extended range of measurements and increased possibilities contributed essentially to obtaining new absolute chronological data and we have a permanent possibility to determine the age of the new Upper Palaeolithic settlements.

When investigating past events the radiocarbon dating method is used widely and is usually considered the most reliable for determining ages over the past 50 000 years. Because of its heavy use it is important to identify its imperfections. Bard et al (1990, 405-410; 1993, 191-200) compare the ¹⁴C and ²³⁰Th/²³⁴U ages of Barbados corals and provide a much needed calibration of the radiocarbon timescale beyond the range of previous calibration. Comparison of the U-Th ages with ¹⁴C ages obtained on the Holocene samples shows that the U-Th ages are accurate because they accord with the dendrochronologically calibrated radiocarbon ages. Before 9000 yr BP the ¹⁴C ages are systematically younger than the U-Th ages, with a maximum difference of ~3 500 yr at 20 000 yr BP. The latest age calibration program of Stuiver and Reimer (1993, 215-230) provide calibrated radiocarbon ages for the period of 11 400 - 21 950 cal yr BP. The calibration is based on measured U-Th and ¹⁴C coral ages. Atmospheric radiocarbon ages are inferred by deducting a 400 yr reservoir ages from the coral ¹⁴C ages thus the character of the marine calibration curve changes

when moving beyond the Holocene; older samples are calibrated against a curve based on direct measurements, whereas younger samples are calibrated against a model-calculated curve. For atmospheric samples, the situation is the reverse; an inferred atmospheric curve is used for older samples (based on the assumption of a constant 400 yr reservoir age) and a detailed measured calibration curve for the last 11400 cal yr.

The geographical position of the Carpathian Basin, especially the vicinity of potential centres of the formation of cultures essentially influencing the ethno-archaeological image of the Central European Upper Palaeolithic renders the publication of these new data interesting for the international public. Among the sites mentioned in the text, Esztergom-Gyurgyalag has been published, the studies on the sites Mogyorósbánya and Jászfelsőszentgyörgy are in press and the elaboration of the Püspökhatvan material is in progress. The basic information on the sites is given in the following order: history of research, topography, stratigraphy, fauna, archaeology and C-14 dates. At the end of this paper, the Hungarian C-14 dates relevant to the so-called Gravettian period are given (second half of the Inter-Pleniglacial, Pleniglacial B or the period between the Paudorf phase and the end of the Würm glaciation, etc.).

ESZTERGOM-GYURGYALAG

History of research

In 1982, archaeological finds were reported from a weekend plot in the much favoured resort place district of Esztergom, found in course of digging cellar basement. On a field survey in 1983, the steeply descending loess margin was inspected and former collecting points of faunal remains checked, together with their possible relation to the Upper Palaeolithic site. In the spring and autumn of 1984, the available

1 Hungarian National Museum, Budapest P.O.Box 364, H-1370, Hungary

2 Institute of Nuclear Research of the Hungarian Academy of Sciences, Debrecen, P.O.Box 51, H-4001, Hungary

area (some 100 m² of settlement surface) was excavated. On about 1/4 of the plot there are standing buildings preventing excavations. The material of the site has been published in 1991.

Topography (Dobosi and Kövecses-Varga 1991, 233-255)

The main direction of the Danube arriving to the Central parts of the Carpathian Basin from the West is W-E oriented, which is forming at the same time the current Northern border-line of Hungary. After some 70 kms, following several changes in direction, i.e., 'bends', at the middle of the country it takes an almost exactly N-S direction attaining middle phase character. The winding phase between the two perpendicular main directions is called the 'Danube Bend'. 30 kms along the Danube Bend on both sides of the river (between Mogyorósbánya and Dömös) a range of Upper Palaeolithic settlements are known. The site in question is situated in the middle of the range, the NE of Esztergom, the Early Medieval capital of the country. The site is located at the foothill region of the Visegrád Mts. comprising Miocene andesite cones of 400 m average elevation, a.s.l., on the Northern loessy margin, 3-4 meters from the vertical margin of the current terraces. The site has one habitation layer, settlement features can be observed on an oval patch of 11 x 13 meters, with NW aspect.

Stratigraphy

The cultural layer is 90-130 cms deep under the recent cultivated surface, in a faded reddish brown embryonal soil layer transected by lime mycelia. The underlying and overlying layers of the buried soil layer were both slightly sandy loess.

Fauna

Vertebrates (Vörös 1991, 261-264): *Equus germanicus*, *Rangifer tarandus*, *Mammuthus primigenius*.

The Molluscan fauna is characterised by the dominance of *Punctum pygmaeum* and the relatively low ratio of *Succinea oblonga* compared to other Late Würm Molluscan faunas (Krolopp and Sümegi 1991, 17-23). This species list dated the settlement within the Late

Pleistocene loess sequences in accordance with the C-14 dates (Krolopp 1991, 257-259). The relative chronological position of the site can be determined for the Pilisszántó faunal phase - the younger interstadial of the Ságvár period - in respect of loess morphology, the Tápiósüly h1 embryonal soil horizon.

Archaeology

The type list is deficient, the tool kit is fairly asymmetrical. There were 376 typical tools and 53 'divers', cca. 600 flakes and chips, complete and split pebbles and boulders. Most numerous within the assemblage, there are burins and burin composite tools (56 pieces). There are only two scrapers. Cultural markers within the assemblage, we can find 26 Gravettian points and 2 Chatelperron-like blade points, as well as 2 pieces of 'burin sur truncature'. The assemblage is a classical blade industry with careful and minute finish. The most typical attribute is the 'blunted' working; apart from 134 blunted blade, typically one or both edges of other artefacts are blunted, even a part of the flakes has shorter or longer blunting retouch. The tool kit is exceptional among the Hungarian Upper Palaeolithic industries. Its unique character is emphasised by the raw material; on the basis of comparative trace element analyses, 94 % of the objects were made, most likely, of Volhynian flint (Varga 1991, 267-269). Its geological source is located outside the Carpathian Basin, some 600 kms far from the site. This smoky-gray, slightly translucent white patinated raw material became popular in far more recent archaeological periods. The other objects were made of hydroquartzites of the Garam (Hron) valley and other silices. The tool kit is coloured by some bone objects: fragments of a polished bone lath and a pierced mammoth-tibia. A large quantity of trinket-snails were found (90 pieces) that had been collected from Oligocene-Miocene marine sediments; most of them *Dentalia* (Magyar 1991, 265-266).

C-14 date:

Deb-1160. 16169 ± 200 BP (Hertelendi 1991, 270)

$\delta^{13}\text{C} = 24.5\text{‰}$ cal BC 17329 (17100) 16890

MOGYORÓSBÁNYA-UJFALUSI DOMBOK

History of research

The site was found in 1982, on the basis of surface finds. Excavations were performed here in 1984 (145 m²), in 1986 (104 m²) and in 1991 (60 m²). Two settlement surfaces were opened completely, one more is in progress and another concentration of finds indicates the fourth settlement patch on a surface of 150 x 150 meters. The elaboration of the material will be completed after the completion of the excavations. Publication on the interior structure of the settlement is in press for the periodical *Communications Arch. Hung.*

Topography

The geographical position of the settlement is considerably similar to that of the Esztergom-Gyurgyalag site. It is situated on the margin of the same Late Würmian loess terrace (II/B), along the river Danube, on the top of which the row of more or less excavated Upper Palaeolithic hunting camps are located. Mogyorósbánya is the westernmost member of the site series. Its topographical speciality was, that opposed to the rest of the series, the settlement is facing not to the river of the shallows but an 'interior route' of the loess terrace, on the margin of a terrace over an active stream valley. This valley leads to the Danube starting from a large vertical lime cliff containing important cave sites like the Jankovich cave that were inhabited during the Palaeolithic. The topography of Mogyorósbánya is worth special attention because we could observe 3, possibly contemporary settlement patches. The temporary habitation site of the small hunting communities and/or nuclear families could not be more sophisticated than a windscreen. There are no concrete evidences of contemporaneity among the three (possibly, four) units, but also there are no arguments against it.

Stratigraphy

The single cultural layer is situated under the present surface in varying depth: the relief of the late ice-age relief is different from the current one, the cultural layer is wedging out at the margin of the terrace. Typically, some 60-100 cms under the present surface, between sandy

and typical loess layers, respectively, we can find a humic loess denoting milder climate, containing the cultural layer.

Fauna

On the basis of observations during excavation, the fauna is dominated by *Rangifer*. In the Molluscan fauna, the dominance of cold-resistant, species preferring humidity is coupled by species of large ecological resistance (p.c. of E. Krolopp). The relative chronological position of the site can be fixed to the Pilisszántó fauna phase - Lower part of the Ságvár interstadial - Tápiósüly h2 embryonal soil.

Archaeology

The tool kit is dominated by traditional types but not in traditional finish. 14 % of the tools are scrapers, 24 % burins, which is fitting into the general picture. The true speciality of the Mogyorósbánya assemblage is the high ratio of pebble material used for the Upper Palaeolithic assemblage. The 'pebble-Gravettian' is typical of this period (Ságvár lower layer, Madaras, Mogyorósbánya). In case the "Ságvárien" complex outlined by Kozłowski and Kozłowski has real meaning, this would be most conveniently related to this technologically-chronologically separable group of sites (Kozłowski, J.K. - Kozłowski, S.K. 1979, Map 7.), i.e., the older archaeological sites of the Ságvár interstadial geomorphologic phase (Dobosi, V.T., Vörös I. 1987 table 8.). In the interpretation of V. Gábori-Csánk and A. Leroi-Gourhan, the Ságvár-Lascaux or Laugerie-Lascaux (Gábori-Csánk V., 1978. 3-11, Leroi-Gourhan A. 1980 95-100) interstadial can be divided into three more phases; just on the eponym site, Ságvár, two embryonal soil horizons and about 1 meter of sterile loess in between them were separated. These two interstadials were, according to our present knowledge, periods of two settlement waves of the gravettian culture: the older 'pebble gravettian' and the younger classical blade industries. Due to the distance from archaeological sites it is important to note the high ratio of obsidian and an amorphous piece of amber. The infrared spectrum of the latter was slightly different from any of the known (mainly Baltic) ambers (p.c. of M. Földvári), which is not surprising around the cold maximum of the Würm period. Unfortunately, the sources could not be located yet. So far, we

cannot even risk the hypothesis of the common origin of our amber piece with Russian Upper Palaeolithic finds, lacking supporting or excluding arguments (Soffer, O. 1985. p. 371).

C-14 dates:

Deb-1169. 19 930 ± 300 BP (Hertelendi 1991, 270)

$\delta^{13}\text{C} = -24.62\text{‰}$

JÁSZFELSŐSZENTGYÖRGY

History of research

The site was surveyed in 1988 among a range of sites of possibly Upper Palaeolithic material, discovered by local collectors.

In 1989, new field survey followed, in 1990 and 1992, excavations were carried out in the vicinity of Jászfelsőszen^űgyö^űrgy, at the sites Szunyogos and Székesd^űl^űő.

Topography

Opposed to general views on the Great Hungarian Plain, the marginal parts bordered by, from the West, by the Danube and, from the North, a partly volcanic, partly sedimentary mid-mountain range is not uniformly flat. Middle- and Late Pleistocene river beds, parabolic dunes exposed according to the ruling wind directions and tectonic steps between the mountains and the deep basin form characteristic surface morphological elements (Süme^űgi, in press.). The 5-7 m high elevations rising over the level of the flood-plain at 100-110 m a.s.l. were, on one hand, reliable settlement locations, on the other hand, they are still recognisable in spite of the smoothing effects of centuries of intensive agricultural use. On the top of these elevations built up of eolic or fluvial sediments, Upper Palaeolithic settlements could be successfully located at the margin of the Alföld. The hill of the Jászfelsőszen^űgyö^űrgy site is situated on the NW slopes of a dune bending over a still wet Late Pleistocene dead branch of the river Zagyva.

Stratigraphy

The meagre cultural layer of the single period site is located at 100-110 cm under the present surface, between sandy and typical loess layers.

Fauna

Vertebrates: Rangifer, Equus and Lagopus (egg-shell) (on the basis of excavation observations)

Archaeology

The tool kit is deficient, the find assemblage is poor with a small number of typical tools. The number of worked pieces is around 100 with 400 pieces of fabrication debris and chips. Most of the tools were scrapers and burins, a nicely worked Gravettian point was also found. The finish of the tools is sometimes casual, the technology is of typical Upper Palaeolithic character. Truncation is typically substituted by cutting one or both ends of the blade off resulting in a working edge similar to truncation. The bulk of the raw material comes from the outcrops located at the southern slopes of the neighbouring Mátra Mts. which is in the distance of one day's walk. From here, hydrothermal and limnic quartzites were collected, which is complemented by radiolarite and 2.5 % obsidian. There are some trinket-snails with unknown sources. The primary archaeological significance of the site lies in its geographical position.

C-14 dates:

Deb-1674. 18 500 ± 400 BP

$\delta^{13}\text{C} = -25.32\text{‰}$

PÜSPÖKHATVAN

History of research

Field surveys were performed here in 1985 and 1989, followed by excavations in 1990. The excavations are still in progress and they will be followed by the elaboration of the material.

Topography

The Northern part of Hungary to the East of the Danube is covered by the Northern Mid-Mountain range. The second member of this range, more like a range of hills than real mountains, is the Cserhát Mts. The Cserhát Mts. is of varied geological structure, which is transected by the Galga stream valley. The Galga is a tributary of the river Zagyva leading to the Tisza river. The valley is bordered by a range of hills of 300-350 m height a.s.l., sloping steeply on the Eastern side of the stream. The

NEW C-14 DATES FROM THE HUNGARIAN UPPER PALAEOLITHIC

margin of these hills is covered by hydroquartzite benches formed by postvolcanic activities cropping out the surface at several points. The site Püspökhatvan-Diós is based over such a hydroquartzite bench. Here, remains of an early Upper Palaeolithic workshop were excavated.

Fauna

No traces of fauna were found (Csongrádiné Balogh, É. - T. Dobosi, V. 1991 14)

archaeology

C-14 dates:

Deb-1901. 27 700 ± 300 BP
 $\delta^{13}\text{C} = -23.82\%$

C-14 data are indispensable for the chronological-cultural classification of the sometimes poor and typologically specific Hungarian Upper Palaeolithic. Therefore we are determined to continue our collaboration within the frames of possibilities.

REFERENCES

- BARD E., HAMELIN B., FAIRBANKS R. G. and ZINDLER A., 1990,
 Calibration of the ^{14}C timescale over the past 30000 years using mass spectrometric U-Th ages from Barbados corals. *Nature* Vol. 345 p. 405-410.
- BARD E., ARNOLD M., FAIRBANKS R. G. and HAMELIN B., 1993,
 ^{230}Th - ^{234}U and ^{14}C ages obtained by mass spectrometry on corals. *Radiocarbon* Vol. 35, No. 1 p. 191-200.
- CSONGRÁDINÉ BALOGH, É., DOBOSI V.T., 1991,
 Püspökhatvan-Májoka. *Régészeti Füzetek* Ser I. No. 43. p. 14.
- DOBOSI V.T., VÖRÖS I., 1987,
 The Pilisszántó I. Rock-shelter. Revision. *Folia Archaeologica* XXXVIII. p.58.
- DOBOSI V.T., KÖVECSES-VARGA E., 1991,
 Upper Palaeolithic Site at Esztergom-Gyurgyalag. *Acta Archaeologica ASH.* 43. p. 233-255.
- GÁBORI-CSÁNK V., 1970,
 C 14 dates of the Hungarian Paleolithic. *Acta Archaeologica ASH.* 22. p. 3-11.
- GÁBORI-CSÁNK V., 1978,
 Une oscillation climatique a la fin du Würm en Hongrie. *Acta Archaeologica ASH.* 30. p. 3-11.
- HERTELENDI E., 1991,
 Radiocarbon dating of a wood sample from an excavation near Esztergom-Gyurgyalag. *Acta Archaeologica ASH.* 43. p. 270.
- KOZŁOWSKI J.K., KOZŁOWSKI S.K., 1979,
 Upper Palaeolithic and Mesolithic in Europe. Prace komisji archeologicznej Nr 18. Wroclaw, Warszawa, Krakow, Gdansk
- KROLOPP E., 1977,
 Absolute chronological data of the Quaternary sediment in Hungary. *Földrajzi Közlemények* 25. p. 231-233.
- KROLOPP E., 1991,
 Malacological analysis of the loess from the Archaeological Site at Esztergom-Gyurgyalag. *Acta Archaeologica ASH.* 43. p. 257-259.
- KROLOPP E., SÜMEGI P., 1991,
 Dominance level of the species *Punctum pygmaeum* a biostratigraphical and paleoecological key level for the Hungarian loess sediments of the Upper Würm. *Scosiana* 19. p. 17-23.
- LEROI-GOURHAN A., 1980,
 Interstades würmiens: Laugerie et Lascaux. *Bulletin de l'Association française por l'Etude du Quaternaire.* 3. p. 95-100.

MAGYAR I., 1991,
Palaeolithic trinkets in Esztergom-
Gyurgyalag. *Acta Archaeologica ASH.* 43. p.
265-266.

STUIVER M., REIMER P. J., 1993,
Extended ¹⁴C data base and revised CALIB 3.0
¹⁴C age calibration program. *Radiocarbon* Vol.
35, No. 1 p. 215-230.

SOFFER O., 1985,
The Upper Paleolithic of the Central Russian
Plain. Academic Press.

SÜMEGI P., in press,
Sedimentological and lithostratigraphical
analysis of Upper Paleolithic Site
Jászfelsőszentgyörgy Szűnyogos. *Tisicum*.

VARGA I., 1991,
Mineralogical analysis of the lithic material
from the Palaeolithic Site of Esztergom-
Gyurgyalag. *Acta Archaeologica ASH.* 43. p.
267-269.

VÖRÖS I., 1991,
Large mammal remains from the Upper
Palaeolithic site at Esztergom-Gyurgyalag.
Acta Archaeologica ASH. 43. 261-263. p.

REFERENCES

BARAD E., HAMELÉNYI E., FAIRBANKS R. G. and
KINDLER A., 1990
Calibration of the ¹⁴C scale over the last
30000 years using tree specimens U-13
ages from Barbados ovals. *Nature* Vol. 343, p.
402-410.

BARAD E., FAIRBANKS R. G. and
HAMELÉNYI E., 1995
¹⁴C and ¹³C ages obtained by mass
spectrometry on corals. *Radiocarbon* Vol. 37,
No. 1 p. 191-200.

CSONÉADINÉ BALOGH E., DOBOSI V.T.
1991
Lithological and stratigraphical study of
the Upper Paleolithic site at Esztergom-Gyurgyalag.
Acta Archaeologica ASH. 43. p. 265-266.

DOBOSI V.T. and VÖRÖS I., 1991
The Palaeolithic of Esztergom-Gyurgyalag.
Acta Archaeologica ASH. 43. p. 267-269.

NEW C-14 DATES FROM THE HUNGARIAN UPPER PALAEOLITHIC

C¹⁴ DATES OF GRAVETTIAN PERIOD

Amplification of Gábori-Csánk's /GÁBORI-CSÁNK 1970, table 1/ and Krolopp's /KROLOPP 1977, table 1/

		SEDIMENT	LAB. CODE	BP	CAL. BC
Szekszárd-Palánk	UP	fluvial terrace	Hv 408	10 350 ± 500	10826 (10280) 9060
Almásfüzitő		fluvial terrace	Hv 6958	11 850 ± 110	12010 (11860) 11726
Dunaföldvár	UP	loess	Hv 1657	12 110 ± 315	12601 (12180) 11796
Zalaegerszeg	UP	loess	Hv 1816	12 125 ± 300	12601 (12200) 11831
Tápiósüly		loess	Hv 1615	16 750 ± 400	18093 (17540) 17074
Arka-Upper	UP	loam	GrN 4218	13 230 ± 85	13972 (13840) 13698
ESZTERGOM- GYURGYALAG	UP	loess	Deb 1160	16 160 ± 200	17329 (17100) 16890
Arka-Lower	UP	loam	GrN 4038	17 050 ± 350	18749 (18230) 17725
Ságvár-Upper	UP	loess	GrN 1959	17 760 ± 350	19684 (19220) 18738
Madaras	UP	loess	Hv 1619	18 805 ± 405	
JÁSZFELSŐSZENT GYÖRGY	UP	loess	Deb 1674	18 500 ± 400	
Arka	UP	loam	A 518	18 700 ± 190	
Ságvár-Lower	UP	loess	GrN 1783	18 900 ± 100	
MOGYORÓSBÁNYA	UP	loess	Deb 1169	19 930 ± 300	
Tokaj		loess	Hv 1775	20 350 ± 470	
Balatonszabadi		loess		21 725 ± 660	
Dunaszekcső		loess	Hv 4189	21 740 ± 320	
Veszprém		loess	Hv 1777	26 350 ± 311	
PÜSPÖKHATVAN	UP	loess-loam	Deb 1901	27 700 ± 300	
Bodrogkeresztúr	UP	loess-loam	GxO 195	28 700 ± 3000	
Mende		loess	A 3430	27 200 ± 1400	
Mende		loess	Mo 422	29 800 ± 600	