A Dufour bladelet from Potočka zjalka (Slovenia)

Boštjan ODAR

Abstract
At one of the most important Aurignacian sites in Europe, the cave of Potočka zjalka, part of a bladelet of the Dufour type was recently discovered. It was lying on the surface of the heap of sediments excavated by Srečko Brodar in the years 1928–1929 in the rear of the cave. Potočka zjalka is known primarily for the 125 bone points and 11 other bone tools found there in a perfect state of preservation and bearing the age of approximately 30,000 years. It is interesting to note that almost contemporaneously with the appearance and use of the bone points from Potočka zjalka, the nearby cave site of Vindija in Croatia was used by the Neanderthals, the bone remains of which were uncovered in the youngest Mousterian G1 complex of Vindija together with bone points.

Keywords: Slovenia, Potočka zjalka – Aurignacian, Dufour bladelet, bone points; Croatia, Vindija – Neanderthals

I had obtained permission for the inspection from Darja Pirkmajer, director of the Regional Museum Celje, since this institution is the owner of the cave. Thereupon I set off, in the company of Ivan Turk, to Potočka zjalka on 24th November, 2004 with the aim of taking a sample of the excavated sediment from the rear of the cave. I brought 8 litres of the sediment back from the cave, which I washed through a sieve at home. The one-square-millimetre sieve retained numerous small fragments of bones and rare fragments of teeth, but to my great surprise also a partially preserved small bladelet made of black chert. The size of the bladelet, particularly its small width, the clearly recognizable lateral retouch and, most

1 S. and M. Brodar 1983.
2 Pacher 2001; Turk 2007b; all dates that appear in the text were obtained by using the 14C method except in the case of Divje babe I, where the AMS - 14C as well as the ESR methods were used on the enamel of cave bear teeth; the 14C dates must be calibrated, while the ESR and Th/U dates are assumed to be calendar years.

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Izvleček


Ključne besede: Slovenia, Potočka zjalka – aurignacien, klinica Dufour, koščene konic; Hrvaška, Vindija – neandertalci

Within the framework of my doctoral thesis on the subject of bone points from Potočka zjalka, I wished to verify whether the excavated sediments that S. Brodar had removed to the rear of the cave,1 contained any bone by-products made during the production process. This would conclusively prove that the bone points were being produced inside or in front of the cave rather than being brought from elsewhere. Six of the bone points have recently been dated with the 14C method that showed them to be around 30,000 years old.2

I would like to thank Ivan Turk for his professional guidance during the visit to Potočka zjalka and Darja Pirkmajer for the permission to visit.

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1  S. and M. Brodar 1983.
2  Pacher 2001; Turk 2007b; all dates that appear in the text were obtained by using the 14C method except in the case of Divje babe I, where the AMS - 14C as well as the ESR methods were used on the enamel of cave bear teeth; the 14C dates must be calibrated, while the ESR and Th/U dates are assumed to be calendar years.
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importantly, the twisted curvature of the bladelet are features convincing enough for the determination of the bladelet as that of the Dufour type (fig. 1; fig. 2).\textsuperscript{4} As for parallels, the closest site on the southern side of the Alps that revealed Dufour bladelets and is temporally comparable to Potočka zijalka, is the Italian cave site of Fumane.\textsuperscript{5} The surprise of finding a Dufour bladelet was all the greater due to the fact that S. Brodar failed to find any stone tools or flakes at the rear part of the cave. At this point it has to be mentioned that the sediments from Potočka zijalka were neither washed nor sieved, neither at the time of the excavations by S. Brodar nor during the new excavations in 1997–2000.\textsuperscript{6} Simona Petru did not identify any traces of use wear on the Dufour bladelet from Potočka zijalka.\textsuperscript{7}

The bladelet supplements the small number of small stone tools and flakes from the entrance part of the cave.\textsuperscript{8} Since it was collected from the top of the excavated heap of sediment, the principle of inverse stratigraphy indicates that it most probably originates from the earlier cultural layer at the rear of the cave according to S. Brodar, that is Layer 5. The formation of Layer 5 at the rear of the cave is equated by Ivan Turk to the formation of Layer 5 in the front part of the cave on the basis of the development of the bone points through a longer period of time.\textsuperscript{9}

D. de Sonneville-Bordes showed, in her synthesis on the Upper Palaeolithic of the Périgord, that Dufour bladelets are rarely present in the Aurignacian assemblages.\textsuperscript{10} The rare occurrence of Dufour bladelets is in a great measure a reflection of the old manner of excavation without wet-sieving of the excavated sediments. Having said that, modern excavations in Périgord also showed a varying appearance of these bladelets from site to site.\textsuperscript{11}

The rarity of Dufour bladelets can be observed also at the site of Abri Pataud. Only one of the eight Aurignacian layers revealed a greater number of Dufour bladelets. Layer 8, dated to 32 $\text{ky BP}$, revealed 44 bladelets (= 10.8 % of all stone tools).\textsuperscript{12} As opposed to other layers, it contained also a greater number of other types of retouched bladelets. A similar pattern can be seen in the stone tools assemblage from the site of La Ferrassie, where Layer Els, dated to 28 $\text{ky BP}$, revealed 11 Dufour bladelets (= 9.7 %). Besides the Dufour type, there were several other retouched bladelets as well as backed bladelets.\textsuperscript{13}

The two examples cited above show that Dufour bladelets were made with a special intention and appear in a limited number and on certain sites only. The multivariate analysis by F. Djindjian showed that the levels with a greater number of Dufour bladelets represent a special phase of the Aurignacian.\textsuperscript{14}

The question of the manner in which the Dufour bladelets were used remains open. On that subject, J. P. Rigaud is of the opinion that they formed parts of composite bone and antler points and were used in hunting. He bases his opinion on the trace analyses of these bladelets conducted by H. Plisson for the site of Le Flagollet. J. P. Rigaud also noticed a common appearance of Dufour bladelets and carinated scrapers, which led him to suppose that the latter actually represent core remains in the production of the Dufour bladelets.\textsuperscript{15} This supposition was convincingly confirmed by a practical experiment and reassembling of the chipped-off Dufour bladelets from the site of Abri Pataud by L. Chiotti.\textsuperscript{16}

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\textsuperscript{4} Demars, Laurent 1989; Lucas 2006; the as yet uninventoryed bladelet is kept at the Regional Museum Celje; I would like to thank Matija Turk for drawing the bladelet.


\textsuperscript{6} Turk 2007a, 328–329; Turk 2007b.

\textsuperscript{7} I would like to thank Simona Petru for inspecting the bladelet.

\textsuperscript{8} S. and M. Brodar 1983, pl. 2: 36, 42, 47, 49; Pohar 2004, fig. 2: PZ: 227, fig. 4: PZ 681.

\textsuperscript{9} Turk 2002; Turk 2005; Turk 2007b.

\textsuperscript{10} Sonneville-Bordes 1960.

\textsuperscript{11} Sonneville-Bordes 1982.

\textsuperscript{12} Brooks 1995.

\textsuperscript{13} Delporte 1984.

\textsuperscript{14} Djindjian 1993.

\textsuperscript{15} Rigaud 1983.

\textsuperscript{16} Chiotti 2000.
The number of bladelets on other sites varies greatly. The site of Le Trou Magrite (Belgian Wal- lonia), for example, revealed no Dufour bladelets in the Aurignacian layers dated to 40–30 $k_y$ BP.\textsuperscript{17} On the other hand, the bladelets in question form an important part of some of the earliest Aurigna- cian stone tool sets on the sites in Provence and northern Italy.\textsuperscript{18}

The cave of Morín (Cantabria) was the site of modern excavations that revealed Dufour blade- let in greater numbers only in Layers 9, 8a, 8b and 6. Layer 8a revealed 17 (\approx 15.1 \%) and Layer 8b 25 bladelets (\approx 21.1 \%). The latter contained also other retouched bladelets. Layers 8a and 7 are dated to 28–29 $k_y$ BP. Layers 9 and 8b are ascribed to the "Archaic Aurignacian", Layers 7 and 6 to the "Typical Aurignacian" and Layer 5 to the "Developed Aurignacian". Layers 7 and 5 contain few Dufour or other bladelets. A similar picture as at the Morin cave can be observed at the rock shelter of La Viña (Asturias). The promptly published excavation reports of the rock shelter speak of several Dufour bladelets in Layers XI, XIII and XIII below, while they reveal a greater number of the same bladelets in Layer XII. All the above-mentioned layers also contained a larger number of carinated scrapers or cores.\textsuperscript{19} Layer XIII below is dated to 36.5 $k_y$ BP, while Layer XIII, which contained also split-based bone points, to 32 $k_y$ BP.\textsuperscript{20} The Aurignacian layers at the site of El Pendo (Cantabria), on the other hand, revealed neither Dufour nor any other bladelets, although the excavations were conducted according to modern standards.\textsuperscript{21}

The appearance of bone points and tiny retouched bladelets in Europe was, in the past, tied by numer- ous authors to the arrival of Cro-Magnon man in Europe,\textsuperscript{22} while the culture was named after the well-known site of Aurignac. Due to new discov- eries and particularly due to the modern dating methods, the old definition of the Aurignacian is no longer appropriate.\textsuperscript{23}

The bearer of the Aurignacian Culture was be- lieved, until the mid-1990s, to be the Cro-Magnon exclusively. The last decade, however, has brought a change in this belief, also due to the surprising finds from the Slovene cave site of Divje babe I, where the remains of bone points were uncovered together with a flute of the Mousterian age (116–40 ka).\textsuperscript{24} An important site in that respect is the Croatian cave site of Vindija. It revealed numerous bone remains of the Neanderthals in the

\begin{itemize}
  \item \textsuperscript{17} Otte, Straus 1995.
  \item \textsuperscript{18} Bazile 1983; Broglio 1993.
  \item \textsuperscript{19} Fortea 1995.
  \item \textsuperscript{20} Fortea 1996.
  \item \textsuperscript{21} Bernaldo de Quiros 1982.
  \item \textsuperscript{22} Bayer 1929.
  \item \textsuperscript{23} Bar-Yosef, Zilhão 2006.
  \item \textsuperscript{24} Turk (ed.) 1997; Turk 2001; Turk 2007a; Horusitzky 2007.
\end{itemize}
Mousterian levels of Complex G. The remains of the Neanderthal from Complex G1 have recently been dated to 32–33 ky BP. This complex also contained bone points, while the stone tools show Szeletian characteristics. A particularity of this complex is the os penis of a cave bear with an incision in the form of a coil, such as is known on the bone points from Potočka zijalka. Complex G1 is topped by layers with bone points spanning from the Early Aurignacian to the Final Gravettian. The successive Late Palaeolithic layers with bone points spanning from the Early Aurignacian to the Final Gravettian are important in explaining the gradual development of the bone points. Also important and telling is the age of the Neanderthal remains, since it shows them to have lived almost contemporaneously with the producers and users of the bone points from Potočka zijalka. Bone remains that were positively ascribed to the Cro-Magnon, once thought the bearer of the Aurignacian Culture, and are older than 30,000 years, have, on the other hand, so far been uncovered only at the Romanian cave site of Peştera cu Oase (34.36 ky BP) and at Mladeč in the Czech Republic (34–35 ky BP).

The Aurignacian is today used to mark the period from 30,000 to 40,000 years ago. The earliest Aurignacian layers in the southern parts of Europe reveal nosed and carinated scrapers on large flakes. The latter were used to chip off tiny twistedly curved Dufour bladelets. Besides the latter, there is also a large number of other tiny retouched bladelets. Also appearing in greater numbers are bone points and other products made of bone, antler and mammoth’s tusks. However, new research proves that the processing of bones and appearance of bone points occurred much earlier in some parts of Europe. O. Bar-Yosef sees the origin of the Aurignacian proper in western Europe, whence it supposedly rapidly spread towards the east. J. Zilhão and F. D’Errico, on the other hand, set the appearance of the Aurignacian at the time of 36,500 years ago.

Tiny bladelets signify a novelty in the production of stone tools. It is the first attempt at microlithization in Upper Palaeolithic, such as it is known from much later archaeological periods. Numerous authors tie this change to the first attempt at producing composite tools of different materials. The tiny bladelets were thereby supposedly set into wooden and bone mounts, used as larger blades for every-day purposes, such as the production of various objects, food preparation and hunting.

25 Karavanić et al. 2006.
29 Kuhn, Elston 2002; Bar-Yosef 2006; Bon 2006; Lucas 2006.
31 Bar-Yosef 2006.
of the tiny bladelets from the earliest Aurignacian levels in the cave of Fumane show edges that run together into a point.32 Similar points from much later formed parts of arrow points.33 The Aurignacian microlithization is tied by some authors to the change in nutritional habits. S. L. Kuhn tied the appearance of Aurignacian microlithization in Italy to the much stronger presence of bird bone remains in the Aurignacian layers as opposed to that observed in the Mousterian layers. Ground birds such as partridges had become an important link in the food chain of the Early Aurignacian.34 Kuhn also writes that the Stone Age communities used bow and arrows during the warm period of the Holocene primarily for hunting animals that were evasive and difficult to catch, such as hares or fish.

It is interesting to note that all experts dealing in any way with the Aurignacian mention the microlithization, but not microossazzation (the parallel process of making small objects of bone during that period).35 There are, in fact, numerous small bone points known from Potočka zijalka in Slovenia as well as from the cave of Istállóső in Hungary. These could only have been used as arrow points of bowmen (fig. 3).36

The Dufour bladelet from Potočka zijalka confirms my supposition that the logic of decreasing the size of functional objects involved the entire world of objects of the Aurignacian communities. Potočka zijalka revealed large bone points and large stone tools and flakes as well as small bone points and some stone micro-tools or their flakes, whereby the middle sizes of bone points are the consequence of reparations of large points after they had been broken during use.37 The bone objects of small size from Potočka zijalka include also the earliest needle known so far in the world.38

Translation: Andreja Maver
Boštjan ODAR

Études et Recherches Archéologiques de l’Université de Liège 76, 329–344.
- Arheološki vestnik 58, 9–27.
ODAR, B. 2006, Sedimenta v zadnjem delu jame. Ker je lastnik jame Pokrajinski Potočko zijalko z namenom, da vzamem vzorec prekopanega zob jamskega medveda; s 14C metodo dobimo relativne starosti, razen v primeru Divjih bab I, kjer je bila p. s. = tisoč let pred sedanjostjo. Vse datacije v besedilu so bile radiometrično metodo 14C. Stare so okoli 30 t. l. 2
od drugod. Šest koščenih konic je bilo nedavno datiranih z poleg AMS 14C metode uporabljena še ESR metoda na sklenini zadnjem delu jame,1 ohranili kostni ostanki, ki bi lahko nastali prekopanih sedimentih, ki ih je Srečko Brodar dal odložiti v sem ga doma spral z vodo.3 Darje Pirkmajer. V dolino sem odnesel 8 litrov sedimenta, ki muzej Celje, sem pridobil dovoljenje od direktorice muzeja

Klinica Dufour iz Potočke z jalke

V sklopu doktorata, v katerem se ukvarjam s koščenimi konicami iz Potočke z jalke, sem želel preveriti, ali so se v prekopanih sedimentih, ki jih je Srečko Brodar dal odloditi v zadnjem delu jame, ob izdelavi konic. S tem bi neizpodbitelno dokazal, da so koščene konice ljudje izdelovali v jami ali pred njo in da jih niso prinesli od drugod. Šest koščenih konic je bilo nedavno datiranih z radiometrično metodo 14C. Stare so okoli 30 t. l. 2 24. novembra 2004 sva se z Ivanom Turkom odpravila v Potočko z jalko z namenom, da vzamem vzorec prekopanega sedimenta v zadnjem delu jame. Ker je lastnik jame Pokrajinski muzej Celje, sem pridobil dovoljenje od direktorice muzeja Darje Pirkmajer. V dolino sem odnesel 8 litrov sedimenta, ki sem ga doma spral z vodo.3 Ob številnih drobcih kosti in redkih zob je na situ s prepotnostjo enega kvadratnega milimetra na veliko presenečenje.

1 S. Brodar 1983.2 Pacher 2001; Turk 2007b. Okrajšava t. l. = tisoč let; t. l. p. s. = tisoč let pred sedanjostjo. Vse datacije v besedilu so bile narejene s 14C metodo, razen v primeru Divjih bab I, kjer je bila poleg AMS 14C metodo uporabljena še ESR metoda na sklenini zob jamskega medveda; s 14C metodo dobimo relativne starosti, s metodo ESR in Th/U pa so določena knezdarska leta.

3 Ivanu Turku se zahvaljujem za strokovno vodstvo ob obisku Potočke z jalke in Darji Pirkmajer za dovoljenje.

4 Demars, Laurent 1989; Lucas 2006; klinico, ki se ni inventarizirana, hrani Pokrajinski muzej Celje; Matiji Turku se zahvaljujem za izris klinice.


Klinica dopolnjuje majhno število drobnih kamenih orodij in odbitkov iz vhodnega dela jame.8 Ker je bila klinica pobrahna z vrha odloženega stožca, po načelu obrnjene stratigrafije najverjetneje izhaja iz starejše kulturne plasti v zadnjem delu jame po S. Brodarju, torej iz plasti 5. Turk nastanek plasti 5 v zadnjem delu jame enači z nastankom plasti 5 v sprednjem delu jame po Zadnje datacije plasti XIII spodaj je 36,5 t. l. Plasti 8a in 7 je 28–29 t. l. Plasti 9 in 8b sta prikazani "arhaičnemu aurignacieni", plasti 7 in 6 "tipičnemu aurignacienu" in plasti 5 "razvitetemu aurignacienu". Plasti 7 in 8 in vsebujejo majhno število klinic Dufour kot tudi ostalih klinic. Podobno kot pri jami Morin je pri spidomolu La Véa (Asturija). Sprotina poročila o izkopavanjih govorijo o nekaj klinicah Dufour v plasti XII, XIII in XIII spodaj, na večjem številu teh klinic pa v plasti XII. V vseh omenjenih plasteh je večja številnost klinic, ki vpliva na zgodovinsko in kulturno interpretacijo, saj so živeli skoraj sočasno z izdelovalci in uporabniki.9

Vprašanje je, zakaj so se klinice Dufour uporabljale. J. P. Rigaud meni, da so bile deli sestavljenih konic iz kosti in rogovja predstavljajo nivoji z večjim številom klinic Dufour posebej v enih najdiščih. V pravljini multivariantni raziskavi F. Djindijana so bile odkritih 11 klinic Dufour (= 9,7 %). Še vedno je bilo število Dufour klinic v tipičnih aurignacienskih zbirkah.10 Redkost klinic v Evropi pokazala na redko prisotnost klinic Dufour v Evropo,22 kulturo pa so poimenovali po prepoznavnem francoskem najdišču Aurignac. Zaradi novih odkritij in predvsem modernih načinov datiranja tako opredeljevanje aurignacien je v Evropo,23 kar je potrebovalo za prevozna standardizacije. Posebnost iz tega kompleksa predstavljata o specifični oblikah karcasomek, poimenovali so po izdelovalci in uporabniki.19

V jamskem najdišču Morín (Kantabrija), kjer so bile odkriti številni drobnih retuširanih klinic, je bilo večja številnost klinic, ki se nahajajo v eni od osmih aurignacienskih plasti. V plasti 8a je bilo odkrito večje število klinic Dufour kot v plasti 8b.9

13  Kuhn, Elston 2002; Bar-Yosef 2006; Bon 2006; Lucas 2006.
14  Fortea 1995.
15  Fortea 1996.
16  Bernaldo de Quirós 1982.
17  Bernaldo de Quirós 1982.
18  Bernaldo de Quirós 1982.
19  Bernaldo de Quirós 1982.
20  Bernaldo de Quirós 1982.
21  Bernaldo de Quirós 1982.
po Evropi že mnogo prej. 30 O. Bar-Yosef vidi izvor pravega aurignacienca v zahodni Evropi, od koder naj bi se hitro razširil proti vzhodu. J. Zilhão in F. D’Errico pa začetek aurignaciena postavita v čas izpred 36,5 t. 31
Drobne klinice pomenijo novost med kamenimi orodji. Gre za prvi poskus mikrolitizacije v mlajšem paleolitiku, kot jo poznamo iz mnogo kasnejših arheoloških obdobij. Številni avtorji to spremembo povezujejo s prvimis poskusii izdelave sestavljenih orodij iz različnih snovi. Tako naj bi bile drobne klinice, vstavljenih v lesena in koščena ogrodja, uporabne kot večja rezila pri vsakdanjih opravilih, kot so na primer izdelava različnih predmetov, priprava hrane in lov. Nekaterim drobnim klinicam iz najzgodnejših aurignacienskih plasti v jami Fumane se robovi iztečejo v konico. 32 Mnogo kasneje so podobne konice sestavni del puščičnih osti. 33 Aurignaciensko mikrolitizacijo nekateri strokovnjaki povezujejo s spremembo prehranjevalnih navad. S. L. Kuhn je pojav aurignacienske mikrolitizacije v Italiji povezal z mnogo večjo prisotnostjo kostnih ostankov perjadi v aurignacienskih plasteh kot v moustérienskih. Pomemben prehranjevalni člen v zgodnjem aurignacienu so postale talne ptice, kot je na primer jerebica. 34 V nadaljevanju Kuhn omeni, da so kamendobne skupnosti v holocenski otoplitvi uporabljale loke in puščice predvsem za lov izmuzljivih in težko uveljavljivih živali, kot so zajci ali ribe.

Zanimivo je, da vsi strokovnjaki, ki se tako ali drugače ukvarjajo z aurignacienom, omenjajo mikrolitizacijo, ne pa mikroosazacije v aurignaciuen, ali lepše napisano: izdelovanja majhnih koščenih izdelkov. 35 Iz Potočke zjala v Sloveniji in iz jame Istállóskő na Madžarskem poznamo številne majhne koščene konice, ki so se lahko uporabljale le kot lokostrelske puščične osti (sl. 3). 36
Klinica Dufour iz Potočke zjala potrjuje mojo domnevo, da je logika pomanjševanja uporabnih predmetov zajela vses predmetni svet aurignacienskih skupnosti. V Potočki zjali imamo velike koščene konice in velika kamena orodja v kame- ne odbitke kot tudi majhne koščene konice in nekaj kamenih mikroorodij ali njihovih odlomkov. Vmesne velikosti koščenih konic so posledica popravljanja velikih konic potem, ko so se pri uporabi zlomile. 37 Med koščene predmete majhne velikosti iz Potočke zjale smemo šteti tudi do sedaj najstarejšo znano šivanko na svetu. 38

31 Bar-Yosef 2006.
32 Kuhn 2002, 85, sl. 6.2.
33 Fischer 1985.
34 Kuhn 2002, 89.
36 Odar 2006.
37 Turk 2002; Odar 2006.
38 Odar 2006, sl. 8.